
Evolving Spatial Form of Urban-Rural Interaction in the Pearl River Delta, China*

George C. S. Lin

The University of Hong Kong

Much of the development literature and the theory of urban transition have been based on an arbitrary division of production space into city and countryside. Despite growing recognition of the need for an integrated approach to urban-rural relations, controversial issues related to the definition and measurement of the phenomenon remain unresolved. This case study of spatial transformation in China's Pearl River Delta analyzes with greater precision the geographic extent and functional attributes of a zone of urban-rural interaction located outside and between major metropolitan centers. This zone has been the spatial focus of industrial and commercial development, although most of its population remains officially classified as "agricultural." The peri-urban zone was initially left behind by the central cities in terms of its contribution to the regional economy. After a decade of postreform development, this zone has moved ahead of the central cities and become the region's main destination for in-migrants and foreign investment. The growth of the zone of urban-rural interaction outside the central cities has absorbed a significant amount of the increased urban population, but it has not brought about a reduction of regional economic inequality because of the persistence of a backward economy in the periphery. Theoretical questions are raised concerning the validity of several fundamental assumptions underlying the conventional model of urban transition. **Key Words:** urbanization, urban-rural interaction, peri-urban zone, China, Pearl River Delta.

Introduction

Studies of urbanization and national development have traditionally been based on an unambiguous distinction of city and countryside. Most research has tended to treat urban and rural development as separate issues, with little consideration of the linkages and interaction between the two components (Roberts 1978; Gilbert and Gugler 1982; Harris 1982). In recent years, however, a growing number of scholars have become increasingly critical about the adequacy of the arbitrary urban/rural dichotomy (Unwin 1989; Friedmann 1996; Douglass 1998; Tacoli 1998). For instance, studies of urbanization in many developing countries have revealed a distinct phenomenon of urban-rural interaction¹ that can often be found in the areas surrounding and between major metropolitan centers (Ginsburg, Koppel, and McGee 1991; McGee 1991; Potter and Unwin 1995). These regions do not fit neatly into the conventional category of "urban" or "rural" settlements, but they demonstrate features of both types. While the significance of urban-rural interaction in developing coun-

tries has been addressed, its precise geographic extent, functional attributes, and implications for policy-making remain elusive. As several writers on the subject have openly admitted, there is considerable ambiguity concerning the measurement of urban-rural interaction and delineation of its area coverage, partly because of the lack of relevant data and partly because of the evolving nature of the phenomenon (Ginsburg 1990; McGee 1991; Pannell and Veeck 1991).

This study attempts to identify and analyze the emerging spatial form of urban-rural interaction in one of the fastest growing metropolitan regions in China. The purpose is to delineate a zone of urban-rural interaction in the Chinese context, examine the functional attributes of this zone in terms of urbanization and regional development, and assess the relevance of several major theoretical assertions to the Chinese situation. The paper begins with a brief overview of the existing literature. This is followed by an empirical study of the case of China's Pearl River Delta, where dramatic structural and spatial transformation has taken

*This research is funded by the Hong Kong Research Grant Council (HKU 7219/00H), Hui Oi Chow Urbanization Trust Fund, and the Committee on Research and Conference Grants of the University of Hong Kong. I wish to thank Terry McGee, Graham Johnson, Francis Yee, and three anonymous reviewers for their comments, which helped improve an earlier version of this paper.

place since the 1978 economic reforms. Major findings of the research and their theoretical implications are summarized and discussed at the end.

Theoretical Context

Despite its definitional difficulty, urban-rural interaction is generally understood as a process of linkages and exchange between the two loci of change in a broader context of social formation (Harvey 1985, 14–15; Unwin 1989, 12). It may take the form of the flow of people, commodities, capital, information, and other social transactions (Tacoli 1998, 147; also Preston 1975; Gould 1982; Potter and Unwin 1995). It can also manifest itself in the new form of spatial complexes in which urban and rural or industrial and agricultural activities are intensely mixed or “interlocked” (Ginsburg 1990, 31; McGee 1991, 7; Zhou 1991, 89). This study focuses on the spatial manifestation of urban-rural interaction with special reference to the development of what has been known as zones of “urban-rural integration” (*chengxiang yitihua*) in the Chinese context.

