

THE VERTICAL AND HORIZONTAL EXPANSIONS OF CHINA'S CITY SYSTEM¹

C. Cindy Fan

**Department of Geography
University of California—Los Angeles
405 Hilgard Avenue
Los Angeles, California 90095
Tel: 310-825-3821
Fax: 310-206-5976
fan@geog.ucla.edu**

Abstract: Most studies of the size, growth, and distribution of cities have been based on Western economies and have identified economic factors such as scale and agglomeration economies and level of economic development as major determinants of urban growth. It is unclear whether these generalizations are applicable in socialist economies. In this paper, I argue that institutional factors have played key roles in shaping China's city system, which is characterized by declining population concentration across cities and by tremendous vertical (population growth of cities) and horizontal (addition of new cities) expansions. The empirical analysis focuses on describing the size distribution of cities, estimating a multivariate model predicting the population growth of cities, and performing a logistic regression analysis of new and existing cities. The findings underscore the effects of urban and regional development policies, socialist institutions, changes in the urban administrative system, and state and local government interests, and suggest that they as a whole are more important than economic factors in explaining the attributes and changes of China's city system. [Key words: urban growth, city system, institutional factors, China.]

Research of the size, growth, and distribution of cities continues to occupy a central position in urban geography. Early interests in rank-size distributions have given way to emphases on processes and contexts of urban growth, and on situating urban systems in their political-economic and historical contexts. Yet much of our existing knowledge is based on studies of Western economies, where firms and individuals (e.g., migrants) are often considered primary agents of urban growth. Relatively little is known about urban systems in current or former socialist economies, which are underrepresented in cross-country and longitudinal studies.

Studies based on Western economies generally have concluded that urban growth is primarily a function of economic factors, specifically scale and agglomeration economies and level of economic development. But socialist and socialist transitional economies, where institutional factors play important roles in shaping the urban systems, present a challenge to these generalizations. Through a study of China's city system, I argue in this paper that institutional factors including policy, socialist administrative institutions, and the agencies of state and local governments, may be more important than economic factors in explaining the evolution of urban systems.

China's city system is unique, large, and complex. Despite a relatively low level of economic development, population distribution across cities resembles that of developed nations. This is related to China's long history and large size, but is also a function of the tremendous expansion of the city system—vertically through population increase of cities and horizontally through the addition of many new cities. The ways in which the system expands vertically and horizontally must be understood in relation to institutional factors. Specifically, urban policy that limits migration and the size of large cities, regional development policy that favored inland regions in the pre-reform period but has focused on the eastern coastal region since the reforms, the state's emphasis on cities as growth poles for stimulating regional economic development, and state and local governments' attempts to "upgrade" counties and towns into cities, are all important factors shaping China's city system.

The next section of the paper gives a brief and critical review of the literature focusing on economic explanations of urban growth. It is followed by a short but important discussion of how Chinese cities are defined and designated. Then, the empirical analysis begins with descriptions of the size, number, and growth of Chinese cities and of their size distribution. After a detailed discussion of factors of city growth, I estimate a multivariate model evaluating the relative contribution of various factors to the vertical expansion of China's city system from 1949 to 1980 and from 1980 to 1994, respectively. Then I discuss the complexities of new city designation and, through a logistic regression analysis that compares new and existing cities, I highlight the role of institutional factors in the horizontal expansion of China's city system.

EXPLANATIONS FOR THE SIZE AND GROWTH OF CITIES

An important strand of urban systems research has focused on the descriptions and explanations of city size, growth dynamics of cities, and distribution of population across cities. Among the many theories advanced to explain city sizes, the rank-size model has been most popular. Yet critics not only question the applicability of the rank-size rule (e.g., Rosen and Resnick, 1980), but more importantly they point out the lack of consistent and well-defined theoretical explanations of the processes that govern city-size distributions (Carroll, 1982; Sheppard, 1982; Guerin-Pace, 1995). Many argue that a more desirable approach is to focus on the processes and contexts of urban growth (Ettlinger, 1981; Sheppard, 1982).

The literature has identified economic factors as the most important systematic explanations of city size (Richardson, 1973). In particular, scale and agglomeration economies often are highlighted as critical ingredients for urban growth (Alonso, 1971; Mera, 1973; Parr, 1985; Clayton and Richardson, 1989; Richardson, 1989; Begovic, 1992; Alperovich, 1993). This view stresses in particular the relationship between industrialization and urbanization, and argues that large cities and cities with concentration of economic activities will continue to grow, primarily through rural-urban migration, until scale diseconomies set in. By the same token, cities that are centers of political power also attract agglomeration of economic activities and tend to grow faster than other cities (Browning, 1958; Friedmann, 1978).

Studies on contexts of urban growth have highlighted level of economic development as an important explanation of city-size distributions within nations. In this view, low

levels of development are associated with primacy, whereas economic development is conducive to a spatially and socially organized urban hierarchy and more even distribution of population (Mehta, 1964; Lasuen et al., 1967). Therefore, a more concentrated distribution of cities during early stages is expected to be followed by deconcentration of population at more advanced stages of development. Evidence supporting this view typically is based on cross-sectional studies involving national per capita GNP, but also is drawn from longitudinal national studies. For example, Wheaton and Shishido (1981) argued that reaching a certain level of per capita GNP will enable population deconcentration from core regions and subsequently a more evenly distributed urban system. More recent studies continue to emphasize the link between higher per capita GNP and a more evenly distributed urban system (e.g., Alperovich, 1993).

While scale and agglomeration economies and level of economic development are powerful explanations of urban systems in Western nations, their applications in developing countries and socialist economies are at best qualified. In MacKellar and Vining's (1995) study of 90 countries, for example, they found that many developing countries do not exhibit the expected relationship between economic development and population deconcentration. Clayton and Richardson's (1989) study of the former Soviet Union showed that the state's plan to control the size of large cities contradicts the principle of scale economies. On the other hand, Begovic (1992) showed that Yugoslavia's city size is a function of agglomeration economies and industrial diversification, owing to income maximization by firms. These conflicting findings supported Berry's (1961) argument that explanations of city size must be mediated by the size of the country, the history of urbanization, and the complexity of forces affecting the urban system.

Urban systems in socialist economies are poorly understood, partly because of their underrepresentation in cross-country analyses, and partly because of the focus of existing studies on firms and migrants, rather than political institutions, as agents of urban change. This is unsatisfactory especially in contexts where urban policy is pursued explicitly. Even in capitalist economies, institutional interests and local politics are important factors of city size (e.g., Jonas, 1991); but their roles are seldom addressed in the literature. In socialist economies, where state and local governments frequently "intervene" directly in the evolution of urban systems (Smith et al., 1983), institutional factors are even more important. Although many former and existing socialist economies are undergoing economic transformation, thus permitting firms and individuals to play more important roles, the socialist institution and its legacy continue to influence urban growth. Rather than weakening in their influences, socialist institutions often are making adjustments to economic transformation, while continuing to exert control over processes of urban growth.

China's city system clearly exhibits profound impacts of institutional factors. Not only have urban and regional development policies explicitly encouraged or discouraged growth of cities of certain sizes, they also have enabled the growth and birth of cities in certain parts of the country more than in others. Most importantly, these policies have not been stagnant but have changed especially in relation to the economic reforms and economic transformation. Through population growth of cities and designation of new cities, China's city system has expanded tremendously, which is key to understanding processes of urban growth and the role of institutional factors in that growth. Before we go on to examine China's city system, definitions related to China's cities must first be clarified.

DEFINITIONS OF CITY POPULATION IN CHINA

The definitions of cities and city population in China are not straightforward because they have changed many times and because they vary widely from one study to another. Several recent studies have provided effective inventories and discussions of these definitions and their changes (Chan, 1994b; Hsu, 1994; Kirkby, 1994). A brief summary follows. First of all, Chinese urban places consist of cities and towns. Both are administrative entities and must be officially designated. The designation criteria, though revised many times, are a function of political-administrative status (e.g., seat of government), economic development, total population and *nonagricultural* population² of the settlement, or a combination of the above. These criteria are designed to reflect the level of urbanization, economic development, and special functions of the settlement.

