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Assessing the spatial and temporal differences in the impacts of factor allocation and urbanization on urban–rural income disparity in China, 2004–2010

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A B S T R A C T

Drawing on a cross-provincial panel dataset from 2004 to 2010, and grounded in urban-bias theory, this study analyzes the extent to which China's urban–rural income disparity is determined by factor allocation and urbanization. It empirically tests whether such associations vary between provinces and change over time by considering the presence of spatial dependence and heterogeneity. The results of panel data regression first indicate that differences in factor allocation are major contributors to the enlargement of urban–rural income disparity, and urbanization narrows this income gap. Nonetheless, spatial and temporal differences in such impacts are observed using a geographically weighted regression technique. Educational resource allocation only exerts an effect in many eastern and central provinces, with its influence increasing during the period, whereas the impact of capital allocation is obvious in most western provinces and remains relatively stable. In addition, government spending allocation is increasingly effective in most central and western provinces, yet the influence of financial resource allocation is weakening. Finally, urbanization has an enduring impact on all provinces. The policy implications of these findings are discussed.

Introduction

China tops the world in terms of urban–rural income disparity (UNDP, 2005). In recent decades, China's urban–rural income gap has widened amid the most rapid economic growth and urbanization the world has ever seen. For instance, the country's urban–rural residents' income ratio surged from 2.57:1 in 1978 to 3.13:1 in 2011, according to the State Statistics Bureau. Furthermore, its Gini coefficient, another index measuring income disparity, was 0.31 in 1978 and 0.55 in 2011 (UN, 2012). Although great emphasis has been placed upon the relationship between urbanization and urban–rural income disparity (e.g., Barclay & Solomane, 1996; Henderson, 2003; Lu & Chen, 2004; Wang, 2011), very few studies have attempted to examine the impact of urban–rural differences in factor allocation on this inequality. However, based on urban-bias theory, which is discussed in the next section, rural areas in most developing countries suffer discrimination and inequality in factor allocation due to some institutional obstacles. In China, the general nature of urban–rural dualism may be part of the explanation, but more important is the unprivileged position of rural areas in factor allocation. In fact, recent decades have seen bias toward urban areas in the allocation of national government expenditure and asset investment (see Table 1). Such allocation difference is arguably one of the reasons for China's enlarged urban–rural income disparity. We examine the influence of factor allocation, in addition to urbanization, on urban–rural income disparity from 2004 to 2010. In particular, we focus on empirically establishing the spatial and temporal differences involved in that disparity.

The 2004–2010 period was selected because of notable shifts in national policies that took place during that time. Since 2004, to reduce urban–rural income disparity, the Central Committee has chosen "*sannong*" (agriculture, countryside and farmers) as the theme for its No.1 document for nine consecutive years. An agricultural tax with a history of more than 2000 years was also eliminated in 2006, reducing the burden on farmers by an estimated twenty billion US dollars annually. How these policy changes have affected China's urban–rural income disparity after 2004 and whether the effects have varied over time is one of the key themes of this study.

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Table 1
Indices reflecting differences in factor allocation between urban and rural areas, 1978–2010.

Year	National government expenditure ratio (%)		Asset investment ratio (%)		Year	National government expenditure ratio (%)		Asset investment ratio (%)	
	Urban	Rural	Urban	Rural		Urban	Rural	Urban	Rural
1978	86.6	13.4	–	–	1999	91.8	8.2	79.5	20.5
1980	87.8	12.2	–	–	2000	92.2	7.8	79.7	20.3
1985	92.3	7.7	–	–	2001	92.3	7.7	80.6	19.4
1990	90	10	–	–	2002	92.8	7.2	81.6	18.4
1991	89.7	10.3	–	–	2003	92.9	7.1	82.4	17.6
1992	90	10	–	–	2004	90.3	9.7	83.8	16.2
1993	90.5	9.5	–	–	2005	92.8	7.2	84.6	15.4
1994	90.8	9.2	–	–	2006	92.1	7.9	84.9	15.1
1995	91.6	8.4	78.1	21.9	2007	93.2	6.8	85.5	14.5
1996	91.2	8.8	76.7	23.3	2008	92.7	7.3	86.1	13.9
1997	91.7	8.3	77	23	2009	91.2	8.8	86.3	13.7
1998	89.3	10.7	79.2	20.8	2010	91	9	86.8	13.2

Source: Data from the China Statistical Yearbook 1982–2011.