Although there is a dearth of literature on the linkages and interactions between urban and rural areas, there exists a long tradition of scholarly interest in the relations between town and country as two different economic and social organizations. Ravenstein’s (1889) “law of migration” represents one of the earliest theoretical attempts to conceptualize the movement of people between town and country as a result of the perceived economic differences between the two loci. The dualistic model that was later developed by Lewis (1954) and Fei and Ranis (1961) gave a sectoral and economic explanation of urban-rural relations. A developing economy was described as a combination of two different sectors, a traditional rural subsistence sector coexisting with a modern urban industrial sector. These early theoretical attempts emphasized the differences between the urban and rural economy.

The theory of urban/rural contrast highlighted by these scholars has shaped policy-making and influenced development studies. Governments have devised “rural development policies” contrasted with “urban development policies,” and the twain seldom meet (Ginsburg 1990, 29). In development studies,

much of the debate has concentrated on the “correct” formula of resource allocation between industry and agriculture, or the urban and rural sector (Douglass 1998, 3; Tacoli 1998, 149). Lipton’s (1977) notion of “urban bias” and the debate it provoked has testified to the importance and controversial nature of the urban-rural divide (Corbridge 1982).

This perception of urban and rural economies as two separate sectors competing for government resource allocation has been shared by China specialists (Ma and Hantel 1981; Perkins and Yusuf 1984; Whyte and Parish 1984; Sit 1985; Ho 1994; Davis 1995). However, the treatment of urban-rural relations in the Chinese context has been interpreted in various ways. Some scholars have described the Chinese approach to rural development as a result of the socialist ideological commitment to spatial equity (Ma 1976; Murphey 1976; Buck 1981). Others contend that socialist China has actually practiced an “urban- and industrial-biased” development strategy that seeks city-based industrialization at the expense of agriculture and rural development (Kirkby 1985, 14; Chan 1992, 276). Common to the two opposing interpretations is a clear-cut urban/rural or industrial/agricultural distinction (Lin 1998).

The dynamic of urban-rural relations has been discussed extensively in the literature of urban transition (Friedmann and Wulff 1975; Timberlake 1985; Lin 1994). A major thesis postulated in the model of urban transition is that concentration of population in cities will be an inevitable outcome of economic growth. As the industrialization process advances, a growing number of people will shift their occupations from agriculture to industry and move from rural to urban areas. This thesis is based upon assumptions that there is a clear-cut distinction between “urban” and “rural” settlements, that such a distinction is measurable and quantifiable, and that urban/rural differences will persist as urbanization continues. To satisfy these assumptions and ensure comparability of research on urbanization, painstaking efforts have been made to demarcate what is “urban” and what is “rural” (Mumford 1961; Petersen 1975; Orleans and Burnham 1984; Goldstein 1990; Zhou and Shi 1995).

In recent years, this perceived distinction between urban and rural settlements has faced se-

rious challenges by a growing number of scholars as a result of a critical reassessment of the literature on development and urban transition (Potter and Unwin 1995; Friedmann 1996; Douglass 1998; Tacoli 1998). Based on continued research on the experience of urbanization in Asia, McGee (1989, 1991) and Ginsburg (1990) have identified a distinct spatial form of intensive urban/rural interaction that is emerging adjacent to and between major urban centers. These zones are characterized by a high population density, a rapid growth of nonagricultural activities, extreme fluidity and mobility of the population, and an intense mixture of land use, with agriculture, cottage industries, industrial estates, suburban developments, and other uses existing side by side (McGee 1991, 16–17). Examples of these zones include Jakarta-Bandung in Indonesia, Shanghai-Nanjing-Hangzhou in China's lower Yangtze, Taipei-Kaohsiung in Taiwan, and Seoul-Pusan in South Korea. In recognition of the evolving nature of these zones, McGee and Ginsburg have highlighted the conditions/processes underlying the development of these zones, which include high population density, smallholder paddy-rice cultivation, close linkages with large cities, existence of cheap labor reservoirs, a well-developed transport infrastructure, and the expansion of the global economy (McGee 1991, 14–16). The emergence of these zones has raised important questions concerning the adequacy of the urban-rural dichotomy that has been a widely accepted assumption fundamental to the studies of development and urbanization. Furthermore, the persistence of these zones in many developing countries has cast doubt on the model of urban transition that describes a sustained rural-urban migration as an inevitable outcome of economic growth.