Designations of a rural settlement as a town, and a town or county (usually considered a rural settlement) as a city, denote an "upgrading" of status in the administrative hierarchy and usually are accompanied by greater autonomy, political power, and access to resources (e.g., taxes, foreign investment). Local authorities are therefore eager to pursue upgrading of their settlements to higher statuses, and are sometimes successful in doing so even if they have not satisfied official designation criteria. Such efforts have culminated into the upgrading of many towns and counties to cities since the early 1980s, resulting in a sharp increase in the total number of cities. Some small counties have earned the city status even though their population may be smaller than many other towns.

Cities are further categorized into three major levels, in descending order: (1) provincial-level cities or centrally administrated municipalities (*zhixiashi*), (2) prefecture-level cities (*dijishi*), and (3) county-level cities (*xianjishi*). In 1994, there were a total of 3 provincial-level cities (Beijing, Shanghai, Tianjin),³ 183 prefecture-level cities, and 436 county-level cities. The higher the level, the more directly the city reports to Beijing and the greater is its autonomy and influence.

A major difference between provincial- and prefecture-level cities on one hand and county-level cities on the other, which also gives the former wider spheres of influence, is the extent of their administrative jurisdiction. A revival of the "city leading counties" (*shidaixian*) concept in the 1980s (Ma and Noble, 1986), which emphasizes cities as growth poles, has brought about enlargement of the jurisdiction of provincial- and prefecture-level cities over surrounding counties and in some cases neighboring county-level cities. Since the surrounding counties may be largely rural, it is necessary to distinguish between two definitions of provincial- and prefecture-level cities (SSB, 1996, p. 583). The narrow definition *shiqu* (loosely translated as city proper or urban district) includes *chengqu* (built-up area) and *jiaoqu* (suburban area) but excludes the surrounding counties and county-level cities under the city's jurisdiction. The broad definition *diqu* (prefecture) includes all areas under the city's jurisdiction. Most studies of city population, including this paper, use the narrow definition. Since county-level cities do not administer surrounding areas, they automatically are considered as *shiqu* (SSB, 1998, p. 626). Data used for empirical analysis in this paper, including data per unit area and per capita, are all based on *shiqu*.

It is important to note that *shiqu* may still include a significant number of people engaging in agricultural activities. But available data do not provide further subdivisions of provincial- and prefecture-level cities into *chengqu* and *jiaoqu* portions, or county-

level cities into finer portions for temporal comparison.⁴ A popular solution is to use *nonagricultural* population (footnotes 2 and 4) to represent city population (e.g., Zhou and Yang, 1988; Leung and Yeh, 1993). A practical reason is that *shiqu nonagricultural* population (*shiqu feinongye renkou*) is the official and only reliable population estimate for the entire array of cities in China. It is the only indicator of city population that permits comparative studies both spatially and temporally. Except for in-depth case studies of individual cities, there are simply no systematic data for the population who hold *agricultural hukou* but live and/or work in the city. Including them would have boosted even more the expansion of the city system. The *agricultural* population includes temporary migrants who may plan to return to their homes in the near future and transients who do not intend to stay. Although anecdotal evidence suggests that many migrants do stay in the city for extended periods of time, estimates of their number do not exist, except for a handful of large cities. Until systematic estimates about urban *agricultural* population are available, *shiqu nonagricultural* population will continue to be the best indicator of city population in China. Therefore, unless otherwise specified, in the rest of the paper city population refers to *shiqu nonagricultural* population.

CHINA'S CITY SYSTEM AND ITS EXPANSIONS

The size and distribution of cities are central to China's urban policy and research (Ma and Noble, 1986; Pannell, 1990; Yeh and Xu, 1990a, 1990b). For example, Pannell (1982) and Fan (1988) have shown that policies discouraging urban growth succeeded in halting the growth of large cities between the 1950s and about 1970. Similarly, Xu et al. (1995) concluded that size distribution of China's cities has become more even between 1953 and 1986.⁵ Hsu (1994) identified four periods of urban development: (1) pre-1953 period of modest urban growth, (2) rapid urban growth from 1953 to 1961, (3) period of uncertainty with slow urban growth from 1962 to 1977, and (4) rapid urban growth from 1978 to 1990. These studies all highlight the important role of state policy in fostering changes in China's city system.

Table 1 shows the number of cities in the first four conventional size categories (super-large, very-large, large, and medium) and two classes of "small cities" for selected years. The four selected years are approximately 15 years apart, and delineate among them an early period of relatively little state intervention (1949 to 1965); the more radical period, including the Cultural Revolution, of strict control in urban growth (1965 to 1980); and the reform period with rapid expansion of the city system (1980 to 1994). They also correspond roughly to Hsu's (1994) last three periods of urban development.

Since cities with population less than 100,000 are similar in size to, and perhaps smaller than, many towns that have not attained city status, the former are omitted from the empirical analysis in this paper.⁶ As noted in Table 1, cities with 100,000 or more population represent the bulk of China's city system. In 1994, they accounted for 75.1% (467) of all cities and 94.4% (180.83 million) of the population in all cities. Unless otherwise specified, in the following discussion, China's city system refers to cities with 100,000 or more population.

Between 1949 and 1994, the number of cities has grown from 50 to 467; the bulk of that growth occurred after 1980, where an average of 20.5 new cities were designated every year. The size distribution of cities in 1994 suggests that most of the newly desig-

TABLE 1.—NUMBER OF CITIES BY SIZE AND *NONAGRICULTURAL* POPULATION

<i>Nonagricultural</i> population		1949	1965	1980	1994
> 2,000,000	super-large	1	5	7	10
1,000,000–2,000,000	very-large	4	8	8	22
500,000–1,000,000	large	7	18	30	41
200,000–500,000	medium	18	42	72	175
100,000–200,000	small (1)	20	54	63	219
< 100,000	small (2)	82	41	43	155
Total number					
All cities		132	168	223	622
100,000+		50	127	180	467
Average annual increase					
All cities		2.25	3.67	28.50	
100,000+		4.81	3.53	20.50	
Total <i>nonagricultural</i> population (million)					
All cities		27.41	66.91	90.72	191.65
100,000+		23.33	64.01	87.98	180.83
Average annual growth (%)					
All cities		5.58	2.03	5.34	
100,000+		6.31	2.12	5.15	

Source: SSB (1990, 1996).

nated cities are small or medium in size. Specifically, while the growth in the number of super-large, very-large, and large cities primarily results from size increase of cities from smaller categories, the several-fold increase in the number of medium (from 72 in 1980 to 175 in 1994) and small (from 63 in 1980 to 219 in 1994) cities reflects the concentration of newly designated cities in these size categories.

Partly because of the addition of new cities, and partly because of size increase of existing cities, population in China's city system grew from 23.33 million in 1949 to 180.83 million in 1994. In 1994, China had a total of 32 cities with one million or more population, representing a more than five-fold increase from 1949. During the periods 1949 to 1965, 1965 to 1980, and 1980 to 1994, average annual growth of city population was 6.3%, 2.1%, and 5.2%, respectively, which illustrates the differential impacts of policy on urban growth in different periods. As a whole, these rates of growth were much higher than population growth rates for the nation; the growth of city population since 1980 was especially prominent when compared with declining national population growth rates resulting from aggressive birth control campaigns since the late 1970s.

