Urban-Rural Relations in China: A Study of the Beijing-Tianjin-Hebei Metropolitan Region

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ABSTRACT

Over three decades of rapid economic growth in China, beginning in 1978, has been accompanied by ever-enlarging urban-rural inequalities in terms of the various aspects of income, welfare, infrastructure, medical treatment, and education (amongst others). These two parts – the urban and the rural - have long been treated separately, without much consideration being given to their mutual linkages (relations). Urban and rural development can, essentially, be interpreted as the deployment of key factors (terms of trade for agricultural products, land requisition, and labor transfer), and the supply of public goods and services (infrastructure, education, insurance, and medical care). Thus, the urban-rural inequalities experienced by China at present can be understood as the consequence of the factor flows (labor, capital, goods, information, and technology, etc.) and agglomeration between these two parts.

This thesis aims to investigate urban-rural relations in China in the post-reform era, and their influences on the economic, social, and environmental development in both the urban and the rural areas. The thesis consists of five papers and the cover essay. The first two papers provide a detailed picture of urban-rural relations in China, while the other papers examine the impact of urban-rural relations in terms of population mobility, arable and built land use change, and regional economic inequality in the study area.

The findings of the thesis reveal that urban-rural relations in China became gradually intensified in the post-reform era, especially when the central government initiated a shift from a situation of urban bias to comprehensive support for the rural areas. However, the mutual resource flows in the study area still tend to agglomerate in the urban districts, while only reaching the rural peripheries to a limited extent. This is demonstrated in the way in which the urban
districts experienced fast and large scale demographic growth and land use change, while slow and small-scale demographic and land use change took place in the peripheries. The urban-rural interface, which is situated between the urban and rural areas, evidences medium-level resource agglomeration.

This thesis, through the discussion which it sets out, emphasizes the necessity of exercising both political and market forces in order to achieve balanced urban-rural resource flows in China. Another implication for policy making is to develop more sub-centers at the peri-urban or periphery, making these areas the interface for urban-rural resource linkages.

**Key words:** Urban-rural linkages, Urban bias, Urban-rural interface, Beijing-Tianjin-Hebei Metropolitan Region, China
COVER ESSAY
INTRODUCTION

1.1 Research background

A period of over three decades of rapid economic growth in China (with an annual growth of over 9%), beginning in 1978, has made China an important focal point in the world. Per capita GDP in China has increased tremendously, from 379 ¥/person in 1978 to 18,934 ¥/person in 2007. However, such an “economic miracle” has been accompanied by ever-enlarging urban-rural inequalities in terms of the various aspects of income, education, medical care, the provision of infrastructure, and social insurance (amongst others). Taking income inequality as an example, the differentiation of annual household per capita income between urban and rural areas has increased from 209.8 ¥ in 1978 to 9,645.4 ¥ in 2007, a 45-fold increase (National Bureau of Statistics of China, 2008).

To a large extent, urban-rural inequalities could be attributed to what has, for a long time, been an urban-biased policy in China, which has resulted in imbalanced resource distribution between urban and rural areas. Such policy and subsequent measures like the household registration system (*Hukou*) and *Hukou*-based welfare provisions have led to a dualistic society in which urban and rural areas develop separately. The inequality problems that exist between urban and rural areas in China became exacerbated in the post-reform era, which witnessed large-scale rural-urban migrants and major economic activities agglomerating in the cities. Although economic achievements are also evident in rural China, rural development - which is driven by industrialization and urbanization – became, however, more dependent on the urban areas in terms of markets, finance, techniques, and other services.

Undoubtedly, China’s future development can’t be achieved merely on the basis of cities, or a dualistic economy. Future development requires a comprehensive
framework, involving both the cities and countryside. The coordination of urban and rural development is, therefore, very important to the Chinese economy in the future. At the beginning of the twenty-first century, China entered a new stage of coordinated urban and rural development\(^2\). The remarkable feature of this change is that urban-rural development in China has shifted from an urban bias to “industry nurturing agriculture and cities supporting the countryside”. In 2002, the Sixteenth National Congress of the Chinese Communist Party for the first time stressed the importance of the countryside for achieving moderate prosperity (Xiaokang), and declared that socio-economic development must incorporate urban and rural areas alike. Thereafter, a series of policies and measures were made and implemented to achieve the integrated development of urban and rural areas. Particularly, seven consecutive “No.1 Central Documents”\(^3\) were issued by the Central Committee of the Communist Party of China and the State Council from 2004 to 2010, aiming at coordinating the harmonious development of urban and rural areas so as to achieve an overall well-off society in China.

At a basic level, integrated urban and rural development primarily relies on the deployment of key factors (terms of trade for agricultural products, land requisition, labor transfer) between urban and rural areas, and the supply of public goods and services (infrastructure, education, insurance, and medical care) in these two areas (Ye, 2009). In this sense, the urban-rural inequalities in China can be interpreted as the consequence of factor flows (like labor, capital, goods, information, and technology) and agglomeration between these two parts. Thus, urban-rural integrated development in China can be analyzed in terms of the urban-rural relations (linkages) that are conducted by both the market and by political forces.

1.2 Research questions and aim
The research background indicates the importance and necessity of integrated urban and rural development in China, particularly when facing the ever-enlarging urban-rural inequalities. The research aims to investigate urban-rural relations in China, and to propose ways of achieving integrated urban and rural development. This general theme can be rendered through three specific research questions, namely:

(1) How have urban-rural relations evolved in China? This research question calls for a comprehensive understanding of urban-rural relations in China. The evolution of urban-rural relations in China is basically attributed to political and economic factors in the centrally-planned economy (1949-1977) and market economy (since 1978). A historical review of urban-rural relations can, therefore, provide evidence of how urban-rural inequalities in China emerged and developed at different stages.

(2) What are the influences of urban-rural relations on regional development? The resource flows and agglomeration conducted by both political and market forces exerted great influence on regional development in China, in particular though the demographic, economic, and environmental changes experienced by urban and rural areas.

(3) How to achieve integrated and coordinated urban-rural development in China? This research question has a basis in the research findings generated by addressing the first and second questions. Implications for policy making and planning are to be derived through the historical review and analysis of influences in the study area. The fundamental purpose of these efforts is to propose ways of achieving coordinated urban and rural development in the future.

1.3 Thesis structure
The thesis consists of the cover essay and five papers. The cover essay integrates the research background, aim, methodology, theory, research findings, and the discussion. The structure of the thesis is shown in Figure 1. The “input” of the thesis includes Paper I and II which provide a detailed research background and understanding of urban-rural relations in China. The “output” of the thesis includes Papers III, IV, and V which analyze the influences of urban-rural relations in terms of population change, land use change, and regional economy. The last part of the thesis is the discussion and implications for policy making and regional planning.

Figure 1. Research structure and constitution

Evolution of urban-rural relations in China

Urban-Rural relations and the influences on urban and rural areas in China

INPUT

Paper I

Paper II

OUTPUT

Paper III

Paper IV

Paper V

Demography

Environment

Economy

Implications for policy making and regional planning
Paper I aims to review the evolution of urban-rural relations in China since 1949, and to compare that evolution with that of developed countries. The paper also tries to predict future urban-rural relations in China.

Paper II aims to assess urban-rural relations (interaction) in China, and to examine whether a quantitative assessment of those relations conforms to the historical evolution (Paper I).

The research of the thesis selects as its study area the Beijing-Tianjin-Hebei Metropolitan Region (the Jing-Jin-Ji region for short, Beijing as the central city, Jing, Jin and Ji are the abbreviations of Beijing, Tianjin and Hebei province). This selection is to examine population change and distribution, arable and built land use change, and regional economy.

Paper III aims to investigate population change and its spatial distribution at the county level in the Jing-Jin-Ji region. The counties/districts are divided in terms of three residential patterns and three population growth groups. Driving factors for the population change are also analyzed in two scenarios.

Paper IV aims to examine land use change at the county level in Jing-Jin-Ji region. Unlike previous studies, which merely divide the region according to the administrations, the paper examines arable and built land use change in terms of three land use patterns, the area of each of which is identified upon the basis of urban-rural resource flows.

Paper V aims to investigate the composition of regional economic inequality in the Jing-Jin-Ji region. A decomposition analysis is made by dividing the region into three classifications according to urban-rural resource flows and agglomeration: urban, peri-urban, and periphery areas.

1.4 Composition of the cover essay
Chapter 2 introduces the research methodology of the thesis. The Jing-Jin-Ji region, the study area, is introduced in detail. A literature review of the different research topics addressed by the papers is also presented. The chapter also introduces the principle of Principal Component Analysis which is used in Papers II, IV, and V.

Chapter 3 provides a theoretical understanding of urban-rural relations, including the evolution and apprehension of urban-rural relations, urban-rural linkages patterns, and urban-rural inequalities.

Chapter 4 introduces the situation of urban-rural relations in China. From a historical perspective, the chapter generally analyzes how such relations evolved in China in the centrally-planned economy, transitions (decentralization, globalization, and urbanization) in the market economy, and the comprehensive support of rural areas in the twenty-first century.

Chapter 5 outlines the findings of the five papers. The content and the research results of each paper are concretely presented in the chapter.

Chapter 6 is based on the research findings of the papers. It puts forward a discussion of these findings and sets out their implications for policy making and planning.

Chapter 7 concludes the research of the thesis, and lists three aspects which can be important to future urban-rural development in China.
2. RESEARCH METHODOLOGY

2.1 The choice of study area

The choice of the Jing-Jin-Ji region as the study area is not occasional. First of all, the research underlying this PhD forms further the study of this region which I first put forward within my Master’s thesis, “The research of capital economic circle\(^4\) and the coordinated urban development under its influence”. The Master’s thesis investigated the major problems of the region: environment and resource restriction, uneven regional development, regional protectionism, and lack of cooperation. The research of the PhD thesis goes further, examining the urban-rural resource flows and regional development.