Although the Ginsburg-McGee proposition has met with enthusiastic response among scholars working on Asian urbanization, many theoretical and practical issues remain unresolved and the model has yet to be proven against the reality. One major issue that requires further clarification is the definition of the concepts or parameters that have been used in the model. Although significant effort has been made to outline the "definitional components" of the hypothetical spatial system (Ginsburg 1990; McGee 1991, 6), it remains unclear

how the zone of intense urban/rural interaction can be practically defined. The functional characteristics of the zone and their geographic variation among countries of different political economies also require in-depth investigations. Finally, the policy options suggested by the Ginsburg-McGee model are still a topic of unsettled debate. Is it true that industrial development can be optimally pursued in the extended metropolitan regions? Can these regions be utilized as the "modified regional growth pole" that McGee (1991, 22) and Ginsburg (1990, 42) have enthusiastically advocated? What are the social and economic implications of the continued growth of these regions? How sustainable are they when viewed in a social and environmental perspective? These questions are all critical, and the answers can only be found in the real world.

Research Scope

This study investigates the development of a spatial form of urban-rural interaction in China's Pearl River Delta. Specifically, it seeks answers for three interconnected questions: 1) Does the kind of zone of intense urban-rural interaction postulated in the Ginsburg-McGee model exist in the Chinese context, and if so can it be identified and delineated? 2) How special is this zone when compared with other spatial entities such as the central cities and the countryside, and what are its functional attributes in terms of economic production, population, and land use? 3) What is the regional effect of the emergence of this zone, and what are the implications of its growth for economic and social development at the broader regional level?

Study Site

The Pearl River Delta (PRD; Fig. 1)² selected in this study represents a natural "laboratory" suitable for empirical analyses to answer the questions raised above. Located on the southern coast of China's mainland, the PRD is one of the most populous and rapidly urbanizing regions in the country. A subtropical climate, fertile alluvial soils, and a water system good for year-round irrigation and transportation have made the PRD one of the largest rice bowls in China, supporting a large and dense population for centuries. The existence of large

metropolitan centers nearby, including Hong Kong and Guangzhou (the primate city of Guangdong Province), has created great market demand for the production of various farm commodities and led to the development of an agricultural system in which paddy rice cultivation and cash crops are intensely mixed. Over the years, the continued growth of farm commodities has given rise to thriving trade and manufacturing, based primarily on local agricultural produce. In turn, this has paved the way for cities and towns to flourish across the region. By the end of the nineteenth century, the PRD was already one of the most commercialized and urbanized economic regions in China, second only to the lower Yangtze (Skinner 1977, 211–249). Viewed in a geographic perspective, the conditions identified by McGee and Ginsburg in their model of urban-rural interaction appear to be present in the PRD.

Selection of the PRD as the study site for the research described in this paper is also made on the grounds that it has been one of the most rapidly changing economic regions in China since new economic policies were instituted in 1978. With its geographic proximity to and extensive connections with Hong Kong, the PRD has been given special autonomy by the new pragmatic regime to attract foreign capital, promote export, and develop an open market economy on the basis of its regional comparative advantages (Lo 1989; Xu and Li 1990; Fan 1995). Two of China's four Special Economic Zones were established in the region in 1979, and the entire delta was designated an Open Economic Region in 1985. Taking full advantage of both the given economic freedom and its rich natural endowments, the PRD has moved "one step ahead" of the nation as a whole, and has experienced accelerated economic growth and urbanization (Lo 1989; Vogel 1989; Johnson and Woon 1997; Lin