A number of studies have found that China's city-size distribution approaches the rank-size rule (Berry, 1961; Onoye, 1970; Pannell, 1990), but most scholars agree that the roots of such patterns are unlike that of developed countries. With a relatively low level of economic development, China's city-size distribution is more likely a result of its large size, long history of urbanization and urban policy. Although the rank-size approach to studying city size has been criticized for its lack of theoretical bases, the rank-size func-

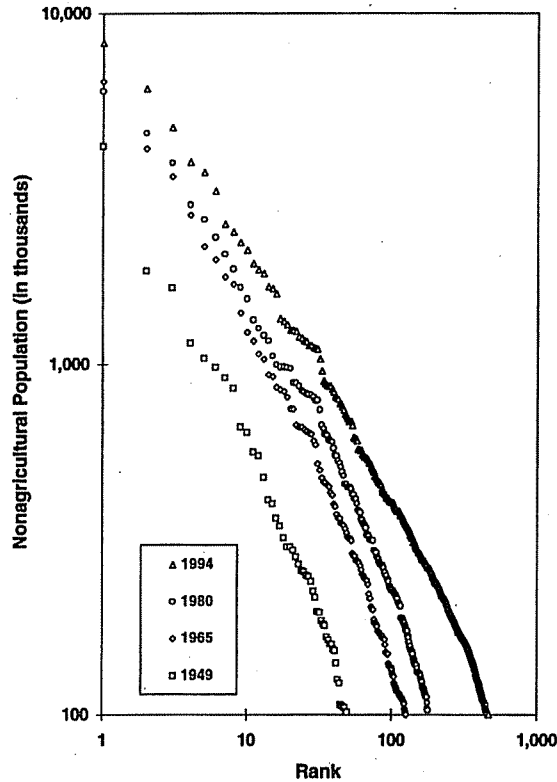


Fig. 1. Size distribution of cities with nonagricultural population over 100,000 (1949, 1965, 1980, and 1994).

tion remains an effective tool for measuring population concentration (Malecki, 1975, 1980; Fan, 1988, 1992). Figure 1 shows the rank-size distribution for the four selected years, using city population data from China State Council and the Chinese Academy of Sciences (1987) and SSB (1990, 1991, 1995, 1996). The movement of the distribution over time away from the lower-left origin of the graph depicts the expansion of the city system. More specifically, I estimate for the four selected years the rank-size function

$$\ln y = a + b \ln r \tag{1}$$

where y is city size, r is city rank according to size ($r = 1$ for the largest city), a estimates the intercept or logarithm of the size of the largest city, and b is the slope coefficient of the rank-size curve. Since b also evaluates the percentage rate of change in size associated with the percentage rate of change in rank, it can be interpreted as a measure of population concentration in the city system—a more negative b indicates a less even distribution of city population, and a less negative b a more even distribution.

Columns 2 through 4 of Table 2 summarize the estimates for equation 1. Estimates for a (constant) indicate that, over time, the largest city has increased in size. More importantly, changes in the b estimate (less negative over time—from -0.95 in 1949 to -0.78 in

994
10
22
41
75
19
55
22
57

31.65
30.83

er of
from
1980
ntra-

se of
49 to
more
riods
lation
f pol-
much
since
ation

s the
at the
level
large
ch to
func-

TABLE 2.—ESTIMATES OF RANK-SIZE FUNCTIONS FOR CITIES WITH 100,000+
NONAGRICULTURAL POPULATION^a

Year	Number of cities (1)	Linear			Expanded: $b = b_0 + b_1 r^2$			
		Constant (2)	b (3)	r^2 (4)	Constant (5)	b_1 (6)	b_0 (7)	R^2 (8)
1949	50	6.23	-0.95	98.14%	5.98	-0.82	-4.91e-05	99.36%
1965	127	7.06	-0.95	97.97%	6.70	-0.81	-7.42e-06	99.59%
1980	180	7.11	-0.87	97.73%	6.72	-0.74	-3.44e-06	99.60%
1994	467	7.24	-0.78	99.08%	6.95	-0.70	-2.51e-07	99.86%
1994 ^b	180	7.30	-0.81	96.92%	6.75	-0.66	-3.94e-06	99.65%

^aAll estimates are significant at 0.01 or lower.

^bExcluding new cities added since 1980.

Source: SSB (1990, 1996).

1994) suggest that size distribution of cities has become more even over time. This finding supports earlier and recent works indicating continued decline in national urban primacy during the past several decades (Chang, 1986; Pannell, 1990; Yan, 1995). But a single b coefficient is not capable of summarizing the entire city system. After experimenting with several different functions, the following expansion equation is selected to represent variation of b across the system:

$$b = b_0 + b_1 r^2 \quad (2)$$

Substituting equation 2 back to equation 1 yields the following terminal model:

$$\ln y = a + b_0 \ln r + b_1 r^2 \ln r \quad (3)$$

Columns 5 through 8 in Table 2 summarize the estimates for the terminal model. The coefficients of determination (R^2) have improved to more than 99% across all four selected years, which in conjunction with statistically significant coefficients for b_1 indicate that the expansion is warranted. Negative coefficients for b_1 suggest that population concentration is more uneven among smaller cities (of lower ranks). Changes in the b_1 coefficient over time are indicative of the relative growth of cities. A more negative b_1 coefficient in 1965 (-7.42e-06) suggests that between 1949 and 1965 larger cities grew faster than smaller cities, which characterized urban growth in that period. On the other hand, since 1965, smaller cities have grown faster than larger cities, which has not only reduced the slope of the rank-size curve as a whole (b), but has also reduced population concentration among smaller cities, as reflected by less negative b_1 coefficients in 1980 (-3.44e-06) and 1994 (-2.51e-07).

The designation of many new cities since the early 1980s has likely contributed to the trend toward more even distribution of population among cities. To test this effect, the rank-size functions are estimated again for the city system in 1994, by omitting new cities

added since 1980. A b coefficient of -0.81 is between the 1980 and 1994 estimates for the entire system (-0.87 and -0.78 , respectively), which suggests that deconcentration of population did occur among the existing cities in 1980, but also that the addition of 287 new cities between 1980 and 1994 has further accelerated this process. Estimates for the expanded model also depict the effect of new cities toward more even distribution in the city system.

The above findings show that two processes simultaneously have contributed to the expansion of China's city system and more even distribution of population in that system. During the vertical expansion of the system, characterized by growth in city population, smaller cities have grown faster than larger cities. Second, the horizontal expansion of the system is marked by addition of new cities, mostly smaller in size. Both processes are critical for explaining why the city-size distribution takes the forms shown in Figure 1 and Table 2, and are necessary for understanding how China's city system evolves. The impacts of various factors of urban growth can be more thoroughly documented through an examination of the vertical and horizontal expansions of the city system. The next two sections examine the contexts of these expansions and evaluate empirically factors of such expansions.

Vertical Expansion of the City System

Urban growth generally is attributed to three factors: (1) urban natural increase, (2) rural-urban migration, and (3) changes in the urban administrative system. Among them, rural-urban migration often is considered the most important factor. The conventional view is that cities afford scale and agglomeration economies, which facilitate industrialization and economic opportunities which in turn attract migrants (e.g., Todaro, 1976). Therefore, large cities and cities with concentration of economic activities are more likely to grow. On the other hand, urban natural increase and the urban administrative system usually are considered less important factors in city growth.

In the case of China, however, one must reevaluate the relative importance of these three factors. The effect of urban natural increase is indeed limited because birth rates generally are lower in cities than in rural areas. The second factor, migration, has been controlled strictly by the state. Through the *hukou* system, the Chinese state has not only monitored where people live but also thwarted rural-urban migration by denying migrants without local registration (*hukou*) entitlements and benefits enjoyed by urban residents (Chan, 1994a; Cheng and Selden, 1994). It has been an effective instrument suppressing the growth of large cities.

The notion of restricting the growth of large cities has its roots in the antiurban sentiment popularized by Mao, but is continued in the post-Mao period because of the fear of uncontrollable urban growth that has haunted so many developing countries. Official urban policy since 1980 is to "control large cities, develop medium-sized cities rationally, and actively develop small cities." Urban policy in the 1990s continues to emphasize controlling the size of large cities, and advocates the growth of smaller places, despite a growing sentiment among scholars that large cities are more efficient (Wei, 1994; Zhao and Zhang, 1995; Zhou and Yang, 1995).