The Jing-Jin-Ji region is one of the three giant metropolitan regions (Yangtze River Delta and Pearl River Delta) in Eastern China (Figure 2). In 2005, there were 274.5 million people in these three regions, producing 37.6% of the GDP in China (National Bureau of Statistics of China, 2006). Recently, the Jing-Jin-Ji region has also been considered the “third engine”, beside the other two regions, in promoting the Chinese economy further in the twenty-first century. Among the three regions, the Jing-Jin-Ji region has a comparatively lower economic level. However, this region has nonetheless been experiencing rapid economic growth and urbanization. Per capita GDP in this region increased from $5,785 ¥/person in 1990 to $22,252 ¥/person in 2005, while the level of urbanization increased from 28.2% to 46.5% in the same period (National Bureau of Statistics of China, 1991; 2006). Such development has induced great changes in demographic, economic, and environmental terms, in both the cities and the countryside. It is for this reason that the research of the thesis chooses this region as the study area to examine the influences of urban-rural relations on regional development.
Another reason for the choice of the Jing-Jin-Ji region is that resources are distributed in an imbalanced manner in this region. The Jing-Jin-Ji region (183,000 km²) includes Beijing and Tianjin (directly-governed cities under jurisdiction of central government), and eight prefecture-level cities in Hebei Province (Zhang Jiakou, Chengde, Qin Huangdao, Tangshan, Langfang, Cangzhou, Baoding and Shi Jiazhuan) (see Figure 3).
Beijing is the capital of China and the regional center of Jing-Jin-Ji region. Tianjin is the third largest city in China and the main coastal city (Pohai Sea) servicing Beijing. Hebei, which is located in the Huabei Plain, surrounds Beijing and Tianjin. Due to the geographic adjacency and the political status of Beijing and Tianjin, cities in Hebei Province basically serve (particularly with regard to resource supply and environmental protection) these two centrally-governed cities. In general, Beijing and Tianjin dominate the economic growth of the Jing-Jin-Ji region. They produced 50% of regional GDP in 1995, while this figure increased to 85% in 2005 (see Figure 4).
Figure 4. Shares of regional GDP in Jing-Jin-Ji region, 1995 and 2005
The major source of GDP in Beijing and Tianjin is the non-agricultural industries. As Figure 5 shows, the secondary and tertiary industries have produced over 90% of GDP in Beijing and Tianjin since 1978. Nevertheless, there is still a certain amount of agricultural production (around 13%) in Hebei Province in 2006.

Figure 5. Contribution of primary industry to the regional GDP (%), 1978-2006

These two cities also represent the major concentrations of population in the region. Population change within the Jing-Jin-Ji region in the period 1990-2000 mainly took place in Beijing, Tianjin, and their surrounding counties (Figure 6).
2.2 Literature review

Relevant literature pertaining to the topic of urban-rural relations was reviewed in the course of the research. Papers I and II involved much literature addressing the aspects of urbanization, industrialization, urban bias, and rural development in China. This literature introduced urban and rural development as processes that were influenced by both political and market forces, in both the centrally-planned economy and the market economy.

Reviews of theoretical literature concerning resource flows and agglomeration were used in the study of the Jing-Jin-Ji region to address the aspects of population
mobility (Paper III), resource flows and land use change (Paper IV), and the decomposition of regional economic inequality (Paper V).

2.3 Principal Component Analysis

Principal Component Analysis (PCA) is employed within the research in the attempt to assess urban-rural linkages and divide the Jing-Jin-Ji region into urban, peri-urban, and rural areas by introducing a group of variables. PCA can transform these possibly correlated variables into a smaller number of uncorrelated components. The data dimensionality was then reduced by introducing a covariance analysis between factors.

Suppose there are $m$ variables $x_1, x_2, \ldots, x_m$ and $m$ new variables can be generated through PCA, known as the principal components ($PC$), $PC_1, PC_2, \ldots, PC_m$ which can be expressed as follows:

$$PC_1 = a_{11}x_1 + \ldots + a_{1m}x_m = Xa_1$$

$$PC_m = a_{m1}x_1 + \ldots + a_{mm}x_m = Xa_m$$

Where $a_i$ is the coefficient for $PC$ and each column of $a$ contains the coefficients for one $PC$. Here $PC_1$ and $PC_2$ which have the first and second largest variance, are chosen on the condition that they are uncorrelated. If we consider that the sample variance-covariance matrix of the original variables $X$ is $N_x$, then the coefficient vector $a_i$ can be computed through the equation:

$$|N_x - \lambda I|a = 0$$

Where $\lambda$ is the vector of characteristic roots, and $a$ is a matrix comprising of the characteristic vectors corresponding to each characteristic root. It is noted that $PC_i$ is computed by using the characteristic vector corresponding to the largest
characteristic root $\lambda_1$ while $PC_2$ is computed by using the characteristic vector corresponding to the largest characteristic root $\lambda_2$, and so on (Harris, 2001).
3. THEORETICAL FRAMEWORK OF URBAN-RURAL RELATIONS

3.1 The emerge and evolution of urban-rural relations

Historically, there exist persistent and rigid distinctions between “urban” and “rural”, founded on the basis that agriculture is the dominant activity of rural population, while urban residents primarily engage in industrial production and services. Most theories and practices focus on either “urban” or “rural”, with little attention being paid to the interrelations between these two parts. It is, however, commonly understood that strong mutual linkages exist between urban and rural areas, through the resource flows of people, capital, goods, information, and technology; flows which play an important role in the process of rural and urban development (Tacoli, 1998; 2003). Potter et al. (2004) argue that urban-rural linkages were initiated in an attempt to take the advantage of differentials or complementarities between these two parts.

The evolution of urban-rural relations can be traced throughout the urbanization process of human society. In the era before the Industrial Revolution, when all nations were predominantly rural, urban-rural relations were characterized by urban residents consuming agricultural products in exchange for the industrial products of cities. However, such linkages were restricted due to low productivity, and limited transportation and communication capacity.

After the Industrial Revolution, the major part of the population in most Western European countries lived in cities. Urban-rural relations in this era shifted from the previous balanced exchange to an increasing dependency of rural areas on the urban economies. Cities could utilize resources from a larger context, which extended beyond their surroundings, while rural areas increasingly relied on the urban market, facilities, and services.
Since the second half of the twentieth century, most developed countries have maintained major urban populations, while developing countries have undergone rapid urbanization. Areas where both agricultural and non-agricultural activities exist have been identified in many developing countries (McGee, 1987; Ginsburg et al., 1991; Potter & Unwin, 1995). Urban-rural relations, at this stage, are now demonstrating a more complex process of development through which interdependencies are shaping the fortunes of cities and the countryside alike (Davoudi & Stead, 2002). The initial exchange of food and industrial products between urban and rural areas has evolved to a stage of mutual linkages.

3.2 Theoretical apprehension of urban-rural relations

Generally, von Thünen’s model of agricultural land use (von Thünen, 1826) and Alfred Weber’s industrial location theory (Weber, 1909) have served as the basis for the theoretical understanding of resource flows between urban and rural areas. Urban demand is the key factor in the spatial allocation of economic activities (agricultural and industrial), which primarily depend on both production cost and potential profits. Central Place theory (Christaller, 1933) provided a way of ordering of the economic activities flowing between villages, towns, and cities. Under Christaller’s model, cities are seen as the main suppliers of high-order services like medical services and education to the surrounding areas, which in turn supply low-order services like food and other resources to the central place. The Core-Periphery model (Friedmann, 1966) which addresses the unequal distribution of power in economy, society and polity, indicates that the core area is the central realm while the surrounding rural periphery is dependent on the core area for the supply of high-order services. The core area thereby evolves into urban or metropolitan areas with a high potential for innovation and growth, while
periphery areas experience slow growth or even stagnation, adding to their dependency on the core area.

In the new economic geography, Krugman (1991) and Fujita et al. (1999) pointed out that interrelated industry concentrations, reliable infrastructure, accessibility to the market, and high production returns all drive a cumulative process that may result in a core-periphery economy. In this sense, resource flows tends to agglomerate to the urban areas, while the fortunes of rural areas are tightly reliant on the adjacent urban areas.

Recently, small and medium urban centers have come to be seen as playing an important role in urban-rural linkages, given the strong link that they maintain to their rural hinterlands (Baker & Claeson, 1990). Situated between urban and rural areas, these centers serve as the interface for urban-rural linkages. McGee (1991) used the concept of ‘desakota’ in the Asian context, describing the symbiosis of urban and rural areas which resulted from the transformation into a dispersed metropolis. Gering et al. (1998) found the urban-rural interface a zone where social, economic, and political factors interact in complex ways. Browder (2002) considered the urban-rural interface as an array of networks connecting urban agents and rural producers. These manifestations all emphasized the transitional and dynamic features of the urban-rural interface, which serves as a frontier where rural areas are in transition to becoming urban areas. The urban-rural interface acts as an attractive destination for rural migrants, offering non-farm employment and access to education and medical service etc.

Further, the role of the urban-rural interface has also been recognized in situations where out-migration and industrial transfer from a downtown area to the outskirts and suburbs of a city emerge because of congestion problems in the urban areas. Krugman and Elizondo (1996) pointed out that resource relocation to the urban-rural interface is attributed to the “centrifugal” forces that tend to break the
agglomerations in the urban areas. The centrifugal forces include pure external diseconomies like congestion and pollution, urban land price increase, transportation cost increase, and the preference of moving away from highly competitive urban areas to less competitive rural locations (Tabuchi, 1998).

This theoretical analysis suggests, to a large extent, that patterns of resource flows and agglomeration exist at the regional level: resources tend to be concentrated in urban areas, while being located sparsely in the rural peripheries. In turn, resource agglomeration in the peri-urban areas (small towns) is at a medium level. The small towns can be treated as sub-centers in the rural peripheries, supplying urban services. These patterns are actually in line with what Johan Friedmann (2005) termed “multi-centric urban fields” in the Yangtze River Delta and Pearl River Delta in China. He pointed out that in the process of the urbanization of the countryside, Chinese peasants migrated to the coastal cities to find work and a better life, while millions also went to the rapidly industrializing rural areas in their vicinity (mostly the small towns). This resulted in multi-centric urban fields in the immediate vicinity of medium-sized and large cities that would eventually integrate with the urban cores.