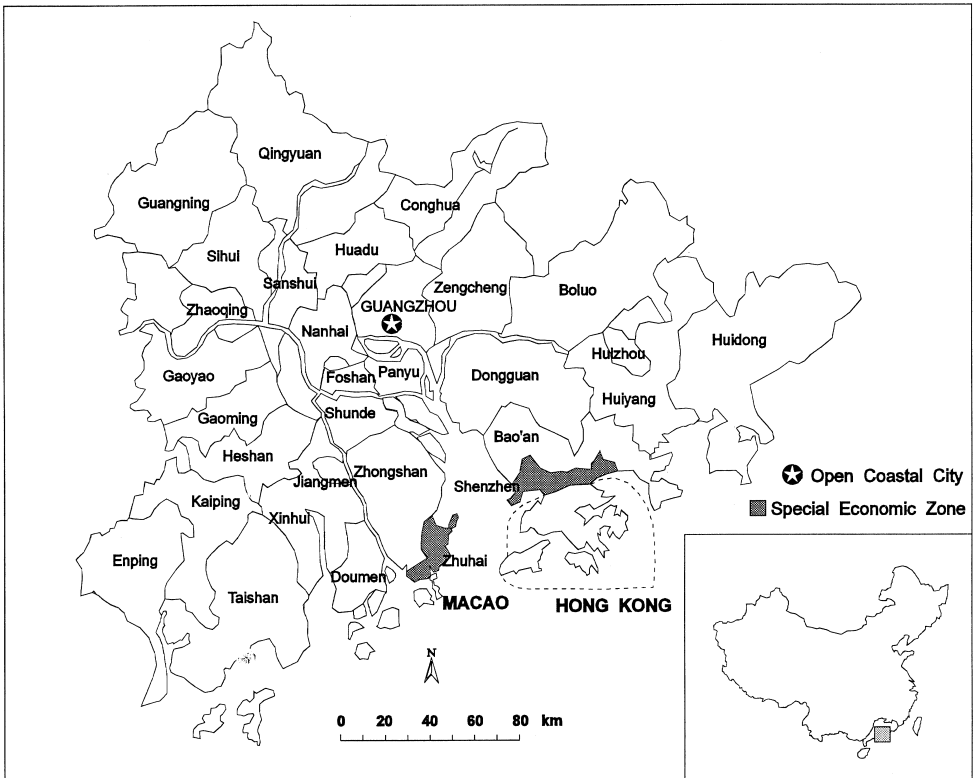


Figure 1 The Pearl River Delta Open Economic Region, China.

Table 1 *Selected Economic Indicators for the Pearl River Delta, Guangdong Province, and China, 1995*

Indicator	Unit	PRD	Guangdong	China
Population density	Persons/km ²	514	382	126
Non-agricultural population as % of the total population	Percent	43.9	30.0	23.6
Per capita GDP	Yuan/Person	18,242	7,927	4,810
Per capita GVAO ^a	Yuan/Person	1,379	1,148	874
Per capita GVIO ^b	Yuan/Person	27,495	11,446	5,376
Per capita export output	US\$/Person	2,157	819	122
Per capita realized foreign investment	US\$/Person	401	178	40

Sources: CSSB (1996, 22–27); GPSB (1996, 93, 54–129).

^a Gross Value of Agricultural Output, measured at the 1990 constant price.

^b Gross Value of Industrial Output, measured at the 1990 constant price.

1997). During the years between 1980 and 1995, the PDR's gross domestic product grew at an accelerated rate of 18.6% per annum, significantly higher than both the provincial average of 14.5% and the national average of 10.2% (GPSB 1995, 6–8; CSSB 1996, 22–27; GPSB 1996, 93, 53–61). Dramatic expansion of the economy has brought the PRD up to a level of development well above the provincial and national average in almost all major economic indices on a comparable per capita basis (Table 1).

Clearly, the PRD has undergone a remarkable process of accelerated economic growth and regional development. It is acknowledged that dramatic economic and spatial development in the PRD may not be typical of the general situation of the country. However, a detailed study of spatial transformation of a region that has moved “one step ahead” of the nation may still shed important light on what may occur in other Chinese regions that have just started to experience a similar practice of economic reforms and opening up.