Nonetheless, urbanward migration has become more prevalent since the 1980s. Part of it is due to the return of millions of people who were forced to migrate to the countryside

R^2
(8)

1.36%
1.59%
1.60%
1.86%
1.65%

is find-
ban pri-
) But a
experi-
lected to

(2)

(3)

odel. The
s all four
or b_1 indi-
population
in the b_1
egative b_1
ities grew
the other
s not only
population
its in 1980

uted to the
effect, the
new cities

during earlier periods. But more importantly, it is a function of new opportunities in cities and relaxation of migration control. Since the reforms, decollectivization of the economy and expansion of foreign investment have created many new employment and economic opportunities in Chinese cities. Recent research has revealed that economic opportunities are indeed a key determinant of the direction and volume of migration in China (Fan, 1996). At the same time, the increasing agricultural labor surplus compelled the state to grant peasants temporary permits to work in urban areas (*Renmin Ribao* [People's Daily], October 22, 1984, pp. 1-2). But the role of migration as a factor of city growth is still unclear so long as migrants are not given rights to permanently stay in the city.

The third factor—the urban administrative system—is a more important factor of city growth in China than in most Western nations. Kirkby (1994) estimated that administrative changes accounted for 40% of China's total urban increase from 1978 to 1990. As discussed earlier, the post-Mao development strategies highlight cities as growth poles playing leading roles in stimulating regional economic growth, and revitalize the "city leading county" policy that allows cities to administer surrounding counties. Such emphasis on city-led growth has also resulted in "upgrading" of places in the urban hierarchy. Upgrading of counties and towns to cities, which increases membership of the city system and expands the system horizontally, will be discussed in the next section. Upgrading of an existing city in the urban hierarchy, from county-level to prefecture-level, or from prefecture-level to provincial-level, signifies increases in power, authority, and resources, which are all conducive to further growth. The most recent and publicized example is Chongqing, which was a prefecture-level city until 1997. After obtaining a provincial-level status that year (footnote 3), it now reports directly to Beijing rather than through Chengdu, capital of the Sichuan Province where Chongqing used to belong.

Bigger roles by cities and upgrading of cities have also brought about altering, usually enlargement, of their geographic territories. This mostly is done by annexing part of the area of neighboring counties and towns, thus increasing the city's population and resource base. However, it is important to distinguish annexation of area from the "city leading county" policy that designates cities to administer surrounding areas (*diqu*). Although the two processes are related, and both are a function of increasing roles of cities, annexation increases directly the geographic territory and population of the city proper (*shiqu*), while the "city leading county" policy enlarges the jurisdiction but not necessarily the geographic territory of *shiqu*. The considerable increase in the geographic territory of *shiqu* since the early 1980s suggests active processes of annexation by cities. Among the 180 cities in 1980, their average annual growth rate of geographic territory was 3.8% during the period 1982 to 1994 (China State Council and the Chinese Academy of Sciences, 1987; SSB, 1996). Expansion of a city's geographic territory results in in-situ urbanization because the population in annexed areas is reclassified automatically as city population.

Another institutional factor is regional development policy. Urban development before the late 1970s was dominated by an even development strategy. The First Five-Year Plan (1953 to 1957) and the "third front" program in the 1950s and 1960s are examples of the state's desire to industrialize inland areas at the expense of coastal development. Since the late 1970s, however, a shift of emphasis to the eastern coastal region has brought about an uneven regional development policy (Yang, 1991; Fan, 1997) through, for example, designations of special economic zones and various open zones. Some coastal cities are

allowed to grow rapidly, through migration and by annexing neighboring areas, reflecting the state's preferential policy and the effect of foreign investment on city growth. For example, the designation of Shenzhen and Zhuhai in Guangdong as two of the first four special economic zones, which has brought about considerable foreign and domestic investments and migration, has boosted their population many-fold, respectively, from 67,600 and 42,100 in 1980 to 695,000 and 308,600 in 1994 (SSB, 1990, 1995).

In short, explanations of the growth of Chinese cities must consider not only economic factors such as scale and agglomeration economies, but also various institutional factors including regional development and urban policies. Strategies encouraging or discouraging cities of certain size to grow, policies fostering enlargement of cities' geographic territories, and measures promoting the growth of cities in specific parts of the country have been especially relevant to the evolution of China's city system.

In order to ascertain the relative contributions of various factors of city growth, I estimate a multivariate model with population growth of cities as the dependent variable and predictors of population growth as independent variables. Data limitations preclude the decomposition of population growth into portions attributable to natural increase, migration, and changes in the urban administrative system. Instead, these factors are represented by various independent variables in the model.

Natural increase is represented by the variable NI. Scale and agglomeration economies are both expected to enhance economic opportunities and attract migrants. If scale economies is an important factor of urban growth, then large cities will grow faster than small cities. But if China's urban policy of controlling the size of large cities has been effective, then opposing results are expected. SIZE (city population at the beginning of each period) is selected as an independent variable for testing these effects. The variable AGGLOMERATION, which measures concentration of economic activities by dividing total output⁷ by the city's geographic area, represents the effect of agglomeration economies. The variable OUTPUT evaluates per capita output (footnote 7) and is a proxy for the city's level of economic development. More specifically, it connotes income, wealth, and economic opportunities. In short, SIZE, AGGLOMERATION, and OUTPUT represent systematically the important factors of rural-urban migration in many developing countries—migrants go to large cities, cities with concentration of economic activities, and cities with high levels of economic development.

The effects of the urban administrative system are represented by the variables AREA and HIERARCHY. AREA is the average annual growth rate of the area and measures changes in the city's geographic territory. HIERARCHY tests if cities of higher administrative statuses, which are given greater autonomy and access to resources, have grown faster. It is a dummy variable with values 1 for provincial- or prefecture-level cities and 0 for county-level cities. Since provincial- and prefecture-level cities are generally bigger in size than county-level cities, HIERARCHY and SIZE are correlated ($r = 0.39$ for 1994). But since HIERARCHY refers to two dichotomous classes of cities, and some county-level cities are bigger in size than certain prefecture-level cities,⁸ including both variables in the model facilitates estimations of their independent effects on city growth while holding the other constant. Multicollinearity diagnostics will also detect if correlation between HIERARCHY and SIZE has unduly affected the model's estimation.

In addition to the above variables that are more directly related to factors of natural increase, migration, and the urban administrative system, several additional variables for

TABLE 3.—GROWTH AND DISTRIBUTION OF CITIES WITH 100,000+
NONAGRICULTURAL POPULATION

	Growth ^a		Distribution				1994 All
	1949-1980	1980-1994	1949-1980		1980-1994		
			Existing ^b	New	Existing	New	
Eastern	2.8	3.3	62.0	30.8	39.7	51.4	46.9
Central	3.8	3.3	26.0	47.7	41.3	36.5	38.3
Western	3.5	2.8	12.0	21.5	19.0	12.2	14.8
Number of cities	50	180	50	130	180	287	467

^aGrowth refers to average annual growth of *nonagricultural* population during respective periods.

^bExisting cities refers to cities at the beginning of each period; and new cities refers to cities designated during that period.

testing the effects of China's regional development policy are included. Table 3 shows in summary the spatial shifts of urban growth—from 1949 to 1980 cities in the central region grew the fastest (3.8%), followed by those in the western (3.5%) and eastern (2.8%) regions, but from 1980 to 1994 growth rates of cities in the central and eastern regions were the same (3.3%) while city growth in the western region has slowed down considerably (2.8%). Two dummy variables—EAST and WEST—represent these effects in the model. Cities in the eastern region are coded 1 for EAST and 0 for WEST, those in the central region 0 for both variables, and those in the western region 0 for EAST and 1 for WEST.

Regional development policy in the reform period also is characterized by preferential treatments of coastal provinces and open zones, including large amounts of domestic investment and aggressive measures for attracting foreign investment. Both types of investments are expected to boost city growth. To represent these effects, D-INVESTMENT and F-INVESTMENT are included as the final two independent variables in the model, representing respectively and in per capita terms domestic investment and foreign investment received by the cities.