3.3 Patterns of urban-rural resource flows

3.3.1 Population migration

Generally, rural-urban migration is induced by socio-economic factors. Working with the dual economy theory, Lewis (1954) stated that surplus rural laborers would move from agricultural sectors to modern industrial sectors due to the different production efficiency. In this process, agricultural production efficiencies would increase, while industrial sectors would achieve further development. Schultz (1962) considered migration from lower-productivity sectors to higher-productivity sectors as a choice made after balancing the migration cost and
potential profit. According to Bogue (1959), the pushing forces from out-migration places and the pulling forces from in-migration places jointly induce population mobility. Todaro (1969), and Harris and Todaro (1970) also added that employment opportunities in the cities and higher income were the major reasons behind rural-urban migration.

Brueckner and Zenou (1999), however, point out that continuous immigration from villages to cities somehow leads to an increase of urban land price, which may discourage and dampen the enthusiasm of potential migrants. Further, the ever-decaying urban environment and severe congestion problems that are associated with it are also factors which induce out-migration from the urban districts. Rogers (1960) considered such out-migration (relocating in the urban outskirts) to be a choice of combining country life with employment in the cities.

According to Myrdal’s (1957) theory, labor flows from low-wage to high-wage regions contributes to economic growth and wage increases in the destinations, while it constitutes an even more serious drain of resources from the original areas, which suffer from the depressed demand of goods, services, and production. Such population movement finally leads to enlarging inequalities between rich and poor places. Population migration can also lead to changes in the educational composition of both the original and destination places. Korpi (2008) found that if migrants consist of lower-educated laborers or only find work requiring limited education, immigrants contribute to inequality since low-educated laborers are replaced due to the negative supply-side effects. Skilled migrants can, however, induce positive effects through many channels such as return migration remittances, return to education, and by facilitating resource flows between destination and original places (Docquier & Lodigiani, 2006; Docquier & Rapoport, 2007; Beine et al., 2008).
At the level of the regional economy, neoclassical economic theory indicates that population movement is supposed to speed up the convergence process. The reason is that higher wages in the destinations are the result of higher per capita capital. Labor flows indicate that the speed of capital accumulation will decrease in the destinations and increase in the original places, leading to the convergence of the regional economy (Barro & Sala-i-Martin, 1991; Canova & Marcet, 1995).

3.3.2 Urban-rural environmental linkages

In general, urban-rural environmental linkages are deeply embedded in urban-rural relations. Resource flows and agglomeration have induced great changes in land use, water supply and air quality etc. in both cities and in the countryside. Cities normally serve as the central places of large rural hinterlands, concentrating major economic activities. This central role is mainly attributed to the positive externalities arising from the scale and agglomeration economies in the utilization of resources, technology, and public services (Renaud, 1981; Douglas, 1983). The rural economy therefore becomes reliant on the cities and, subsequently, economic inequality between urban and rural areas emerges. This emerging difference evidences continuous rural-urban migration and other resource flows from countryside to the cities.

McGranahan et al. (2001) pointed out that as cities become wealthier, their environmental burdens tend to become more dispersed. One of the adverse environmental impacts of urbanization is the continuous increase in the demand for resources. Urbanization is a spatial concomitant of industrialization, reflecting the spatial extent of the scale economies influencing industrial development (Gu & Han, 2010). The land use change which is associated with urbanization thus leads to increased consumption of natural resources. Urbanization also leads to the excessive exploitation of water. Cities which are facing water shortage have to rely
on surrounding areas for their water supply. Another environmental impact of urbanization is the distribution of urban waste and pollution to the countryside. There is usually a dichotomy in terms of environmental management - between urban and rural areas - in developing countries. Thus, many pollution-generating industries tend to move from urban areas to the countryside, where the environmental supervision is comparatively weak.

3.3.3 Urban-rural economic linkages

The content of urban-rural economic linkages consists of two aspects: the diversified urban and rural economy due to the sectoral linkages, and agglomeration and growth. Sectoral linkages between urban and rural areas have developed beyond the traditional division by which rural areas undertake agricultural production and urban areas handle non-agricultural production. Many rural residents have been found to turn to non-agricultural employment in the rural industries during the slack season. Thus, rural households’ income becomes diversified, consisting of both farm and non-farm income sources. Bryceson (1997) defined this change as “de-agrarianization”, a process composed of four elements: occupational adjustment, income re-orientation, social identity transformation, and the spatial relocation of a rural livelihood. Urban agriculture, which has received increased attention during recent decades, comprises a variety of production systems, ranging from subsistence production and processing at household level to fully commercialized agriculture (Veenhuizen, 2006). Growing urban poverty and the lack of formal employment has stimulated the development of urban agriculture in and around cities. It has also been found to be an integral part of the urban economic, social, and ecological system (Mougeot, 2000).

The attempt to investigate the relationship between agglomeration and growth can be traced to the 1950s. Perroux (1955) coined the concept of “growth poles”,
indicating that spatially concentrated milieus are important to the entire economy’s growth. Myrdal (1957) and Hirschman (1958) pointed out that spillovers, together with market forces, tend to increase the inequalities between regions because of “cumulative causation”. Further, the relationship between resource agglomeration and economic growth conforms to the process of “backwash and spread” or “polarization and trickle down” (Myrdal, 1957; Hirschman, 1958 and Alonso, 1968). From the regional perspective, the centripetal forces of geographic concentration can be described as natural advantages (e.g. land productivity, transport convenience, mineral resources), Marshallian externalities (e.g. technological spillovers, labor market pooling) and non-pecuniary externalities (e.g. forward and backward linkages, market size) (Kim, 2008). Inequality thus emerges when there is a net balance in terms of the forces of concentration and dispersion. From a national perspective, Kuznets (1955) indicated that the evolution of economic inequality follows an inverted-U shape curve: inequality increases as the country’s economy develops in the initial stage, then inequality starts to drop after a certain stage when a certain average income is attained.

3.4 Urban-rural inequalities

In general, inequalities between urban and rural areas are attributed to three types of factors: natural and geographical factors, socio-economic factors, and political factors. The agro-climate conditions and natural endowments like resources and geographical locations determine development potential. Since most rural areas are engaged in agricultural production, the rural economy and rural households’ incomes are strongly influenced by climatic conditions. According to Gallup and Sachs (1998), who explain spatial inequality by examining geographical and natural factors, people tended to agglomerate in places which are conducive to growth, not in places of great disadvantages. Compared to invariable natural
factors, geographic conditions like infrastructure can be improved. For instance, convenient road systems which increase the accessibility to the urban market and services have contributed to economies of scale and agglomeration in the cities.

The socio-economic factors refer to the values of innovation, entrepreneurship, and the existence of linkages that lead to the agglomerations. In the villages, peasants maintain their networks mainly based on families and neighbors, in order to reduce vulnerability and risks in life. These social networks actually act as a disincentive for the entrepreneurial sector (United Nations Economic and Social Council, 2001). There are, in contrast, more diversified social networks in the cities, where people have the spirit of competition and mutual exploitation. Specialization and innovation in cities also results in increased productivity and the growth of wealth. The economic factors, as mentioned in the section 3.2, inducing resource concentration in urban areas are interrelated industry concentrations, reliable infrastructure, accessibility to the market, and high production returns.

Political factors refer to those government decisions - like finance, tax, and decentralization and development strategies - which greatly influence urban and rural areas. The most frequently mentioned factor is the urban bias which once existed or exists in many countries, including China. Since modernization builds upon a preference for urban-based industrialization, many countries (especially developing countries) have prioritized their cities and concentrated public resources within the urban sectors. Urban industries were subsidized and supported, while rural areas became marginalized. The consequence of such policies is massive rural-urban migration and enlarged urban-rural inequalities.
4. PRELIMINARY VIEW OF URBAN-RURAL RELATIONS IN CHINA

4.1 Some concepts

In general, the urban system in China consists of two components - termed “designated cities” (jian zhi shi) and “designated towns” (jian zhi zhen). Places must be officially approved by the State Council or the provincial governments (after they fulfill certain criteria) to qualify as a city or town. The criteria (population, economy, and infrastructure) of defining a city or a town have been adjusted constantly since 1955, until 1993 when the criteria were revised and improved (see appendix, Table 1 and Table 2). By 2007, there were 655 cities (county level and above) in China, compared with 184 in 1958 (National Bureau of Statistics of China, 2008).

The Hukou system serves as the basis for understanding urban population and calculating the level of urbanization China. The hukou system was established in Chinese cities in 1951 and was extended to rural areas in 1955. It classified people into “agricultural population” vs “non-agricultural population” according to the status or type of registration, and “urban population” (cities or towns) vs “rural population” (villages or state farms) according to the place of hukou registration (Chan and Zhang, 1999). Correspondingly, those who want to migrate to cities and become urban residents need to complete two transformations: change the place of hukou registration, and then convert the hukou status from agricultural to non-agricultural. People need to show the authorities a qualified document to get the permission and then fulfill certain fixed qualifications to completely change their agricultural status into non-agricultural status. Due to the complexity of the hukou system, the definitions of urban population have become very complicated over time. There have been many changes of such definitions from the first national census in 1953 to the fifth census in 2000 (see appendix, Table 3). According to
the fifth population census of China, the country’s urban population numbered 455.9 million, compared with 77.3 million in 1953 (National Bureau of Statistics of China, 2001).

Besides people’s *hukou* status, there is a multidimensional construct of urbanization in China (Friedmann, 2005). Economic urbanization brings about structural changes in employment in primary, secondary, and tertiary industries. Physical urbanization refers to the “urban look” of villages and towns that are under construction - to streets, public spaces, housing and factories etc. Sociocultural urbanization indicates the transformation of everyday life, which has seen newcomers working in factories and, increasingly, specialized farming operations. Political urbanization describes the decentralization from central government to the local municipalities, and new structures of power that emerge, with strong linkages between local officials and business elites.