Data and Methodology

Data for this study were gathered through documentary research and field investigations conducted in China between 1980 and 1997. Updated information was obtained from the recent publication of national and provincial statistical yearbooks (CSSB 1996; GPSB 1996). Systematic and comparable data for quantitative analyses focus on the period of 1980 to 1990. There are two major reasons for using the 1980s data. First, choosing the 1980s as the period of study allows the utilization of economic data that are measured at the constant 1980 prices without the distortion of inflation. Second, in 1991 the provincial authorities of Guangdong conducted a comprehensive survey of county-level economic performance in the 1980s. This survey has resulted in a comprehensive data set at the county-level and on an annual basis for the years 1980–1990 (GPSB 1991). Because of the constant administrative changes that took place after 1990, the data set of the 1991 survey has

Table 2 *Variables Selected for Principal Components Analysis*

Variables	Unit	1980	1990
Population density (DNTY)	Persons/km ²	370	437
Percent urban population (URBN) ^a	Percent	27.36	36.70
Percent temporary population (TEMP)	Percent	1.04	14.39
Per capita gross value of industrial and agricultural output (PGVIAO)	Yuan/Person	1,113	5,488
Per capita income (PICM)	Yuan/Person	238	1,288
Per capita export output (PEXPT)	US\$/Person	35	394
Employment rate (EMPY) ^b	Percent	50	58
Per capita cultivated land (PCUL)	mu/Person ^c	0.89	0.66

Source: GPSB (1991, 14–407).

^a Urban population refers to those who are officially registered as “urban” or “non-agricultural” in the Chinese household registration (*hukou*) system. This urban definition, based on nonagricultural population, may underestimate the urban population of an individual city or town because it excludes those urban residents who are officially registered as agricultural. However, it remains a realistic estimate of aggregate urban population at a regional or national level.

^b Employment rate is defined as the ratio of the total number of employed laborers to the total population. See GPSB (1991).

^c Land area in China is measured in mu, where 1 mu = 0.0667 hectare.

now become a rare and highly valuable set of data, comparable through time and across space and hence suitable for quantitative analyses. Although the amount of economic output and the population number may have changed since 1990, the nature of growth and the mechanism of economic and spatial transformation since the reforms have remained more or less the same.

Three specific hypotheses were made to facilitate the research detailed in this paper. First, there exists a distinct zone of urban-rural interaction located outside and between major metropolitan centers. Second, this zone of urban-rural interaction plays an intermediate role between the central cities and the peripheral areas in terms of economic growth and urbanization. Finally, the development of this zone has prevented the excessive concentration of population and economic activities in the central cities, and has therefore helped reduce the overall regional inequality.

Several statistical analyses were carried out to determine acceptance or rejection of the hypotheses posed above. The first hypothesis was tested through a two-step statistical procedure. It begins with the identification of condensed components from a group of economic and demographic variables. This is followed by the classification of spatial units according to their similarities or differences in the condensed components. The first step involves a principal components analysis (PCA), which is essentially a technique for the extraction of a few fundamental components that give a succinct summary of many different variables (Jackson 1983, 111–13; Veeck and Pannell 1989, 285). The second step involves a cluster analysis through which group memberships are assigned to all spatial units according to their loading on the extracted components.

All thirty-one cities (*shiqu*) and counties in the PRD are used as cases for the statistical analysis. The selection of variables is based on the consideration of several important requirements. First, they must describe on a comparable basis the changing economic and demographic characteristics as well as features of land utilization for each case. Second, annual statistical data for them must be available. Finally, the number of variables selected should not exceed the number of cases and should allow the necessary degrees of freedom for

the computation of the interrelationship among the variables. Eight variables are chosen for statistical analyses (Table 2). They describe the characteristics of each case in terms of population density, degree of urbanization, acceptance of in-migrants, productivity, income and employment situation, and land use intensity.

Findings and Interpretation

Two eigenvectors were generated by the principal components analysis (Table 3). They ac-