Ideally, the model of city growth should be estimated for the several periods of urban growth identified in the literature and outlined earlier, since each period signifies some changes in policy. But data limitations do not permit such detailed analyses. And since development strategies and urban policy have changed most drastically since the economic reforms, the analysis focuses on the two periods from 1949 to 1980 and from 1980 to 1994. The dependent variable is the average annual growth rate of city population during respective periods. Because only cities that existed at the beginning of each period are included, new cities that were designated after 1949 are not included in the 1949 to 1980 analysis, and new cities that were designated after 1980 are not included in the 1980 to 1994 analysis. The 1949 to 1980 model omits the three independent variables AREA, D-INVESTMENT, and F-INVESTMENT because respective data for that period are not available. For both periods, the years at which independent variables are evaluated are determined by data availability and consistency (Table 4 notes).

TABLE 4.—REGRESSION ON CITY GROWTH^a

Independent variable ^b	1949–1980		1980–1994	
	Standardized regression coefficient ^c	Sig. level of <i>t</i> ^d	Standardized regression coefficient	Sig. level of <i>t</i>
Natural increase ^e				
NI	0.2211	0.15	-0.0557	0.42
Economic factors/urban policy				
SIZE	-0.1382	0.55	-0.2830	0.03
AGGLOMERATION	0.0013	0.99	-0.1112	0.21
OUTPUT	-0.0196	0.91	-0.0195	0.86
Administrative system				
AREA	-	-	0.5935	0.01
HIERARCHY	0.1057	0.42	0.1926	0.01
Regional development policy				
EAST	-0.4324	0.01	0.0208	0.78
WEST	-0.0220	0.89	-0.1055	0.12
D-INVESTMENT	-	-	0.1019	0.25
F-INVESTMENT	-	-	0.1635	0.03
<i>R</i> ²		0.31		0.43
Adjusted <i>R</i> ²		0.19		0.40
Sig. level of <i>F</i>		0.02		0.01
Degrees of freedom (regression)		7		10
Degrees of freedom (residual)		42		162

^aThe dependent variable is average annual growth rate of city population.

^bEvaluation of independent variables is based on data availability and consistency:

1949–1980: NI—natural increase in 1982; SIZE—*nonagricultural* population (100,000) in 1949; AGGLOMERATION—gross value of industrial and agricultural output (100,000 yuan) per sq. km in 1982; OUTPUT—per capita gross value of industrial and agricultural output (1,000 yuan) in 1982;

1980–1994: NI—natural increase in 1990; AREA—average annual growth rate of city area between 1982 and 1994; SIZE—*nonagricultural* population (100,000) in 1980; AGGLOMERATION—gross national product (100,000 yuan) per sq. km in 1994; OUTPUT—per capita gross national product (1,000 yuan) in 1994; D-INVESTMENT—per capita fixed asset investment (1,000 yuan) in 1994; F-INVESTMENT—per capita foreign investment (100 US\$) in 1994;

Both: HIERARCHY—1: provincial- or prefecture-level city; 0: county-level city in 1994; EAST—1: eastern region; 0: otherwise; WEST—1: western region; 0: otherwise.

^cCoefficients in bold indicate significance levels less than 0.05.

^dSignificance levels less than 0.01 are indicated as 0.01.

^eAll variance inflation factors associated with independent variables are less than 4, suggesting that multicollinearity is not unduly affecting regression estimates.

Source: China State Council and the Chinese Academy of Sciences (1987); SSB (1991, 1996).

Table 4 summarizes the results of multiple regression for estimating the model. Standardized regression coefficients, which estimate the mean response (in standardized units) in the dependent variable per (standardized) unit change in the independent variable, when all other independent variables are held constant, are reported in order to facilitate comparison of the relative importance of predictors. Coefficients statistically significant at the 0.05 level or below are in bold. Multicollinearity diagnostics indicate that all variance inflation factors associated with independent variables are less than 4, and that multicollinearity has not unduly affected regression estimates.

For both periods, the coefficient for NI is not significant, a result consistent with the expectation that natural increase has not played an important role in city growth. The coefficients for SIZE are negative in both periods, and significant from 1980 to 1994, indicating that smaller cities have grown faster than larger cities. The standardized regression coefficient of SIZE (-0.2830) for 1980 to 1994 shows that it is the second most important predictor of city growth in that period (after AREA). These results offer strong evidence for the effectiveness of China's urban policy that restricts the growth of large cities and encourages the growth of medium and small cities, and against scale economies as an important factor of city growth in China.

In both periods, neither AGGLOMERATION nor OUTPUT is significantly related to city growth, as judged by the low values of their standardized regression coefficients and the high significance levels of associated t values. Economic development, both in terms of the concentration of economic activities and output level, does not seem to be an important predictor of city growth in China.

On the other hand, AREA and HIERARCHY, both describing features of the urban administrative system, are positively and significantly related to city growth during the 1980 to 1994 period. In fact, the standardized regression coefficient of AREA, 0.5935, is the largest among all coefficients, which indicates that enlargement of geographic territory is the most important factor in the population growth of cities. Although the coefficient of HIERARCHY is not significant from 1949 to 1980, this variable is the third most important predictor (0.1926), after AREA and SIZE, of city growth from 1980 to 1994. As expected, provincial- and prefecture-level cities that have been given greater authorities, especially in the reform period, have grown faster than county-level cities. This is not to be interpreted as contradictory to the findings about SIZE outlined earlier. Together, their results suggest that when controlling for administrative status, smaller cities have grown faster than larger cities; and when controlling for population size, cities of higher statuses have grown faster than cities of lower statuses.

The dummy variables EAST and WEST together represent regional differentials in city growth. A highly negative and significant coefficient for EAST from 1949 to 1980 (-0.4324) is consistent with the expectation that cities in the eastern region have grown much slower than other cities in that period, and confirms the effectiveness of pre-reform regional development policy in discouraging urban growth near the coast and encouraging the growth of inland cities. A reversal seems to have taken place since the reforms, as depicted by the change of sign of the coefficient for EAST from 1980 to 1994, but its high significance level indicates that it is still premature to argue that cities in the eastern region have grown significantly more rapidly than inland cities. As outlined earlier, cities in the eastern and central regions had the same growth rates during the 1980 to 1994 period (Table 3).

The effects of domestic investment and foreign investment can only be observed for 1980 to 1994 since data for D-INVESTMENT and F-INVESTMENT are not available for the previous period. Their coefficients are both positive, as expected, suggesting a generally positive relationship between regional development policy that influences the two types of investment and city growth. The statistically significant coefficient of F-INVESTMENT (0.1635) further stresses the importance of foreign investment. But its effect, as judged by the small standardized regression coefficient, is weaker than that of expansion of area (AREA), urban policy on city size (SIZE), and the administrative status of cities (HIERARCHY).

The above results support the notion that institutional factors, including urban policy, changes in the urban administrative system, and regional development policy, are the most powerful explanations of city growth in China. Contrary to conventional wisdom, scale and agglomeration economies and level of economic development have not been important predictors of city growth. During the pre-reform period, inland cities grew faster than cities in the eastern region, reflecting the spatial bias of regional development policy at that time. Since the reforms, the most important predictors of city growth continue to reflect institutional controls, in the form of enlargement of the city's geographic territory, urban policy favoring smaller cities and cities with higher administrative statuses. There is also some evidence of a spatial shift in city growth toward the eastern region, which together with the positive effect of foreign investment suggest that post-Mao regional development policy also has played an important role in explaining city growth.

Horizontal Expansion of the City System

In addition to population growth of existing cities, a distinct feature of China's city system is the tremendous increase of new cities. The number of Chinese cities (with 100,000 or more population) has increased from 50 in 1949 to 467 in 1994 (Table 1). This increase has been uneven temporally and spatially. The highest rate of increase was in the 1980 to 1994 period, as discussed earlier and outlined in Table 1, which reflects reform policies emphasizing the role of cities in stimulating regional economic development.