Generally, urbanization in China is defined by a convergence process of population migration from rural areas to urban areas, and a series of related economic, social, and environmental transformations. The urbanization level is normally measured by the ratio of urban population to the total population in a region or a county. Beside the natural population growth in the cities, rural-urban migration constitutes the major part of urbanization in China. As shown in Table 4, over half of the urbanization growth in China came from rural-urban migration in the period 1978-1998.
Table 4. Urbanization and its constitution in China, 1978-1998

<table>
<thead>
<tr>
<th>Year</th>
<th>Urban population (10,000)</th>
<th>Urbanization</th>
<th>Natural growth</th>
<th>Net migration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level (%)</td>
<td>Growth in population (10,000)</td>
<td>Growth in population (10,000)</td>
<td>Share (%)</td>
</tr>
<tr>
<td>1978</td>
<td>17250</td>
<td>17.9 582 144 24.8</td>
<td>438 75.2</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>19139</td>
<td>19.4 645 158 24.5</td>
<td>487 75.5</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>21479</td>
<td>21.1 1305 228 17.5</td>
<td>1077 82.6</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>24017</td>
<td>23 1746 210 12</td>
<td>1537 88</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>26366</td>
<td>24.5 1272 281 22.1</td>
<td>991 77.9</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>28656</td>
<td>25.8 982 313 31.9</td>
<td>669 68.1</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>30191</td>
<td>26.4 651 306 47</td>
<td>345 53</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>32372</td>
<td>27.6 1829 255 13.9</td>
<td>1574 86.1</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>34301</td>
<td>28.6 950 269 28.3</td>
<td>681 71.7</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>35949</td>
<td>29.4 776 264 34</td>
<td>512 66</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>37942</td>
<td>30.4 953 310 32.5</td>
<td>643 67.5</td>
<td></td>
</tr>
</tbody>
</table>


4.2 The centrally-planned economy, before reform and opening-up

After the People’s Republic of China was founded in 1949, this war-torn country adopted centrally-planned economy and installed top-down controls over resource flows and distribution. The use and allocation of resources was strictly determined by the central government, which collected revenue from local municipalities and reallocated them to the localities according to the central plans. Thus, local
development were suppressed and limited, due to the shortage of revenue and the influence of the central plans.

In the centrally-planned era, priority was given to urban-based heavy industries. A strategy was adopted to promote capital-intensive heavy industries and a system was established by which government, by distorting the prices of commodities and factors of production, created an environment disfavoring agriculture, farmers, and rural areas in order to extract a rural surplus to fuel industrialization (Schultz, 1978). In 1953, a compulsory procurement policy was imposed in rural China, and peasants were obliged to sell certain amount of their production to the State at the government-set prices. However, the price of agricultural products was usually lower than the price of purchasing agricultural materials. Thus, over 30 billion ¥ in rural surplus was extracted through this so-called “price scissor” annually (Lu et al., 2001). Moreover, various agricultural and related taxes were also introduced in the national revenue system and around 79.2 billion ¥ was raised through these taxes from 1950 to 1977 (National Bureau of Statistics of China, 2010).

The hukou system that was established in late 1950s drew a clear distinction between rural and urban areas, creating spatial hierarchies between cities and the countryside (Cheng & Selden, 1994). Attached to the local social welfare, the hukou system in different places generated huge welfare differences. City dwellers of the urban hukou have a range of social, economic, and cultural benefits while over 800 million rural peasants were disallowed the same benefits due to their rural hukou. The hukou system actually prohibited linkages between cities and the countryside. In the centrally-planned era, the urban bias and hukou system have essentially disfavored rural development, making rural areas the source of capital, materials, and labor force for urban and industrial development in China.

4.3 Decentralization, globalization, and urbanization in the market economy
Generally, decentralization didn’t really take place until the reform and opening-up in China in 1978. The administrative decentralization has entailed the transfer of power from the central government to the provincial bureaucracies, which have shifted from being passive agents in the central government in China’s political arena to active bodies responsible for local prosperity (Zhu, 2000). Local governments therefore became very active in economic development after they were granted much autonomy in fiscal operation, financing, investment, and enterprise administration.

Market decentralization has incrementally dismantled the State planning and allocation system, which was replaced by the market mechanism. China’s marketization constitutes the establishment of an incentive mechanism through the removal of the egalitarian income distribution system. Joint ventures and sole proprietorship were all allowed to exist in the market economy. Economic conditions also flourished in rural areas. The household responsibility system was implemented, replacing collective farming in the people’s commune. Peasants became responsible for both the profits and the losses of their own household plots. This policy, which enabled peasants to deal with their surplus, has greatly increased peasants’ enthusiasm for agricultural production.

The initiative and actions of local governments in forging international economic relations have been a major determinant in China’s process of re-engagement with the global economy (Breslin, 2000). The abundant and cheap labor force, cheap land supply (often subsidized by the local governments), as well as the low value of Chinese currency against US dollar made China an attractive option for foreign direct investment (FDI) which searches for low-cost production sites. Labeled as a “world factory”, China’s actual usage of foreign capital in the period 1979-2000 came to 506 billion US dollar (National Bureau of Statistics, 2001). The major FDI predominantly rushed into the manufacturing sectors. By the end of 2001, over half
of the accumulated FDI was concentrated in the manufacturing sectors in China (National Bureau of Statistics of China, 2002). In 1993, machinery contributed to 17% of China’s exports, while this contribution reached 48% by 2003 (Guo and N’Diaye, 2009). Correspondingly, the Chinese economy became much more export-oriented.

Followed the strategy of “allowing some regions to get rich first and in turn helping other regions to gradually become rich”, Eastern China - due to its socio-economic and geographical conditions - became the region to get rich first. Facing the competition and opportunities of globalization, in particular it was the cities in Eastern China that received special economic status\textsuperscript{11} and preferential policies (e.g. tax breaks; favorable terms of loan, credit and subsidies; higher foreign exchange retention rates) from the central governments. That’s why the eastern provinces became the places of major FDI in China. As a consequence, there emerged an enlarged gap between eastern and inland areas.

In the urbanization process, the reform and opening-up has seen large-scale rural migration into the cities. According to the National Statistical Yearbook (1999), the contribution of rural-urban migration to the urbanization growth\textsuperscript{12} remained over 60% annually in the period 1978-1989. In particular, foreign-invested or Sino-foreign joint enterprises flourished in the manufacturing industries in Eastern China and enrolled many laborers from other provinces. Thus, urban development became much more export-oriented, which was also characterized as “exo-urbanization” (Sit & Yang, 1997) and as an “externally driven pattern” (Eng, 1997). This export-oriented urbanization pattern is also seen in inland cities, where the economy has tight connections with the global market.

As a strategic way of achieving “urbanization from below”, Township and Village Enterprises (TVEs) also achieved rapid growth in rural China. The strategy, which is to “strictly control the growth of large cities, to rationally develop
medium-sized cities, and to vigorously promote the growth of small cities and towns\textsuperscript{13}, encourages peasants to work in TVEs in small towns and medium-sized cities, instead of migrating to large cities. Lin (2004) considers it a response to the reform of the resource allocation mechanism, and as a way of mechanizing agriculture. By the end of 1988, there were 11.9 million TVEs in rural China, employing 95.5 million rural laborers (National Bureau of Statistics of China, 1990).

4.4 Comprehensive support of rural areas

Since the beginning of twenty-first century, China initiated a shift from its urban-biased stage to “industry nurturing agriculture and cities supporting countryside”. The basic reason is that urban-rural inequalities have enlarged ever since the reform and opening-up. Thus, the central government adopted policies of coordinating the harmonious economic development of urban and rural areas so as to achieve an overall well-off society in China.

A series of measures were taken, such as rural tax and fee reduction, agricultural production subsidy, support of rural infrastructure construction, and social development. All these rural-favored measures formed seven consecutive “No.1 Central Documents” issued by the Central Committee of the Communist Party of China and the State Council from 2004 to 2010, as follows:

(1) The No.1 central document on February 8, 2004, took “boosting farmers’ incomes” as its theme.

(2) The No.1 central document on January 30, 2005, focused on “strengthening rural work and improving the overall production capacity of agriculture”.

(3) The No.1 central document on February 21, 2006, aimed at “constructing a new socialist countryside”.

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(4) The No.1 central document on January 29, 2007, put emphasis on “developing modern agriculture and steadily promoting the construction of a new socialist countryside”.

(5) The No.1 central document on January 30, 2008, stressed the issue of “fortifying the foundation of agriculture” as its theme.

(6) The No.1 central document on February 1, 2009, was themed on “achieving steady agricultural development and sustained income increases for farmers”.

(7) The No.1 central document on February 1, 2010, targeted “better coordinating urban and rural development, consolidating the foundation for agricultural and rural development”.

These policies all focused on issues concerning agriculture, villages, and farmers in China. For instance, the Standing Committee of National Congress officially proposed and decided to cancel agricultural tax, local agri-product tax, and livestock farming tax in 2006. The central government spent around 13 billion ¥ to establish a rural social security system in 2007. In 2008, over 100 billion ¥ in subsidies were allocated to farmers for agricultural production (Xie, 2008). Much progress has been achieved in rural China. The grain production has increased continuously from 469.5 million tons in 2004 to 530.8 million tons in 2009. Correspondingly, rural household per capita income has also experienced rapid increases, from 2,934 ¥ to 5,153 ¥ in the same period (National Bureau of Statistics of China, 2009).

Facing ever-enlarging urban-rural inequalities and the problems confronted by farmers, agriculture, and rural areas, the Chinese government in the 11th Five-year plan (2006-2010) launched the strategy of “building a new socialist countryside”. This strategy embodies the central government’s declaration to promote rural development in terms of advanced production, improved livelihood, clean and tidy
villages, civilized social atmosphere, and efficient management. The key components incorporated in this strategy are:

- Developing modern agriculture by improving production capacity, promoting agriculture restructuring, strengthening the agricultural service system, and improving the rural distribution system;
- Increasing farmers’ incomes by exploring ways of increasing agricultural and non-agricultural income, and improving policies that serve to increase income levels;
- Improving the appearance of the countryside by strengthening rural infrastructure, improving rural environmental protection, improving rural healthcare and sanitation, and developing the rural social security system;
- Assisting new farmers by improving rural education, increasing labor skill training, and improving rural cultural development;
- Increasing investment in agricultural and rural areas; and deepening rural reform (Guo, et al. 2009).
5. MAIN RESULTS FROM THEMES INVESTIGATED IN THE FIVE PAPERS

5.1 Paper I: Future Urban-Rural Relationship in China: Comparison in a Global Context

Paper I of this thesis reviews the evolution of the urban-rural relationship in China after 1949, and compares that evolution with the urban-rural relationship evident in the developed countries since the Industrial Revolution.

