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Urbanization and/or rural industrialization in China☆

Huasheng Song [a], Jacques-François Thisse [b], Xiwei Zhu [a,*]

[a] Zhejiang University, China
[b] CORE, Université catholique de Louvain, Belgium, Zhejiang University, China and CEPR, UK

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ABSTRACT

We study urbanization and rural industrialization in a setting involving one urban region ($\mathbb{U}$) and one rural region ($\mathbb{R}$). Farmers are heterogeneous in their attitude toward migration, while firms' efficiency is higher in $\mathbb{U}$ than in $\mathbb{R}$ because agglomeration economies have been built in $\mathbb{U}$. Farmers face three options: (i) working in the agricultural sector, (ii) setting up firms in $\mathbb{R}$, or (iii) moving to $\mathbb{U}$. There exists a unique equilibrium, which displays four different patterns. In the first one, both urbanization and rural industrialization occur simultaneously. In the second and third patterns, either urbanization or rural industrialization arises, whereas the last pattern involves an industrial core and an agricultural periphery. The conditions under which each pattern emerges are determined. The transfer of labor from the agricultural to the industrial sector always increases farmers' welfare, while the welfare impact on incumbent urban workers is ambiguous.

1. Introduction

The main distinctive feature of industrialization is the transfer of labor from the agricultural to the industrial sector (Lewis, 1954). In most countries, this took place through the urbanization of the economy (Bairoch, 1988). China is no exception to this rule. After the implementation of the Economic Reforms, large-scale rural–urban migrations vastly contributed to the urbanization process. Lu and Wang (2006) estimate that rural–urban migrations accounted for 79% of China's urban population growth from 1979 to 2003. The existence of wide income disparities has been, and still is, the fundamental drive for rural people to migrate to cities. In 1980, per capita disposable income of urban households was 477.6 yuan, while that of rural households was 191.3 yuan. This gap has kept widening and now reaches a ratio exceeding 3 (China Statistical Yearbook, 2010). Controlling for household characteristics, Sicular et al. (2007) show that residential location remains the most important factor explaining the urban–rural income gap. Interestingly, rural–urban migrations occurred at both the intra-provincial and interprovincial levels. Based on the Population Census of China conducted in 2000, Liang and Ma (2004) estimate the scale of what they call the "floating population." According to Liang and Ma, there are around 144 million floating people in China, among which, about 102 million are intra-provincial migrants (including cross-county/city level and intra-county level) and 42 million are interprovincial migrants.

In parallel, the Chinese government has fostered the development of Town-and-Village Enterprises (TVEs), the aim of which was to promote the industrialization of rural areas by making the farmers "leave their rice-fields without leaving hometown" and "move to manufactories without moving into cities." That the rural share in Chinese manufacturing output grew from 14.3% in 1980 to 70.4% in 2002 shows that such firms have been able to absorb or create jobs away from big cities, and may suggest that industrialization arose all over China. As observed by Putterman (1997, p. 1643), "the distribution of TVEs is quite concentrated, with the majority of township and village enterprise outputs being produced either in the suburban areas within older municipal boundaries, or in the rural counties adjacent to municipalities." In the same vein, the in-depth analysis undertaken by Kung and Lin (2007) reveals that the development of most TVEs occurred in coastal areas. Thus, to a fairly large extent, rural industrialization has occurred in regions that have also experienced a fast growing urbanization. This could be explained by the fact that "in

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* Corresponding author at: Center for Research of Private Economy and School of Economics, Zhejiang University, Zheda Road 38, Hangzhou, 310027, China. Tel.: +86 571 87953950; fax: +86 571 87952835.
E-mail address: xwzhu@zju.edu.cn (X. Zhu).

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the collective era, the development of the commune and brigade enterprises relied heavily on urban technicians and youth that were sent to the countryside for the so-called "reeducation by peasants." After these people returned to the cities at the end of the Cultural Revolution, rural enterprises close to cities began to contract with urban technicians and hire retired urban workers to get necessary technologies" (Lin and Yao, 2001). This highlights the fact that some rural areas have a better access to urban technology than others, and thus these areas are more likely to embrace rural industrialization. This agrees with our prediction that rural industrialization is more likely to occur when the technological gap between urban and rural regions is not too large (see below).

We must also stress another distinctive feature of the Chinese economy, namely the *Hukou system*. The Hukou system was established in cities in China in 1951 and extended to rural areas in 1955. It was formalized as a permanent system in 1958. In 1984, the central government allowed farmers to move to cities and to work in the manufacturing and service sectors. However, the system remains unchanged in nature today because migrants must acquire different permits in order to access health care, schooling facilities and housing. Migrants are also imposed various hurdles to get those permits. Finally, they may still have to pay taxes to their home village for public services they do not consume. In other words, rural–urban migrants face total fees that can be equivalent up to several month wages. While most of these fees were abolished officially in 2001, various barriers still restrict labor mobility in China. As a result, migration costs remain high enough to support large wage inequalities (Poncet, 2006).