Table 3 Rotated Factor Matrix from Principal Components Analysis

Variable	Factor Loadings	
	Factor One	Factor Two
DNTY	0.06099	0.91267
URBN	0.46426	0.81925
PGVIAO	0.81567	0.49424
PICM	0.89607	0.12471
PEXPT	0.89045	0.25589
EMPY	0.67223	0.29989
TEMP	0.93166	0.06726
PCUL	-0.20431	-0.82587
Case		
Foshan	-0.00089	3.28872
Guangzhou	-0.43728	2.11673
Jiangnan	-0.01316	1.98924
Zhaoqing	-0.52055	0.99438
Shenzhen	3.89890	0.82168
Huizhou	0.44747	0.61109
Shunde	-0.15325	0.55920
Zhuhai	1.25035	0.35476
Nanhai	-0.05481	-0.04918
Guangning	-0.88011	-0.09981
Huaxian	-0.50885	-0.11223
Xinhui	-0.07336	-0.13614
Zhongshan	0.06589	-0.28741
Kaiping	-0.39878	-0.28826
Dongguan	0.21386	-0.29848
Conghua	-0.79124	-0.30225
Zengcheng	-0.58412	-0.33149
Qingyuan	-0.83292	-0.33561
Heshan	-0.44428	-0.33606
Sihui	-0.65598	-0.36802
Gaoyao	-0.48594	-0.37358
Huidong	-0.34467	-0.41626
Enping	-0.38296	-0.41908
Gaoming	-0.34190	-0.42657
Taishan	-0.42037	-0.48800
Panyu	-0.04143	-0.49242
Sanshui	-0.04305	-0.52135
Huiyang	-0.15331	-0.77586
Boluo	-0.58790	-0.79535
Douman	0.52379	-1.50778
Bao'an	2.75085	-1.57462
% of variance	61.90	18.70

Source: Computed from data in GPSB (1991, 14–407).

counted for 80.6% of the total variance and are adequate to represent the spatial variation of the eight selected variables among the thirty-one spatial units. The first component has high correlations with percent temporary population (TEMP: 0.93), per capita rural income (PICM: 0.89), per capita export output (PEXPT: 0.89), and per capita gross value of industrial and agricultural output (PGVIAO: 0.81), but negative correlation with per capita cultivated land (PCUL: -0.20). Its loadings on percent urban population (URBN) and population density (DNTY) are also quite low. These loadings suggest that high scores on the first component are associated with those areas that have demonstrated a remarkable degree of economic development, although their population density and level of urbanization remain quite low. This component is labeled an “economically developing component.” It accounts for 62% of the total variance.

In sharp contrast, the second component has

high loadings on population density (DNTY: 0.91) and percent urban population (URBN: 0.81) as well as high negative loadings on per capita cultivated land (PCUL: -0.82). Apparently, large scores on these components are associated with those highly urbanized areas—possibly large cities—in which population density and degree of urbanization are high but cultivated land is scarce. This component is labeled a “highly urbanized component.” It accounts for 18% of the total variance.

The PCA has generated two component scores for each of the thirty-one cities and counties. These scores are uncorrelated and dense representation of the original eight variables. They are used as the base data for a cluster analysis that classifies all cities and counties according to their similarities or differences in the loadings of the extracted components. The clustering method selected was Ward’s minimum variance procedure. The dendrogram created by SPSS reveals a natural break that divides all

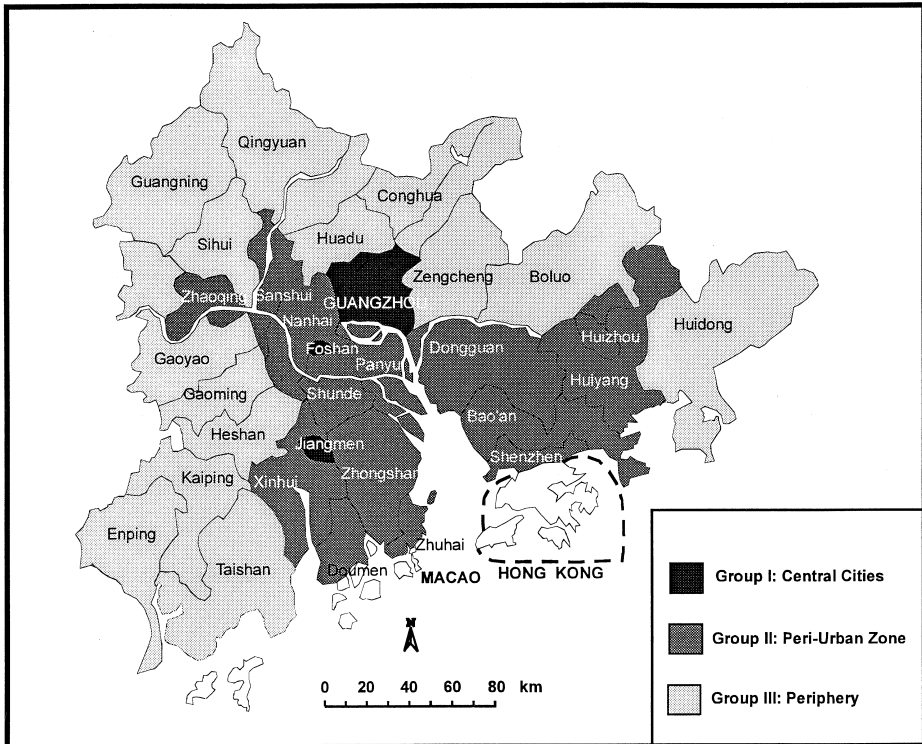


Figure 2 *Result of cluster analysis for the Pearl River Delta.*

cases into three different groups (mapped in Fig. 2).