The historical review demonstrates that the evolution of the urban-rural relationship in China can be highly attributed to political and market forces. The relationship between urban and rural China has evolved from the urban-biased and dualistic economy in the centrally-planned period to a new stage of “industry nurturing agriculture and cities supporting rural areas”. In this process, governmental policies have exerted great influence, and this shift has seen intensification of urban-rural linkages throughout the post-reform era.

An international comparison reveals that urban and rural areas in the developed nations are increasingly integrated and incorporated into ever-enlarging and strengthening world city networks. However, China still needs to transfer a large number of rural residents to the cities as the state approaches high urbanization levels. Rural migrants will continuously move into eastern provinces, whilst “urbanization from below” (rural, industrialization-lead urbanization) will mainly develop at the provincial level. In this process, the education and training of the labor force becomes a critical issue for future urbanization in China.

5.2 Paper II: Urban-Rural Interaction in China: Historic Scenario and Assessment

Paper II performs an assessment of urban-rural interactions in China in the 50-year period between 1958 and 2007, and further investigates whether or not the assessment bears resemblances to the historical evolution.
Urban-rural interaction is, in this paper, defined as linkages (backward and forward) - through labor, capital, materials and technology, etc. - between urban and rural areas. The direct consequences of such mutual linkages are the demographic, economic, and environmental changes experienced in both urban and rural areas. The paper therefore selects ten variables, representing these changes, in order to assess urban-rural interaction in China. A high interaction score indicates tight mutual linkages between urban and rural areas.

Four time periods are identified according to their respective urban-rural interaction scores (See Figure 3): from 1958 to 1977, urban-rural interaction scores stay at low level and experience two periods of fluctuation in the 1960s; urban-rural interaction scores start to increase but with a low speed from 1978 and throughout the 1980s; in the beginning of 1990s, urban-rural interaction scores grow continuously with higher speeds until 1995, after which the speed drops a little; and ever since 2000, urban-rural interaction scores have increased dramatically. The assessment of urban-rural interaction bears great resemblances to the historical evolution of urban-rural linkages (see section 3).

The paper finds that urban-rural interaction in China has increased continuously in the post-reform era. In particular, the shift from urban-biased policy to the strategy of comprehensively supporting rural development in the beginning of twenty-first century has greatly intensified urban-rural linkages in China. The paper indicates that, against a background of ever-enlarging urban-rural inequalities, rural-favored policies and measures can strengthen the mutual linkages between urban and rural areas in China in the future.

5.3 Paper III: *Decomposition Analysis of Population Change and its Determinants in Beijing-Tianjin-Hebei Metropolitan Region*
This paper investigates differences in population change and its determinants at the county level in the Jing-Jin-Ji region in the period 1990-2000. It decomposes population change in this region in terms of three residential patterns (urban districts, surrounding counties, and periphery areas) and three population growth groups (fast, medium, and slow growth groups). Research findings show that urban districts have the fastest population growth, followed by the surrounding counties, while the peripheral counties have the slowest growth. Further, it notes that over half of the population change in this region takes place in the urban districts and those of fast population growth. This is in line with the hypothesis that major population change in the Jing-Jin-Ji region takes place in the urban districts first, followed by the surrounding and periphery counties.

Regression analysis shows the different factors that are influential to population change in the two decompositions (See Table 2). In the urban districts and the fast growing districts/counties, only the initial population size was demonstrated as being significant. Beside the initial population size, economic factors (per capita GDP and its increase) also presented significance in the surrounding counties and medium growth counties. However, the geographic factor (accessibility) only showed significance in the periphery and slow growth counties. The research findings can contribute to the management of population distribution in the urban areas and rural peripheries in the Jing-Jin-Ji region in the future.

5.4 Paper IV: Spatial-temporal arable and built land use change in Beijing-Tianjin-Hebei Metropolitan Region, 1990-2005

Paper IV investigates the arable and built land use change at the county level in the Beijing-Tianjin-Hebei Metropolitan Region in the period 1990-2005. Unlike previous studies, which merely divided the region according to the administrations, the paper identifies, based on the theoretical analysis, three land use patterns in
terms of urban-rural resource flows: urban, peri-urban, and periphery areas (see Figure 2).

Research findings show that changes in arable land and built land is faster in the urban areas than in the peri-urban and periphery areas. The rate of land use change in the period 2000-2005 increased when compared to the rate experienced in the period 1990-2000 (see Table 6). This indicates that dramatic land use change has mainly taken place in the urban areas and their surrounding places, while periphery areas have experienced comparatively slow land use change. Moreover, socio-economic development since 2000 has accelerated the change of both arable land and built land in the Jing-Jin-Ji region.

Regression analysis of the driving factors behind land use change shows that certain factors contributed to the built land increase (and concurrent arable land decrease) in the three classifications in the period researched (See Table 7 and 8). Land use change in the region, and in the three classifications, in the period 1990-2000 is mainly attributed to increases in socio-economic factors. However, the factors of both the initial value and the increased value showed significance in the period 2000-2005.

The factors driving land use changes in urban and peri-urban areas have shifted from economic growth (increase of per capita GDP) in the first period to population growth in the second period. However, the factors driving land use changes in the periphery areas have changed from the initial economic level (initial per capita GDP) to the economic structure (the ratio of non-agricultural industrial employment to the total employment) during the period researched.

The paper predicts that built land in the urban areas of the Jing-Jin-Ji region will undergo continuous expansion which will, to a large extent, induce decreases in the arable land. However, land use in the periphery areas will maintain its slow change given to its demographic and economic conditions. Thus, the paper emphasizes the
role of peri-urban areas in the coordination of land use in the urban and periphery areas of this region in the future.

5.5 Paper V: *Resource flows and the decomposition of regional inequality in Beijing-Tianjin-Hebei Metropolitan Region, 1990-2004*

Paper V introduces a new way of decomposing regional inequality in the Jing-Jin-Ji region. Regional inequality (calculated by the Gini index\(^{15}\)) in this paper indicates the distribution of GDP at the county level in this region. Unlike current studies, which perform decomposition analysis according to the urban/rural administrations, the study detailed in this paper decomposes regional inequality in terms of resource flows and agglomerations. The starting point for the study is the notion that resource flows and agglomerations imply the economic conditions of different places in the region. Thus, three resource agglomeration patterns are identified in the Jing-Jin-Ji region: urban, peri-urban, and periphery areas (see Figure 3).

Research findings show that regional inequality decreased from 1990 to 1994, and stayed at around 0.35 from 1995 to 2004. The variations of Gini coefficients in urban, peri-urban, and periphery areas reflected the Gini coefficient of the whole region during the research period (see Figure 4). Inter-class inequality (inequality among the three classifications) contributed to the major part of regional inequality from 1993 to 2004. From 1990 to 2004, inequality between urban and peri-urban areas was the major component of inter-class inequality. This implies that regional inequality in this region does not primarily come from the inequality between urban and rural peripheries, and that the development of peri-urban areas can help reduce regional inequality in the Jing-Jin-Ji region.
6. DISCUSSION AND IMPLICATIONS

In general, the findings of the five papers answered the first two research questions of the thesis: how have urban-rural relations evolved in China, and what are their influences on regional development? This section discusses the research findings and generates implications for policy making and planning.

6.1 The role of governmental policies

Paper I and II qualitatively and quantitatively investigated the evolution of urban-rural relations in China. Such relations stayed at a low level over a long period before the reform and opening-up in 1978, and this level increased slowly in the initial years after 1978. Obvious intensification of urban-rural relations was found to have occurred since 2000 (see Figure 3 in paper II). Basically, this evolution took place in the background during a period in which China experienced the transformation of decentralization, urbanization, and globalization. In this process, the governmental policies regarding either urban or rural development exerted great influence on the linkages between urban and rural areas. In the centrally-planned era, before 1978, urban-biased policy placed emphasis on the heavy industries in the cities. Rural areas became the base from which finance and materials were supplied to the cities according to the direction of the central plans. Moreover, the *hukou* system and other related measures differentiated urban areas from rural areas and hindered direct resource flows (e.g. migration) between them. To a large extent, such urban-biased policy has intentionally created advantageous endowments in the cities, inducing resource concentration in urban areas.

Reform and opening-up witnessed economic growth both in the cities and villages. However, resource flows (e.g. population migration and economic activities) that were conducted by market forces tended to agglomerate in the cities
which, due to “external endowments”\textsuperscript{16}, could provide more job opportunities and generate high production returns. The shift from an urban bias to complete support for rural areas in the early twenty-first century has seen great intensification of urban-rural relations in China. Tax reduction and cancellation, various agricultural subsidies and financial support for infrastructure, education and medical treatment etc. were implemented by the government to comprehensively promote rural development. The subsequent intensification of urban-rural relations can be considered a response to these rural-favored measures. Like the urban bias in the centrally-planned era, the governments are now intentionally creating “external endowments” in rural China.