Which spatial pattern will emerge depends on the interplay between the agglomeration and dispersion forces that those various factors generate. To uncover their possible implications, we develop a NEG-like model in which one region is urban and industrialized while the agricultural sector is concentrated in the other. However, unlike standard NEG models, our's accounts for spatial differences in firms' technological efficiency as well as for the heterogeneity of rural–urban migrants. To be precise, we recognize that farmers have different attitudes toward migration. Although Hukou rules are uniformly defined, "perceived Hukou costs" differ across individuals. For example, these costs include the lack of official health-care for migrants, so that the young are less affected than the old. Likewise, buying school permits only affects those migrants who move with their children. In the same spirit, idiosyncratic considerations such as family bonds, social networks, and the like are known to play an important role in the decision to migrate (Tabuchi and Thisse, 2002). As a result, farmers do not react in the same way to a given rural–urban gap. How many farmers move to cities is determined at the equilibrium outcome. Furthermore, we acknowledge that urban firms are more efficient than rural firms (Lin and Yao, 2001). This assumption reflects the idea that several Chinese cities have built agglomeration economies during the first phases of the Economic Reforms and attracted a relatively large share of human capital (Collier, 2007).

The aim of this paper is to assess how these specific variables interact with the standard variables of NEG to determine the spatial and sectoral distributions of activities within a Chinese province. Note that, though the situation in China has served as the main motivation for the present paper, our model is general enough to be applicable to other countries characterized by a strong rural–urban divide. As said above, our setting shares several features with NEG. However, it differs from this literature in one important aspect, i.e. farmers now face *three* options. Specifically, (i) they keep working in the agricultural sector, (ii) they set up firms in the rural region, or (iii) they move to the urban region and work in the urban manufacturing sector. Recognizing that opportunities are not restricted to changing places but also cope with changing jobs leads to a much richer set of spatial patterns. In particular, since farmers can work in the manufacturing sector, the number of varieties available in the economy and the supply of the agricultural goods are endogenous, whereas they are exogenous in the core–periphery and related models. Furthermore, it is well known that dealing with positive transport costs for the agricultural goods is already sufficient to make the analysis of NEG models especially cumbersome (Fujita et al., 1999). This explains why such costs are typically neglected. Since our main goal is to study the impact of heterogeneous migrants as well as the heterogeneity between urban and rural firms, we find it reasonable to disregard *all* transport costs. This assumption is driven by the ease with which we can introduce a rich description of the set of equilibrium patterns and keep the model tractable.

Our main findings may be summarized as follows. First, we show that there exists a unique equilibrium, which displays four different sectoral–spatial patterns, each one being determined by the parameters of the economy. In the first pattern, both urbanization and rural industrialization occur simultaneously. Workers' heterogeneity toward mobility is a key element to explain this result. Indeed, only the farmers bearing low migration costs move to the urban region, while the others are split between industrial and agricultural activities provided that the efficiency gap between rural and urban firms is not too wide. Would farmers be homogeneous, only urbanization or rural industrialization could occur. In the second and third patterns, either urbanization or rural industrialization occurs. Rural industrialization arises when migration costs are high and the technological gap is small. Thus, areas situated in the vicinity of existing cities are more likely to embrace rural industrialization because they have a better access to urban technologies. In contrast, if the technological gap is large enough, high migration costs sustain an industrial core and an agricultural periphery, while the city grows when these costs are low. In this case, lowering Hukou costs narrows the income gap between rural and urban regions.

Second, the transfer of labor from the agricultural sector to the industrial one, either through rural industrialization or urbanization, always increases the welfare of farmers, whereas urbanization and rural industrialization are welfare-worsening for the incumbent urban workers when the varieties of the manufactured goods are good substitutes. Indeed, a low degree of product differentiation makes competition on the product market tougher. This in turn leads manufacturing firms to pay lower wages to their workers, who are probably not compensated by the larger number of varieties as many Chinese firms still produce standardized goods. This conflict of interest might well be reflected by the fact that the majority of Chinese cities are undersized (Au and Henderson, 2006a, 2006b): urban workers strive to deter the entry of rural migrants through a tough implementation of the Hukou system. Note that Whalley and Zhang (2007) reach similar conclusions in simulating the implications of removing labor mobility restrictions in China.

Last, when transport costs are taken into account, lowering transport costs generates two opposite effects, the global impact of which is a priori unclear. First, it reduces the intensity of rural–urban migrations by narrowing the rural–urban divide. However, such a transport policy makes competition with the industrialized regions tougher, thus making the creation of rural firms less appealing to farmers. On the other hand, the impact of lower migration costs is unambiguous in that it always fosters urbanization. These results cast doubts on the emphasis put by the Chinese government on the development of transport infrastructure and the relaxation of the Hukou system since these policies are likely to exacerbate regional disparities (Hu, 2002). Instead, our analysis suggests that investments made to improve the level of technological efficiency in rural areas should be the government's main weapon.

The paper is organized as follows. Section 2 presents the model. In Section 3, we show the existence of four different equilibrium patterns and determine their welfare properties. In Section 4, we appeal to numerical analysis to address the case of positive transport costs. Our simulations show that the same equilibrium patterns occur, though characterizing their respective domains appears to be out of our reach. We also discuss some implications of a transport policy that aims to reduce the cost of shipping goods. Section 5 concludes.