In principle, Chinese cities are designated when they satisfy the official criteria, as discussed in earlier sections. But in practice, city designation is not determined solely by the official criteria. It is also the end result of a complex process involving not only state policy but also local interests. All towns and counties are eager to be upgraded to the city status because the latter is accompanied by significantly greater political power, fiscal autonomy, accessibility to resources, and ability to attract domestic and foreign investment (Yeh and Xu, 1990a). Once the city status is obtained, it also opens the door to future expansion and possibilities for administering surrounding counties. Achieving the city status is therefore a great cause of celebration and is testimony to the efficacy of local officials.⁹ Representatives of local interests will therefore go to great length, including lobbying and bribery, in order to achieve the city status (Hsu, 1994). The combination of state policy and local interests represent a coalescence of top-down and bottom-up motivations, and both have played important roles in the rapid horizontal expansion of the city system since the late 1970s.

Spatial shifts in regional development policy clearly have influenced the regional distribution of new cities. Table 3 shows that in 1949 the majority of cities (62.0%) were in the eastern region, but an addition of 130 cities from 1949 to 1980—47.7% of them in the central region—has shifted the regional distribution so that in 1980 the central region had the largest proportion (41.3%) of cities. Nevertheless, post-Mao regional development policy, which emphasizes economic growth of the eastern coastal region, has facilitated the birth of new cities in that region more than in others. From 1980 to 1994, the majority (51.4%) of new cities were in the eastern region, thus once again making it the region with the largest proportion of cities (46.9%) in 1994.

A comparison of existing and new cities may shed some light on the factors affecting the horizontal expansion of the city system. This is done through a logistic regression analysis where the dependent variable takes the value of 1 for new city and 0 for existing city. I use independent variables similar to those for predicting city population growth in the last section, except natural increase (NI) and increase in geographic territory (AREA). Natural increase is not likely to distinguish new cities from existing cities. Since data about the new cities before they are designated are very limited, I omit increase in geographic territory as an independent variable. In order to include most or all of the new cities designated during a period of time, independent variables must be evaluated near or at the end of that period.

Under most circumstances, logistic regression is used to evaluate the relative importance of determinants in explaining the choice between two categories. In this analysis, however, I use logistic regression to identify how and whether new and existing cities differ. Therefore, the interest is more on classifying the observations into new and existing cities, rather than on predicting whether a city is likely new or existing. For example, I ask the question "are new cities likely to be of smaller size" rather than "are small cities more likely to be new cities." Although statistically there is no difference between the two questions, the subtle difference in interpretation needs to be pointed out.

Table 5 summarizes the results of logistic regression for the periods from 1949 to 1980 and from 1980 to 1994. Although we are less concerned with the predictive power of the "model," high levels of ρ^2 (0.53 for 1949 to 1980; 0.60 for 1980 to 1994) and high percentages of correctly classified observations (86.2% for 1949 to 1980; 86.9% for 1980 to 1994) suggest that the independent variables as a whole are successful in identifying salient differences between new and existing cities. Because odds ratios are unit-dependent, they are reported for reference only and should be interpreted with care. Odds ratios higher than 1 suggest positive relationships, and odds ratios lower than 1 negative relationships, with new cities. However, the size of odds ratio is not necessarily indicative of the strength of the relationship. The size of standardized regression coefficients and associated significance tests are more reliable indicators. In Table 5, standardized regression coefficients that are statistically significant at 0.05 or below are shown in bold.

The highly negative and significant coefficients for SIZE (-11.3357 for 1949 to 1980; -14.2715 for 1980 to 1994) in both periods suggest that new cities are considerably smaller than existing cities. This finding supports an earlier observation that the addition of new cities, especially in the post-reform period, has contributed to a reduction of population concentration in the city system. The negative and significant coefficient for HIERARCHY from 1980 to 1994 (-2.1952) indicates that new cities are more likely of county-level than provincial- or prefecture-level statuses, which is consistent with the

TABLE 5.—LOGISTIC REGRESSION ON EXISTING AND NEW CITIES^a

Independent variable ^b	1949–1980			1980–1994		
	Standardized regression coefficient ^c	Sig. level of Wald statistic ^d	Odds ratio	Standardized regression coefficient	Sig. level of Wald statistic	Odds ratio
Economic factors/urban policy						
SIZE	-11.3357	0.01	0.4929	-14.2715	0.01	0.3416
AGGLOMERATION	-1.9638	0.27	0.9936	-2.9917	0.01	0.8681
OUTPUT	-0.1762	0.82	0.0532	0.8757	0.19	1.0865
Administrative system						
HIERARCHY	0.0350	0.98	1.0348	-2.1952	0.01	0.0965
Regional development policy						
EAST	-1.8283	0.01	0.1929	1.3374	0.01	3.7086
WEST	0.6378	0.49	2.0874	-0.5841	0.11	0.4800
D-INVESTMENT	-	-	-	-0.1678	0.74	0.9635
F-INVESTMENT	-	-	-	0.8916	0.02	1.2747
Model chi-square		110.95			369.11	
Significance level		0.01			0.01	
-2 log likelihood with intercept		208.72			617.87	
-2 log likelihood of model		97.77			248.77	
ρ^2 ^e		0.53			0.60	
Percentage correctly classified		86.21			86.88	
Number of cases		174			465	
Degree of freedom		6			8	

^aDependent variable— 0: existing city in the beginning of each period; 1: new city.

^bEvaluation of independent variables is the same as Table 4, except: D-INVESTMENT—per capita fixed asset investment (1,000 yuan) in 1990; F-INVESTMENT—per capita foreign investment (US\$ 100) in 1990;

^cCoefficients in bold indicate that significance levels of Wald statistics are less than 0.05.

^dSignificance levels less than 0.01 are indicated as 0.01.

^e $\rho^2 = 1 - (-2 \log \text{likelihood of model} / -2 \log \text{likelihood with intercept})$.

Source: China State Council and the Chinese Academy of Sciences (1987); SSB (1991, 1996).

expectation that upgrading of cities takes place progressively, starting with county-level status.

A negative and significant coefficient for AGGLOMERATION from 1980 to 1994 (-2.9917) suggests that economic activities are less spatially concentrated in new cities than in existing cities. The coefficient of OUTPUT is not significant in either period, indicating little difference in per capita output between new and existing cities. Together, the AGGLOMERATION and OUTPUT coefficients seem to suggest that new cities as a whole do enjoy levels of economic development similar to existing cities, although the former do not offer the same degrees of agglomeration economies.

The coefficient for EAST is significant in both periods, but its reversal of sign from negative (-1.8283) to positive (1.3374) reflects a reversal of regional development policy—the pre-reform period encouraged urban growth in inland areas while post-Mao regional development policy focuses urban growth in the eastern region. Though not significant, the coefficient for WEST also exhibits a sign reversal, from positive to negative, which further confirms the regional shift in the birth of new cities. These findings also demonstrate greater aggressiveness of local governments in the eastern region in pursuing city status and suggest that relative prosperity enjoyed by many coastal areas is accompanied by urbanization and greater political influence (by local governments that lobby for upgrading of their administrative statuses).

Finally, the positive and significant coefficient for F-INVESTMENT (0.8916) from 1980 to 1994 indicates that new cities as a whole receive higher per capita foreign investment than existing cities. This, together with the above findings about EAST and OUTPUT, hint that new city status has been granted to places exhibiting a combination of ingredients for economic growth, including location in the eastern region and potential for attracting foreign investment, despite their smaller sizes. From a different perspective, China's state and local governments have in the reform period set aside coastal regions and zones most attractive to foreign investment for not only city growth but also designation of new cities. Many small places in coastal provinces have been granted city status so that they could become centers for attracting foreign investment and growth poles for their hinterlands.