Group I is named the “central cities cluster,” as it consists of only the three central cities of the region, Guangzhou (the primate city of the province) and Foshan and Jiangmen (previously central cities at the prefectural level). Group II includes places that are located outside and between the metropolitan centers of Guangzhou, Hong Kong, and Macao. This group is called the “peri-urban cluster,” as it essentially serves as a transitional zone between the central cities identified in Group I and the countryside in Group III. The cities of Huizhou and Zhaoqing are included in this group because they show a development pattern more similar to places in the peri-urban zone than to the central cities cluster. Group III covers the countryside in the periphery of the delta region and is therefore labeled the “peripheral cluster.”

The three groups identified by the cluster analysis differ from one another not only in their locations but also in their demographic and economic structures (Table 4). A quick glance of the level of urbanization measured by the proportion of nonagricultural population in the total population suggests that the central cities and peripheral clusters represent two extremes of the urban-rural continuum. What are worthy of special attention are the special characteristics of the cluster labeled as the “peri-urban zone.” Only 31% of the population in this zone was officially classified as “nonagricultural” (*fei-nongye renkou*) by the Chinese authorities.³ However, about half (49.85%) of the total rural labor force in the “agricultural population” were actually engaged in various nonagricultural activities, such as manufacturing, transportation, construction, retailing, and other services. Nonagricultural output value in this zone accounted for over 70% of the total rural output (Table 4). Apparently the economy and population in this zone are highly dependent upon nonagricultural pursuits, despite the fact that the bulk of the population here is classified as agricultural.

On the other hand, many industrial and commercial activities found in this zone are based upon agricultural resources. For instance, the township and village enterprises (TVEs) employ primarily rural laborers and are financed by local resources. A detailed case study of industrial development in Nanhai, a

Table 4 Internal Demographic and Economic Structure of the Three Groups Identified by Cluster Analysis

Group	Total Population (million) (A)	Nonagricultural Population (million) (B)	B as % of A	Total Rural Labor Force (million) (C)	Non-agricultural Labor Force (million) (D)	D as % of C	Total Rural Output (million yuan) (E)	Nonagricultural Output (million yuan) (F)	F as % of E
I: Central Cities	4.23	3.45	81.56	0.46	0.21	45.65 ^a	6397.19	4488.92	70.17
II: Peri-urban Zone	8.53	2.70	31.65	3.37	1.68	49.85	43539.74	30596.62	70.27
III: Periphery	8.04	1.48	18.40	3.42	1.06	30.99	19588.08	10093.08	51.53

Source: CSSB (1991b, 138–49); GPSB (1991, 14–407).

^a The low percentage of nonagricultural labor in the central cities may reflect the fact that most rural laborers in the suburbs of these cities are engaged in the production of fruits and vegetables for urban consumption, an activity which is classified as agricultural in Chinese statistics.

Table 5 Key Demographic Indicators for the Three Zones Identified by Cluster Analysis

Group	Land (km ²)	Total Population		Nonagricultural Population		Temporary Population ^a		
		1980	1990	1980	1990	1982	1990	
I: Central Cities	No.	1,650	3,512,639	4,231,088	2,628,060	3,448,028	78,795	555,868
	% ^b	3.48	<u>19.97</u>	<u>20.34</u>	<u>54.60</u>	<u>45.16</u>	<u>42.87</u>	<u>18.62</u>
II: Peri-urban Zone	No.	11,831	7,008,802	8,526,929	1,433,568	2,699,716	61,530	2,216,279
	% ^b	35.49	<u>39.83</u>	<u>40.99</u>	<u>29.78</u>	<u>35.36</u>	<u>33.49</u>	<u>74.26</u>
III: Periphery	No.	28,950	7,072,499	8,043,177	751,915	1,487,355	43,454	212,641
	% ^b	61.03	<u>40.20</u>	<u>38.67</u>	<u>15.62</u>	<u>19.48</u>	<u>23.64</u>	<u>7.12</u>
Total	No.	47,431	17,593,940	20,801,194	4,813,543	7,635,099	183,779	2,984,788
	% ^b	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Sources: GPSB (1991, 14–407); GPPCO (1991, 40–44).