Governmental policies were shown to strongly influence resource flows between urban and rural areas. Figure 3 in Paper II also provides evidence of the effectiveness of rural-favored policies in adjusting and strengthening urban-rural linkages in China. Despite the abandonment of central planning and the impacts of market forces in shaping the national and local economies, the power of the State is felt in every facet of China's transformation. The reason for this lies in the central government’s concern that local interests may overtake national goals due to decentralization. Political control over localities is retained as a key instrument for the retention of the central government’s relevance (The World Bank, 1988 and Huang, 1996). The way in which urban and rural areas develop at the local level must, therefore, be in line with the policies from the central government. In this sense, the role of governmental policies - especially the rural-favored policies - could be used to coordinate urban and rural development, in a period in which China is facing the ever-enlarging urban-rural inequality. In light of the efficiency of the rural-favored policies (see Figure 3 in Paper II in the period 2003-2007), the implication for policy making is to maintain and strengthen current policies concerning agriculture, villages, and farmers in China.
6.2 The importance of urban-rural interface

Three resource agglomeration patterns are identified in the study of the Jing-Jin-Ji region: urban, peri-urban, and rural peripheries. The features of peri-urban areas as an urban-rural interface have been revealed in Papers III, IV and V. Resource agglomeration (that is, population mobility and land use) in the urban-rural interface stays at a medium level. The development of the urban-rural interface (that is, through the increase of units in the peri-urban areas described in Paper V) contributes to the reduction of imbalanced resource distribution between the urban and rural peripheries. Essentially, the features described in the paper support the role of the urban-rural interface as a medium for urban-rural linkages. The interface can provide a hinterland for further development in the urban areas, and supply high-order services from the urban cores to the rural peripheries. Generally, small and intermediate urban centers which are situated between urban and rural areas play such a role, contributing to the regional and rural development. Tacoli (2004) characterized this role in four ways: firstly, such places act as centers of demand/market for agricultural production; secondly, as centers for the production and distribution of goods and services to the rural areas; thirdly, as centers for the growth and consolidation of rural non-farm activities and employment; and finally, as places to attract rural migrants to and decrease pressure on larger urban centers.

Following Perroux’s theory (1955), the small and intermediate urban centers are growth poles in the periphery areas. They can be considered as the centers from which innovation and modernization can be diffused to the rural areas. These growth poles make it possible for clusters of services, facilities, and infrastructure that can’t be established economically in the small villages and hamlets to serve a widely dispersed population from an accessible and central place (Rondinelli, 1985). Small and intermediate urban centers can also help to diffuse congestion
problems from the urban areas to the peri-urban or even periphery areas. In this sense, the strategy of “strictly control the growth of large cities, to rationally develop medium-sized cities, and to vigorously promote the growth of small cities and towns”, which encourages peasants to work in the TVEs in small towns and medium-sized cities, incorporates the same notion and emphasis on the development of small and intermediate urban centers in China. Thus, the implications for regional planning are to develop a well-articulated, integrated, and balanced urban hierarchy in which more sub-centers are created in the rural peripheries.

6.3 Inducing the trickle-down effect

The findings of Papers III, IV and V show that population mobility and economic activity tends to concentrate in urban areas. One concern regarding such concentration lies in the problems induced by excessive agglomeration. How to induce resource agglomeration within the small and intermediate urban centers therefore becomes an important issue in achieving a coordinated urban and rural development. According to the inverted U-curve theory, spatial diffusion will occur in areas of lower production cost when the initial growth area begins to suffer the congestion problems which are associated with excessive agglomeration (Petrakos and Brada, 1989). However, there are cases where spatial diffusion has failed, even though incentives were offered to firms to relocate outside the urban areas. Hardoy and Satterthwaite (1986) argued that, in their study of failed trickle-down effect in developing countries, the designated “growth poles” (small and intermediate urban centers) were greatly dependent on the distribution of power, resources, and capacities from the higher levels of governments (state or provincial government). Thus, the sub-urban centers couldn’t compete with large cities for investment. Besides, Parnwell and Wongsuphasawat (1997) also pointed out that,
in the case of Bangkok’s extended metropolitan region, it is the transnational firms allied with local industry - rather than the government - that control the shape, physical form, and urbanization of the urban region.

Generally, the case in China also possesses the attributes mentioned above. In the urban-biased era, heavy industries were predominantly situated in the cities, as symbolized by the cellular society of danwei. Danwei is a self-contained, walled compound that enshrined not only a productive enterprise or service institution like a hospital or schools, but also a “small society” that provided a complete way of life (housing, dining hall, post office, and entertainment etc.) and personal security (Friedmann, 2005). The sectors in a danwei are, finally, expected to serve industrial production. Although such way of organizing production was abandoned in the market economy, those original industries are still, however, functioning as they were before. The most negative aspect of this system is that the organizations that are related to the danwei are also concentrated in cities. Thus, it is fairly difficult to induce the relocation of the danwei outside the cities. In this sense, government-directed or estimated trickle-down effects are hard to materialize once firms and other related economic activities have settled in urban areas.

The focal point then, is how to induce potential resource agglomeration in the sub-urban centers or even the rural periphery areas. The challenge is that large cities - due to their infrastructure, credit systems, and skilled laborers - are more competitive than the sub-urban centers and villages. As mentioned, the limited role of local governments in terms of investment, revenue, and decision-making often restricts the improvement of infrastructure, economy, and social welfare. Such influence may become particularly evident when there is a collision, in terms of development goals, with large cities. Thus, the priority is a real decentralization to the local governments for policy making, taxation, and investment, etc. In this
sense, such a move requires an empowerment of the sub-urban centers and the rural peripheries in dealing with revenue-raising and investment.

6.4 Promoting bottom-up initiatives

Compared with the “external endowments” which result from governmental influence, specialization based on the comparative advantages or returns to scale should constitute the internalized attributes which may strengthen the competitiveness of rural areas. It is therefore important to initiate rural development in accordance with rural competitiveness. Rural industrialization through the TVEs, which can help to diversify peasants’ income, is an efficient way of advancing the rural economy in China. Generally, the growth of the TVEs is mainly driven by the local, non-farm business activities such as manufacturing, construction, transportation, and commerce. Its advantages lie in the availability of large-scale, cheap labor force and land supply. By 1997, nearly 30% of the rural labor force was employed by the TVEs, producing about 80% of the gross rural output and around two-thirds of the total industrial output in rural China (Mukherjee and Zhang, 2007).

However, most TVEs in China are suffering a shortage of working capital since their initial capital accumulation (individual funds) through friends or relatives can’t sustain the need for reinvestment. Further, an enterprise income tax was introduced across all enterprise types. TVEs have to pay more taxes like resource tax, consumption tax, and land value-added tax etc. These two difficulties have basically discouraged rural economies of scale in China. Thus, it is crucial for local governments to provide public goods like credit, infrastructure, and the related preferences to promote the development of TVEs.

The agricultural cooperatives which bring peasants together and serve agricultural planting, processing, and marketing play a key role in modern
agriculture in China. Compared to the family-based farming system (the household responsibility system), agricultural cooperatives can enlarge land use scale for collective operation, specialization, and industrialization; increasing peasants’ capacity with respect to the market and to natural risks. Unlike the passive response of rural areas toward the urban-induced influences, agricultural cooperatives represent the rural stakeholders’ interests and are involved in the initiative of promoting active interaction between rural areas and their urban counterpart. Particularly when facing an ever-decreasing supply of arable land in the peri-urban areas, large-scale farming operations through agricultural cooperatives become the efficient and effective way to achieve competitive agricultural production. Moreover, agricultural industrialization - that is, to deeply process the farm production on the basis of large-scale agricultural operations - can greatly increase the production value and enable more peasants to work in the agricultural enterprises (Peng, et al. 2005). Li (2010) also argues that agricultural cooperatives are acting as the dynamic urban-rural interface, representing rural stakeholders’ interests and taking promoting rural development with initiative, by actively interacting with their urban counterpart.

Since China is a country with a major rural population and limited arable land, the current household land system will probably persist in the future. Thus, agricultural cooperatives in China are serving the suitable pattern of organizing peasants and improving their competitiveness in the market economy. As early as in the 1990s, around 60% of the agricultural production in European market was supplied by the agricultural cooperatives. In particular, diary products in countries like Denmark, Ireland, Finland, and Sweden were monopolized by the agricultural cooperatives. However, the influence of agricultural cooperatives on the urban market in China is not as strong as that of agricultural cooperatives in the
developed countries. Thus, agricultural cooperatives in China need to develop further and become the important part in the rural economy.
7. FOR FUTURE RESEARCH

To conclude the research of the thesis, my own feeling is that urban-rural relations in China are vulnerable since they are subordinate to the historical situation, to governmental policies, and to globalization. Resource flows between urban and rural areas have been conducted by both the political forces and market forces. Generally, urban areas in China have developed at the expense of rural areas, through a dualistic structure. The State has subsequently tried to reduce urban-rural inequalities by “industry nurturing agriculture and cities supporting countryside”. The question is therefore to what extent inequalities can be reduced by promoting rural development. Further, the issue of how to coordinate economic development with social development and environmental protection represents another challenge facing the rural areas in China. Based on the findings of the present research and my own experience, I list below three aspects which can be of great importance to the future urban-rural development in China.

7.1 Urban-rural environmental sustainability

For quite a long time - since the reform and opening-up - emphasis, at various levels of government, has been placed upon economic growth, while environmental protection and management in urban and rural areas has been (comparatively) neglected. Although an economic focus still exists in many local municipalities, awareness of the importance of environmental sustainability has increased recently. Taking Beijing and Tianjin as examples, it is noted that these two cities have been suffering severe water shortages since the 1990s as the result of their ever-increasing populations and the water consumption of industries (Table 5). There are, actually, many Chinese cities like Beijing and Tianjin that are suffering environmental problems such as water and land shortage and pollution because of rapid increases in population and excessive agglomeration. To a large extent, these
Environmental problems have limited the socio-economic development of these cities.

Table 5. Water shortage in Beijing and Tianjin, 1997-2003 ($10^8$ m$^3$)

<table>
<thead>
<tr>
<th>Year</th>
<th>Province</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beijing</td>
<td>-18.01</td>
<td>-2.77</td>
<td>-27.49</td>
<td>-34.06</td>
<td>-19.7</td>
<td>-18.51</td>
<td>-16.6</td>
</tr>
<tr>
<td></td>
<td>Tianjin</td>
<td>-19.06</td>
<td>-7.92</td>
<td>-22.91</td>
<td>-19.5</td>
<td>-13.4</td>
<td>-16.29</td>
<td>-9.93</td>
</tr>
</tbody>
</table>

Source: Feng and Liu (2006)
Note: water shortage = water supply - water consumption

Environmental problems used to be treated separately in cities and in the countryside in China. Environmental management has been recognized as effective in urban areas, while rural environmental protection and management was ignored for a long time. Florig et al. (1995), Zhang et al. (1997), and Abigail (1997) argue that effective environmental policy and management has rarely reached rural China. Given this dichotomous approach to environmental management, polluting industries have tended to move from cities to the countryside, where the environmental supervision is comparatively weak.