SUMMARY AND CONCLUSION

Among existing studies of urban systems, the size, growth, and distribution of cities traditionally have been explained in relation to economic factors. The most prominent economic factors are scale and agglomeration economies and level of economic development. Specifically, large cities and cities with concentrations of economic activities are expected to grow faster, and countries with high levels of economic development are expected to have a more even distribution of population across cities. Whether these generalizations hold in socialist economies is unclear. In this paper, an empirical study of China's city system has shown that population concentration across cities has declined despite the nation's relatively low level of economic development, smaller cities have grown faster than larger cities, and agglomeration economies have not been a critical factor of city growth. The reasoning of popular approaches such as the rank-size rule, however, is not adequate for understanding the intricacies of China's city system. By examining various factors of city growth and comparing new cities with existing cities, this paper has argued for the importance of institutional factors, including explicit state urban and regional development policies, socialist legacies such as the *hukou* system, and local governments and interests, in explaining the attributes and dynamics of the city system.

China's city system is distinguished by its size (large number of cities and large population), complexity (e.g., intricate definitions of cities and complex administrative processes for city designations), and rapid expansion. The expansion has taken place both vertically through population growth of cities and horizontally by the addition of new cities to the system. Both types of expansion have been especially profound since the

reforms and are central to understanding the size, growth, and distribution of cities in China. In both cases, institutional factors have been prominent.

During the pre-reform period, spatial bias of regional development policy favoring inland regions contributed to faster city growth there than in the eastern coastal region. Since the reforms, however, such spatial differentials have disappeared, while foreign investment has emerged as an important predictor of city growth. The notion of cities as growth poles stimulating regional economic development has facilitated the enlargement of cities' geographic territory and subsequently city population, and stimulated population growth of cities with higher administrative statuses. But urban policy on city size continues to limit the growth of large cities, partly via the *hukou* system, so that smaller cities have generally grown faster than larger cities.

The designation of many new cities, especially since the reforms, has expanded China's city system horizontally. The empirical analysis has shown that new cities are smaller and of lower administrative statuses than existing cities. Prior to the reforms, inland regions were more conducive to the birth of new cities, but it is in the eastern region that most of the post-Mao new cities have appeared. Such spatial reversal is testimony to shifts in regional development policy since the reforms, and of more aggressive efforts by local governments in the eastern region to pursue city status. As a whole, the priorities by state and local governments to develop the eastern region, which also have boosted foreign investment there, have led to locational shifts in city growth and in the designation of new cities.

The analysis in this paper has confirmed the key role of institutional factors in shaping China's city system. Unlike many Western economies, the notions of scale and agglomeration economies have been downplayed in the making of China's urban and regional development policies. Even during the ongoing socialist transition, which allows market mechanisms to play bigger roles, socialist institutions such as the *hukou* system continue to exert control over urban growth, and state and local governments continue to play important roles in "planning" the growth of cities and designation of new cities. The role of institutional factors is illustrated further by the interplay between urban and regional development policies, as seen in the impacts of regional development policy on spatial patterns of urban growth, and in the expectation of cities to accomplish regional development goals.

NOTES

¹An earlier version of this paper was presented at the International Conference of the Rural-Urban Transition and Development in China, Guangzhou, China, December 11–15, 1996. The author would like to thank Laurence J. C. Ma, Simon Xiaobin Zhao, Yixing Zhou, and three anonymous referees for their insightful comments on early versions of the paper and Youqin Huang and Rui Yao for research assistance.

²In principle, *nonagricultural* population refers to the "population engaging in nonagricultural activities and their dependent population" (SSB, 1996, p. 584). In practice, data collection of *nonagricultural* population is based on individuals' household registration (*hukou*). The Household Registration System bifurcates the population into the *agricultural* and *nonagricultural* categories. Because *nonagricultural hukou* is accompanied by entitlements and subsidies (such as housing) from the state (Cheng and Selden, 1994), it is more desirable than *agricultural hukou*. But because *hukou* is inherited from one generation to the next and because the state has to protect itself from subsidizing an increasing proportion of the population, approvals for a shift of *hukou* from *agricul-*

tural to *nonagricultural* are extremely rare, even for the *agricultural* population already living in urban areas and/or engaging in nonagricultural activities.

³Chongqing, formerly a part of the Sichuan Province, was designated as the newest provincial-level city in 1997. Its designation enables more autonomy and better access to capital, labor, and information resources, and symbolizes the expectations for Chongqing to become a growth pole in western China and a regional center to the areas affected by the Three Gorges Project (*Renmin Ribao* [People's Daily], March 15, 1997, p. 3).

⁴A related issue is level of urbanization. There are at least three approaches for estimating the nation's level of urbanization. The first is the total population of all cities (including counties under the jurisdiction of cities) and towns, which overestimates urban population. The degree of overestimation is particularly severe since the early 1980s, owing to the "city leading county" policy, which has included large expenses of rural areas and large numbers of rural population under the jurisdiction of cities. The second approach includes only the *nonagricultural* population (with *nonagricultural hukou*) within cities and towns. It is based on *hukou* classification and reflects to a large extent the urban-based population in cities and towns. On the other hand, it underestimates de facto urban population by excluding *agricultural* population (many of them migrants) who engage in urban activities but have not changed to or are not eligible to obtain *nonagricultural hukou*. The 1990 census uses a third approach through a set of more disaggregated criteria, by including the entire population of *shiqu* in provincial- and prefecture-level cities and only the "residents' committee" population in towns and county-level cities. The level of urbanization in 1990, as estimated by the above three approaches, is 52.9%, 18.5%, and 26.4%, respectively (Chan, 1994b), with the last one most widely accepted. Nevertheless, data for the third approach are extremely limited for intercensus years.

⁵Xu et al. (1995) have noted some signs of increase in urban primacy in the 1990s, but it is unclear whether the renewed growth of the largest cities marks a new trend toward population concentration or is merely an aberration in the long-term trend toward more even distribution of population across cities.

⁶I wish to acknowledge Yixing Zhou and an anonymous referee for this suggestion.

⁷Owing to data limitations, gross value of industrial and agricultural output in 1982 is used as a proxy for total output for the first period of the analysis, 1949 to 1980 (Table 4). For 1980 to 1994, total output is evaluated by gross domestic product in 1994.

⁸In 1994, the population of the largest county-level city was 520,800, and the population of the smallest prefecture-level city was 110,200.

⁹One example is the upgrading of Hua Xian in Guangdong, from a county to a city with the new name Huadu in 1993. The periodical *Hua Xian (Huadu) Xiangyin (The Native Voice of Hua Xian [Huadu])*, 1993, No. 4, p. 1) quoted a city official's commentary:

The upgrading of Hua Xian into Huadu City indicates that Hua Xian's economic and social development has reached a high level, is a recognition and milestone of Hua Xian's history, and is a tribute to the residents of Hua Xian and to those who are dedicated and have made important contribution to Hua Xian.

LITERATURE CITED

- Alonso, W., 1971, The economics of urban size. *Papers of the Regional Science Association*, Vol. 26, 67-83.
- Alperovich, G., 1993, An explanatory model of city-size distribution: Evidence from cross-country data. *Urban Studies*, Vol. 30, 1591-1601.
- Begovic, B., 1992, Industrial diversification and city size: The case of Yugoslavia. *Urban Studies*, Vol. 29, 77-88.
- Berry, B. J. L., 1961, City size distributions and economic development. *Economic Development and Cultural Change*, Vol. 9, 573-588.