Our emphasis on spatial difference at the provincial level reflects the different stages of development in the Chinese provinces. Eastern provinces are characterized by low urban–rural income disparity and large rural investment, whereas central and western provinces have much higher disparity and are more urban-biased. The comparative analysis between provinces is thus expected to manifest the different roles that factor allocation and urbanization have played in narrowing each province's urban–rural income gap.

The remainder of this paper proceeds as follows. First, the literature is reviewed, after which the methodology and data collection are discussed. The empirical analysis is then presented, and the paper concludes with a discussion of the main findings and their policy implications.

Literature review

The main theory relevant to this study is urban-bias theory, proposed by Lipton (1977) and later formalized by Bates (1981) and Lipton (1993). The key argument is that urban-biased policies and strategies promulgated by governments in pursuit of economic growth and urbanization result in inefficiency in urban–rural factor allocation, which is a major source of urban–rural income disparity in most developing countries. The restricted allocation of public spending, education, information and human capital in rural areas are the main reasons for their poverty (Chani, Jan, Pervaiz, & Chaudhary, 2012; Lipton, 1993; Majumdar, Mani, & Mukund, 2004; Rillaers, 2001). Although this has been challenged by new economic geography claiming that economic agglomeration is induced by geographic space instead of urban-biased policies (Krugman, 1991), urban-bias theory especially suits China given its state-led economic mechanism and top down urbanization process.

Based on this theory, research in China has revealed a strong relationship between urban-biased policies and urban–rural income disparity. Institutional drivers including heavy-industry-oriented strategy and the opening up policy have often been thought to be to blame for this income gap (Cai & Yang, 2000; Kanbur & Zhang, 2005; Lin & Chen, 2011; Lu & Chen, 2004). Other policies related to financial development, government education budget, the social welfare system and public infrastructure have also been analyzed in the literature (Qiu, 2008; Wang & Fan, 2005; Zhang & Zhan, 2006).

In contrast to the great emphasis placed on institutional impacts, relatively few studies have directly touched the effect of factor allocation on urban–rural income even though most institutional factors affect this disparity indirectly by influencing urban–rural factor allocation. Cai and Chen (2012) and Su, Chen & Chen (2012) point out that an increase of urban–rural labor ratio is beneficial to narrowing the urban–rural income gap, whereas increases in urban–rural ratios of human capital and fixed assets will enlarge it. However, the impact of urbanization has been neglected in such studies, which may have decreased its apparent impact. Moreover, although spatial autocorrelation has been considered, the regression method used is still a kind of global regression technique whereby we cannot observe a clear picture of spatial difference in the impact of factor allocation. Indeed, studies on the US (Cindy & Emilio, 1994; Richard, 2000), EU (Josef, 2007) and Italy (Patrizia et al., 2009) have confirmed a temporal and geographical heterogeneity existing in the impacts on regional or urban–rural income inequality.

We build on recent studies that consider the effect of factor allocation by incorporating it and urbanization into one analytical framework. In particular, we employ the geographically weighted regression (GWR) technique, a kind of spatial econometric model, to examine spatial and temporal differences in the impacts of factor allocation and urbanization on urban–rural income disparity. The consideration of spatial and temporal differences, the focus on factor allocation in the urbanization process and the use of GWR technique are three main ways in which this study fills the gap in the literature.

Methodology and data

Estimation function

The study framework is based on the assumption that urban and rural areas differ in production functions because of factor allocation differences. Cai and Chen (2012) derived the estimation function. In their study, the industrial agglomeration variable, in addition to variables measuring urban–rural differences in total factor productivity, labor force, capital and production material prices, are major factors that influence urban–rural income disparity. One of the key themes in the study is the examination of the relationship between industrial agglomeration and urban–rural income disparity.

In this study, the estimation function is further modified and extended in the following ways. First, the urban–rural ratio of human capital instead of education and entertainment spending is used to measure the urban–rural difference in total factor productivity as the former is more explanatory than the latter. Second, the yield level of the non-agricultural sector representing industrial agglomeration is replaced by financial resources because we think that it is meaningless to use the former index at the provincial level as the scope of the space unit cannot be controlled. As an