Urban-rural linkages have made the environmental problems in cities and villages fundamentally complicated. Firstly, urban expansion due to population increases demands more fuel, space for dwelling, water exploitation, and other resources from surrounding areas. Thus, the rural environment becomes vulnerable and faces a decreasing supply of arable land and increasing industrial pollution. Improved communication and transportation technologies have enabled the dispersion of urban environmental burdens to distant areas beyond urban
administration boundaries. Rees (1992) labeled this phenomenon as urban centers’ “ecological footprint” and indicated that a city’s ecological footprint is usually several times its geographical scope. Secondly, the relocation of those contaminative enterprises to the peri-urban areas has created an environmental dilemma which, if it is to be managed, requires a coalition of both urban and rural administrations. The questions of how to clearly distinguish the responsibilities and benefits of such a coalition, and how to properly coordinate these two administrations, add to the complexity of environmental management.

Urban-rural sectoral linkages have made the urban-rural boundaries even more blurred. The induced environmental problems are, therefore, interwoven in different sectoral industries in both the cities and the countryside. The development of rural industries which firmly rely on the urban market and services has posed great pressure on land, air, and water resources in rural areas. Some enterprises relocate their production parts to rural areas, while the R&D and the sales departments are left in the cities. To a large extent, environmental problems have reached places beyond the administrative and geographic boundaries between urban and rural areas.

Generally, rapid economic growth in China has been accompanied by severe environmental degradation (pollution, waste, and demand-driven resources depletion) both in the cities and the countryside. One argument to emerge holds that rapid economic growth in China has been achieved at the expense of the environment (Chan and Ma, 2004). Wu and Flynn (1995) and Geng et al. (2007) point out that China urgently needs to adopt a sustainability approach due to the escalating environmental and resource problems. Given the complexity of urban-rural environmental linkages, environmental management in China needs to be properly handled within a framework that includes both urban and rural areas.
7.2 The governance of rural development

As mentioned in section 4.4, many rural-favored policies and measures were put forward through the strategy of “building a new socialist countryside” so as to promote rural development in China. Although the policy expresses the good intentions of the central government, many problems have, however, emerged in the villages because of the misunderstandings of local governments. Local governments treated the new socialist countryside as only constituting the construction of new villages to help stimulate domestic demand in the countryside. Such construction was undertaken in many villages by demolishing old houses and roads, and constructing new ones, regardless of the real needs of the peasants. This caused huge economic and resource loss, since there are cases where new buildings were built on arable land and sold to the peasants. In the period 2001-2005, around 1.08 million hectares of arable land were lost because of construction activities in China. The problem is the reclaimed arable land, used to compensate the loss of the original land, is of low productivity and located in places with fragile ecosystems.

There is also the apprehension of the new socialist countryside as just a way of promoting the rural economy. Thus, local governments have tried every means to attract investment in the villages. Driven by economic motives, local governments provided very cheap (mostly arable) land and lowered the environmental standards so as to accelerate the process of examining and verifying the investment. As a consequence, many pollution-generating factories, which consumed vast tracts of land and resources, were established in the villages, inducing a series of environmental and social problems. Taking water pollution due to rural industries as an example, it is estimated that TVEs discharge over 10 billion tons of wastewater every year, half of the industrial wastewater discharge in
China (Wang, et al. 2008). However, most of the wastewater from rural industries is just piped into lakes or rivers without any treatment. According to State of the Environment Report (2002), 70% of the 741 river sections monitored were not suitable for human contact (with pollutions levels at or above Grade IV standard). Besides the abovementioned problems, rural China is also suffering ‘brain-drain’ due to the outmigration of young and skilled peasants to the cities. This problem exists in almost all the villages in China.

The outflow of able and better-educated laborers and the need for carers for children, the aged, and women in rural areas presents new challenges in rural China. According to a recent study by Jingzhong Ye et al. (2010), there were 87 million left-behind people in rural China, including 20 million children, 47 million wives, and 20 million aged people. The left-behind children are usually taken care of by their grandparents, however, due to the shortage of love and care from their parents, many of the children experience psychological and physiological problems. The left-behind wives have to handle the agricultural production, housework, and take care of the old and the young; shoudering a very heavy workload. Moreover, due to the long time separation, the divorce rate in rural areas has increased greatly. Left-behind aged people have to rely on themselves for basic needs, which have increased potential threats to their life and property safety, because of the shortage of care from their children.

In general, rural China is experiencing various economic, environmental, and social problems at present. All these problems require good governance and supervision of rural development in every aspect. However, such a move does not mean depriving the countryside local autonomy, but instead that higher-level governments need to guide and supervise rural development while keeping the autonomy and enthusiasm of the local municipalities.
7.3 Political empowerment of the rural areas

In essence, the research of the thesis implies that rural areas at present experience a situation of being inferior to the urban areas in China. Although both parts are equally important to the country, urban areas (as it turns out) are more politically important than the rural areas. One simple explanation for this is that the policy makers and governmental officials mostly live in the cities. Thus, it is natural that policy making will firstly consider and satisfy the needs and interests of the cities. This tendency is rooted in the urban-bias in China.

Taking the water supply of Beijing and Tianjin as an example, these two cities turned to the rural peripheries in Chengde where the Luan he river and Chaobai he river are located. In the period 1960-2000, Chengde provided 19.5 billion m$^3$ of water to the Miyun reservoir which supplied Beijing with 33 billion m$^3$ of water. Tianjin began to use water from Luan he river after the project of “diverting Luan he river to Tianjin” in 1983. Chengde supplied Pating and Da Heiting reservoirs with 46.5 billion m$^3$ of water from 1983 to 2000. The water consumption of Tianjin from these reservoirs from 1983 to 2005 was 12.3 billion m$^3$, among which 82% was supplied by Chengde (Song, 2006). To ensure an ample and clean water supply, the central government by using the administrative order, also constantly increased the limit of resource exploitation and industrial development in Chengde. Many industrial projects were therefore suspended or canceled in the periphery areas. Moreover, the project of “Converting crop land to grass and forest land” in Chengde and Zhang Jiakou, which was intended to protect the ecological environment in Beijing and Tianjin have also caused great losses to agriculture and animal husbandry in Chengde and Zhang Jiakou, since many places were closed to farming and grazing.
The case of the Jing-Jin-Ji region reveals the conflict between the politically-vulnerable rural areas and the urban areas where the high-ranking governments are located. Situated at the bottom of the Chinese administrative hierarchy (central government, province, city, county, town and village), rural committees are subordinate to the upper governments, which decide and designate the officials in the villages. Whether village officials are promoted or not also rest on the high governments. In this sense, what the officials in the villages can do should be strictly in line with the administrative order and preference of the high governments. Moreover, after the collective farming system collapsed in rural China and the household responsibility system was adopted, most villages experienced a shortage of collective assets and couldn’t launch large-scale projects like road construction and maintenance, school building and renovation, and other infrastructure construction. Particularly since the 16th Party Congress in 2002, rural reform in China has been following the main guideline of "more giving, less taking, and more flexibility". Thus, it is not allowed to collect money from the peasants in order to construct collective projects like roads, libraries and school renovation in the villages. Consequently, due to the shortage of finance, rural committees still need to rely on the financial support and allocation from high government, despite the fact that they are the autonomous units in the Chinese administrative system.

In fact, this problem concerns to a high degree the relation between rural autonomy and intervention from the high-level governments. On one hand, rural committees and the peasants are responsible for rural development; on the other hand, rural development also depends on the financial support of the high government. Thus, it is easy for administrative interventions from the high-level governments to take place in the rural areas. In this sense, a true empowerment of the rural areas becomes necessary for rural autonomy in China. In March 2010, the election law of the representatives to the People’s Congress at the county and
township level was changed, in order that new representatives could be elected according to the same population proportion in both the cities and countryside\textsuperscript{20}. This means that more representatives will be elected from the rural population which takes up major part of the Chinese population, and that more voices representing the rural areas will be heard in the People’s Congress. To a large extent, this political reform contributes to the empowerment of the villagers and places them in the same position as urban citizens. However, the reform of the election law is only one step of the rural empowerment in China. Whether this reform can generate the expected impact still relies on the real role of the People’s Congress in influencing the decision and policy making at various governments. Moreover, whether the rural-based representatives have the political capacity to collect the rural demand and appeal and turn them into laws and policies is also an important factor to the success of rural empowerment.
8. REFERENCES


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NOTES

1. In 1958, the Chinese government officially promulgated the family register system (*hukou*) to control the movement of people between urban and rural areas. Individuals were broadly categorized as a "rural" or "urban" worker. People seeking to move from the rural to urban areas to take up non-agricultural work would have to apply through the relevant bureaucracies.

2. In the Report of the Sixteenth National Congress of the (2002), the coordinated social and economic development in both the urban and rural areas was proposed. This notion is completely different from the urban bias in the centrally-planned era in China.

3. “No.1 Central Document” refers to the first document in the beginning every year, jointly issued by the Central Committee of the Communist Party of China and the State Council. This document contains the most important issues that the state needs to settle or deal with in the coming year.

4. Given the economic connections among the cities in Jing-Jin-Ji region, it is also called capital economic circle.

5. Besides these eight cities, Hebei Province also includes other three prefecture-level cities in the southern part: Hengshui, Xingtai and Handan. In the scope of Jing-Jin-Ji region, Hebei Province does not include these three cities. Hebei Province in the paper follows this division and only consists of eight prefecture-level cities.