- Browning, H. L., 1958, Recent trends in Latin American urbanization. *Annals of the American Academy of Political and Social Sciences*, Vol. 316, 111-120.
- Carroll, G. R., 1982, National city-size distributions: What do we know after 67 years of research. *Progress in Human Geography*, Vol. 6, 1-43.
- Chan, K. W., 1994a, *Cities with Invisible Walls: Reinterpreting Urbanization in Post-1949 China*. Hong Kong: Oxford University Press.
- Chan, K. W., 1994b, Urbanization and rural-urban migration in China since 1982: A new baseline. *Modern China*, Vol. 20, 243-281.
- Chang, S. D., 1986, Distribution of China's city population, 1982. *Urban Geography*, Vol. 7, 370-384.
- Cheng, T. and Selden, M., 1994, The origins and social consequences of China's hukou system. *The China Quarterly*, Vol. 139, 644-668.
- China State Council and the Chinese Academy of Sciences, 1987, *The Population Atlas of China*. Hong Kong: Oxford University Press.
- Clayton, E. and Richardson, T., 1989, Soviet control of city size. *Economic Development and Cultural Change*, Vol. 38, 155-165.
- Ettlinger, N., 1981, Dependency and urban growth: A critical review and reformulation of the concepts of primacy and rank-size. *Environment and Planning A*, Vol. 13, 1389-1400.
- Fan, C. C., 1988, The temporal and spatial dynamics of city-size distributions in China. *Population Research and Policy Review*, Vol. 7, 123-157.
- Fan, C. C., 1992, An investigation into the dynamics of city-size distributions in China. In J. P. Jones III and E. Casetti, editors, *Applications of the Expansion Method*. London, UK: Routledge, 185-212.
- Fan, C. C., 1996, Economic opportunities and internal migration: A case study of Guangdong Province, China. *Professional Geographer*, Vol. 48, 28-45.
- Fan, C. C., 1997, Uneven development and beyond: Regional development theory in post-Mao China. *International Journal of Urban and Regional Research*, Vol. 21, 620-639.
- Friedmann, J., 1978, The spatial organization of power in the development of urban systems. In L. S. Bourne and J. W. Simmons, editors, *Systems of Cities*. New York, NY: Oxford University Press, 328-340.
- Guerin-Pace, F., 1995, Rank-size distribution and the process of urban growth. *Urban Studies*, Vol. 32, 551-562.
- Hsu, M. L., 1994, The expansion of the Chinese urban system, 1953-1990. *Urban Geography*, Vol. 15, 514-536.
- Jonas, A. E. G., 1991, Urban growth coalitions and urban development policy: Postwar growth and the politics of annexation in Metropolitan Columbus. *Urban Geography*, Vol. 12, 197-225.
- Kirkby, R., 1994, Dilemmas of urbanization: Review and prospects. In D. Dwyer, editor, *China: The Next Decades*. New York, NY: John Wiley, 128-155.
- Lasuen, J. R., Lorca, A., and Oria, J., 1967, City-size distribution and economic growth. *Ekistics*, Vol. 24, 221-226.
- Leung, C. K. and Yeh, A. G. O., 1993, Urban development in China in the midst of urban and economic reforms. In W. Taubmann, editor, *Urban Problems and Urban Development in China*. Hamburg, Germany: Institut für Asienkunde, 1-32.

- Ma, L. J. C. and Noble, A. G., 1986, Chinese cities: A research agenda. *Urban Geography*, Vol. 7, 279-290.
- MacKellar, F. L. and Vining, D. R., Jr., 1995, Population concentration in less developed countries: New evidence. *Papers in Regional Science*, Vol. 74, 259-293.
- Malecki, E. J., 1975, Examining change in rank-size systems of cities. *Professional Geographer*, Vol. 27, 43-47.
- Malecki, E. J., 1980, Growth and change in the analysis of rank-size distributions: Empirical findings. *Environment and Planning A*, Vol. 12, 41-52.
- Mehta, S. K., 1964, Some demographic and economic correlates of primate cities: A case for reevaluation. *Demography*, Vol. 1, 136-147.
- Mera, K., 1973, On the urban agglomeration and economic efficiency. *Economic Development and Cultural Change*, Vol. 21, 309-324.
- Onoye, E., 1970, Regional distribution of urban population in China. *Developing Economies*, Vol. 8, 93-127.
- Pannell, C. W., 1982, Recent growth and change in China's urban system. In L. J. C. Ma and E. W. Hanten, editors, *Urban Development in Modern China*. Boulder, CO: Westview Press, 91-113.
- Pannell, C. W., 1990, China's urban geography. *Progress in Human Geography*, Vol. 14, 214-236.
- Parr, J. B., 1985, A note on the size distribution of cities over time. *Journal of Urban Economics*, Vol. 18, 199-212.
- Richardson, H. W., 1973, Theory of the distribution of city sizes: Review and prospects. *Regional Studies*, Vol. 7, 239-251.
- Richardson, H. W., 1989, The big, bad city: Mega-city myth? *Third World Planning Review*, Vol. 11, 355-372.
- Rosen, K. T. and Resnick, M., 1980, The size distribution of cities: An examination of the Pareto Law and primacy. *Journal of Urban Economics*, Vol. 8, 165-186.
- Sheppard, E., 1982, City size distributions and spatial economic change. *International Regional Science Review*, Vol. 7, 127-151.
- Smith, W. R., Huh, W., and Demko, G. J., 1983, Population concentration in an urban system: Korea 1949-1980. *Urban Geography*, Vol. 4, 63-79.
- SSB (State Statistical Bureau), 1990, *Zhongguo chengshi sishi nian* [China: The Forty Years of Urban Development]. Beijing, China: China Statistical Information and Consultancy Service Center.
- SSB (State Statistical Bureau), 1991, *Zhongguo chengshi tongji nianjian 1991* [Statistical Yearbook of China's Cities 1991]. Beijing, China: Author.
- SSB (State Statistical Bureau), 1995, *Zhongguo chengshi tongji nianjian 1993-1994* [Statistical Yearbook of Chinese Cities 1993-1994]. Beijing, China: Author.
- SSB (State Statistical Bureau), 1996, *Zhongguo chengshi tongji nianjian 1995* [Statistical Yearbook of China's Cities 1995]. Beijing, China: Author.
- SSB (State Statistical Bureau), 1998, *Zhongguo chengshi tongji nianjian 1997* [Statistical Yearbook of China's Cities 1997]. Beijing, China: Author.
- Todaro, M. P., 1976, *Internal Migration in Developing Countries: A Review of Theory, Evidence, Methodology, and Research Priorities*. Geneva, Switzerland: International Labour Office.

- Wei, Y., 1994, Urban policy, economic policy, and the growth of large cities in China. *Habitat International*, Vol. 18, No. 4, 53-65.
- Wheaton, W. C. and Shishido, H., 1981, Urban concentration, agglomeration economies and the level of economic development. *Economic Development and Cultural Change*, Vol. 30, 17-30.
- Xu, X., Ouyang, N., and Zhou, C., 1995, The changing urban system of China: New developments since 1978. *Urban Geography*, Vol. 16, 493-504.
- Yan, X., 1995, Chinese urban geography since the late 1970s. *Urban Geography*, Vol. 16, 469-492.
- Yang, D., 1991, China adjusts to the world economy: The political economy of China's coastal development strategy. *Pacific Affairs*, Vol. 64, 42-64.
- Yeh, A. G. O. and Xu, X., 1990a, Changes in city size and regional distribution 1953-84. In R. Y. Kwok, W. Parish, and A. G. O. Yeh, editors, *China's Urban Reform—What Model Now?* New York, NY: M. E. Sharpe, 45-61.
- Yeh, A. G. O. and Xu, X., 1990b, New cities and city system development in China. *Asian Geographer*, Vol. 9, 11-38.
- Zhao, X. and Zhang, L., 1995, Urban performance and the control of urban size in China. *Urban Studies*, Vol. 32, 813-845.
- Zhou, Y. and Yang, Q., 1988, Changes in China's urban hierarchies and their types at the provincial level. *Chinese Geography and Environment*, Vol. 1, 3-30.
- Zhou, Y. and Yang, Q., 1995, Geographical analysis of the industrial economic return of Chinese cities. *Urban Geography*, Vol. 16, 505-520.

n Geogra-
 developed
 ofessional
 ns: Empir-
 ies: A case
 mic Devel-
 ing Econo-
 L. J. C. Ma
 CO: West-
 hy, Vol. 14,
 ul of Urban
 d prospects.
 'd Planning
 ation of the
 ernational
 in an urban
 r: The Forty
 on and Con-
 / [Statistical
 3-1994 [Sta-
 '5 [Statistical
 '7 [Statistical
 w of Theory,
 International