6. Tangshan is the base supplying coal and construction materials to Beijing and Tianjin. Baoding has been the important military base and agricultural-production base for Beijing. Qin Huangdao is an emerging energy base and auxiliary harbor for Beijing. Zhang Jiakou and Chengde which are situated in the north of Jing-Jin-Ji are important for ecological protection in Beijing and Tianjin.
7. Ministry of Public Security, *Chengshi hukou guanli zanxing tiaoli* (Interim Regulations on Urban Household Administration), issued on July 16, 1951, Also see Renmin Ribao (People’s Daily), July 16, 1951.

Ministry of Internal Affairs, *Hukou dengji zanxing banfa*(caoan) (Provisional Measures for Hukou Registration (draft) in Teaching and Researching Unit of Civil Law, China People’s University (ed.), *Zhonghua renmin gongheguo minfa cankao ziliao* (Reference materials on the civil law of the People’s Republic of China), Vol.I, (Beijing: China People’s University, 1956), pp.146-149.

8. “Price scissors” in China refers to is the phenomenon which has most frequently taken the form of falling prices for agricultural produce and steady prices for industrial goods.

9. The agricultural and related taxes include the tax on the use of cultivated land, the taxes on special agricultural and forest products (only the tax on special agricultural products in 1994), agricultural tax, animal husbandry and contract tax.

10. Collective farming is the type of agricultural production in which the holdings of several farmers are run as a joint enterprise. This type of collective is essentially an agricultural production cooperative in which member-owners engage jointly in farming activities. In people’ commune, everything is shared. People work together and eat together in the communal dining.

11. These are the special economic zones of Shenzhen, Zhuhai, Shantou and Xiamen (1980); 14 open coastal cities (1984); Hainan island (1988) and Pudong district in Shanghai (1990) and free trade zones in coastal cities (1993).

12. Urbanization level is refers to the ratio of urban population to the total population. The increase of urban population includes natural urban population growth and the rural-urban migrants.

13. Renmin Ribao (People’s Daily), 16th October 1986, Beijing
14. The demographic data used in the paper is from the national census which is conducted every ten years. The sixth census started in 2010. However, the detailed data has not been published. Due to the data availability, the paper only uses the fourth and fifth national censuses (1990, 2000).
15. The most unequal distribution is that when a single person receives 100% of the total income/GDP and the remaining people receive none (G=1); and the most equal distribution is that when everyone receives the same income/GDP (G=0).
16. Comparing with the natural endowments like natural resource, geographic location, governmental investment and resource allocation in the cities during the urban-biased period have intentionally created the external endowments like infrastructure construction, education and medical care in the cities.
17. The 4th Plenum (Plenary Session) of the 16th CPC Central Committee, 2004
18. How to hold the underline of 1.8 billion mu arable land in China (15 mu=1 hectare)
http://gb.chinareviewnews.com/crn-webapp/doc/docDetailCreate.jsp?coluid=7&kindid=0&docid=100152984
19. According to the author’s survey, there are quite many places of no such environmental standards for investment.
20. The start of change of the People’s Congress in the county and township, the first time of election according to the population proportion in the cities and countryside
## Table 1. Definitions of designated cities and towns since 1955

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Criteria</th>
<th>Official document</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955</td>
<td><strong>Designated cities</strong>&lt;br&gt; (1) a place with a clustered population of more than 100,000; or&lt;br&gt; (2) an important industrial and mining center, seats of province-level state government agencies, relatively large centers for the collection and distribution of goods, or important cities and towns in remote border regions with a clustered population less than 100,000</td>
<td>“Decision by the State Council regarding the establishment of cities and towns”</td>
</tr>
<tr>
<td></td>
<td><strong>Designated towns</strong>&lt;br&gt; (1) seats of county-level or above state government agencies; or&lt;br&gt; (2) with a clustered population of 2,000 of which 50% or more are non-agricultural population.</td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td><strong>Designated cities</strong>&lt;br&gt; (1) The minimum city size remained unchanged, but the granting of exceptions to places with population of less than 100,000 became stricter.&lt;br&gt; (2) The size of city suburban districts was reduced because proportion of agricultural population was not allowed to exceed 20%.</td>
<td>“Directive on the adjustment of (the criteria of) establishing cities and towns and on reducing the areas of city suburban districts”</td>
</tr>
<tr>
<td></td>
<td><strong>Designated towns</strong>&lt;br&gt; (1) A place with a clustered population of 3,000 or more and more than 70% share of non-agricultural population; or&lt;br&gt; (2) a clustered population of between 2,500 to 3,000, of which 85% or more were non-agricultural population.</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td><strong>Designated towns</strong>&lt;br&gt; (1) All seats of county-level state government agencies; or&lt;br&gt; (2) seats of commune (xiang)-level government agencies with more than 2,000 non-agricultural population.</td>
<td>“Circular of the State Council approving the report of the Ministry of Civil Affairs regarding the adjustments of the criteria of designated town”</td>
</tr>
<tr>
<td>1986</td>
<td><strong>Designated cities</strong>&lt;br&gt; (1a) A place with a non-agricultural population of more than 60,000 and a Gross National Product (GNP) of more than 200 million RMB;&lt;br&gt; (1b) a place that does not meet the conditions stated in (1a) but is located within a border, minority, or scenic area, or is a center of mining, industry, and technology or transportation;&lt;br&gt; (2a) if a county has less than 500,000 people; the county seat has more than 100,000 in non-agricultural population, less than 40% agricultural resident, and has a GNP of more than 300 million RMB, this county may be designated as a city;&lt;br&gt; (2b) if a county has more than 500,000 people; the county seat has more than 120,000 in non-agricultural population, has a GNP of more than 400 million RMB, this county may be designated as a city; or&lt;br&gt; (2c) an autonomous prefecture seat has less than 100,000 in non-agricultural population and a GNP of less than 300 million RMB.</td>
<td>“Report of the Ministry of Civil Affairs regarding the adjustments of the criteria of designated cities and conditions for city to administer counties”</td>
</tr>
<tr>
<td>1993</td>
<td><strong>Designated cities</strong>&lt;br&gt; Different requirements in the minimum size of non-agricultural population and its share, GDP and the share of the tertiary industry, local financial revenues and level of urban infrastructure.</td>
<td>“Report of the Ministry of Civil Affairs regarding the adjustments of the criteria of designated cities”</td>
</tr>
</tbody>
</table>

Source: Liu et al. (2003), pp.11
<table>
<thead>
<tr>
<th>Criteria</th>
<th>County-level city</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population density in the former county</td>
</tr>
<tr>
<td></td>
<td>&gt;400</td>
</tr>
<tr>
<td>Population</td>
<td>Population with non-agricultural hukou</td>
</tr>
<tr>
<td>Seat town of county government agencies</td>
<td>Non-agricultural population</td>
</tr>
<tr>
<td>The whole county jurisdiction</td>
<td>Total population</td>
</tr>
<tr>
<td></td>
<td>Population engaged in non-agricultural activities</td>
</tr>
<tr>
<td>Economic</td>
<td>Total</td>
</tr>
<tr>
<td>Gross industrial product of town and township-level enterprises or above of the whole county</td>
<td>Proportion to the total gross product of agriculture and industry</td>
</tr>
<tr>
<td>GDP of the whole county</td>
<td>total</td>
</tr>
<tr>
<td></td>
<td>Share of the tertiary industry</td>
</tr>
<tr>
<td>Local financial revenues</td>
<td>Total (Yuan)</td>
</tr>
<tr>
<td></td>
<td>Per capita</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Covering rate of tap water</td>
</tr>
<tr>
<td></td>
<td>Covering rate of tar road</td>
</tr>
<tr>
<td></td>
<td>Sewer system</td>
</tr>
</tbody>
</table>

Source: Liu et al. (2003), pp.12
Table 3. Definitions of urban population in the national censuses of China

<table>
<thead>
<tr>
<th>National censuses</th>
<th>Urban population definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>First census 1953</td>
<td>All population (agricultural and non-agricultural) reside in designated cities and towns.</td>
</tr>
<tr>
<td>Second census 1964</td>
<td>Non-agricultural population within the designated urban places which were classified according to the criteria of defining cities and towns in 1963.</td>
</tr>
<tr>
<td>Third census 1982</td>
<td>Adoption of definitions in 1953.</td>
</tr>
<tr>
<td>Fourth census 1990</td>
<td>(a) All population, including agricultural and non-agricultural, of cities with urban districts, which is in line with the 1982 definition; (b) the non-agricultural population of designated towns and cities without urban districts, which is roughly in line with the 1964 definition; or (c) temporary population (rural-urban migration without changing Hukou status) who lives in cities for more than one year.</td>
</tr>
<tr>
<td>Fifth census 2000</td>
<td>(a) Only and when in those urban districts, cities, and towns with a population density higher than 1,500 persons per km$^2$, all population is regarded as urban population. As for urban districts with a population density lower than 1,500 persons per km$^2$, only the population that lives in streets, town sites, and adjacent villages is counted as urban population. For higher-level cities with large urban districts, the figures for urban population based on the 2000 census definition would be smaller than those on the 1990 census definition. On the other hand, for lower-level cities without urban districts and designated towns but with high population density, the figures for urban population based on the 2000 census definition would be much larger than those on the 1990 census definition. Thus, the 2000 census definition may greatly improve the comparability of statistical data at provincial-level. Or (b) immigrants without <em>hukou</em> but who reside in cities and towns longer than 6 months, rather than one year in the 4th Census, are accounted as local urban population.</td>
</tr>
</tbody>
</table>
LIST OF PAPERS


Paper IV. Yuheng Li and Qian Zhang (2011) “Spatial-temporal arable and built land use change in Beijing-Tianjin-Hebei Metropolitan Region, 1990-2005”. The paper was presented in the 2011 AAG (Association of American Geographers) conference, 12-16 April, Seattle, and submitted for publication review to *Growth and Change*.

Paper V. Yuheng Li (2011) “Resource flows and the decomposition of regional inequality in Beijing-Tianjin-Hebei Metropolitan Region, 1990-2004”, *Growth and Change* (Accepted for publication, 3 September 2011)