^a Temporary Population refers to those in-migrants who have lived in the Pearl River Delta for longer than one year but whose household remains registered elsewhere. See GPPCO (1991, 40–44).

^b Percentages refer to the share of the total for the whole delta region.

county-level suburban economy in this zone, reported that farmers' increased personal savings contributed significantly to capital investment in rural industry (Byrd and Lin 1990, 78). Over 44% of TVEs were developed by villages and another 39% by rural townships (Lin 1997, 140). This peri-urban zone is thus characterized not only by a coexistence of industry and agriculture or urban and rural activities but also by the interdependence of the two sectors.

The peri-urban zone identified by the cluster analysis has also functioned as the geographic focus of industrialization, regional economic development, and urban-rural interaction. An evaluation of the performance of each group in the regional context reveals the significance of this zone, Group II. It accounted for 35% of the PRD's total land area and 40% of its total population in 1990 (Table 5), but it produced 55% of the total industrial and agricultural output and received 70% of the realized foreign capital that

flowed into the delta (Table 6). In terms of urban-rural interaction, the peri-urban zone clearly distinguished itself from the other two groups as the area of concentration for population movement and exchange of goods between cities and the countryside. An important index of population movement in the Chinese statistics has been the temporary population (*zanzhu renkou*) whose bulk involved people moving from the countryside to small cities and towns nearby (Xu and Li 1990, 56; Ma and Lin 1993, 593; Fan 1996, 35). Statistical data show that about 74% of the PRD's total temporary population were found in the peri-urban zone as identified by Group II, which was significantly higher than that zone's share of the region's total population (40%) or land area (35%) (Tables 5 and 6).

An analysis of the changing spatial distribution of retail sales, an important index of the exchange of goods, also highlights the signifi-

Table 6 Key Economic Indicators for the Three Zones Identified by Cluster Analysis

Group		Gross Value of Industrial and Agricultural Output ^a (million yuan)		Realized Foreign Capital Investment (US\$10,000)		Retail Sales Value (million yuan)	
		1980	1990	1980	1990	1980	1990
I: Central Cities	No.	10,176.35	35,236.11	3,449	32,671	2,799.89	15,037.58
	% ^b	<u>51.95</u>	<u>30.96</u>	<u>34.08</u>	<u>20.96</u>	<u>38.25</u>	<u>32.96</u>
II: Peri-urban Zone	No.	6,224.64	62,281.14	6,332	109,436	2,690.39	22,840.57
	% ^b	<u>31.78</u>	<u>54.72</u>	<u>62.56</u>	<u>70.23</u>	<u>36.76</u>	<u>50.06</u>
III: Periphery	No.	3,187.57	16,310.69	340	13,729	1,829.10	7,750.99
	% ^b	<u>16.27</u>	<u>14.32</u>	<u>3.36</u>	<u>8.81</u>	<u>24.99</u>	<u>16.99</u>
Total	No.	19,588.56	113,827.94	10,121	155,836	7,319.38	45,629.14
	% ^b	100.00	100.00	100.00	100.00	100.00	100.00

Source: GPSB (1991, 14–407).

^a Gross Value of Industrial and Agricultural Output is measured in the 1980 constant price.

^b Percentage refers to the share of the total for the whole delta region.

cant position held by the peri-urban zone. During the years 1980–1990, the peri-urban zone increased its share of the region's total retail sales from 36% to over 50% (Table 6), suggesting that this zone has increasingly become the most important locus for the exchange of goods between the urban and rural sector. Urban-rural interaction in this zone also manifested itself in a severe competition for land resources between urban development and agricultural production. In Dongguan, a county-level economy in this zone, over 63% of the urban development since the reforms has occurred on the fertile agricultural land with a land suitability rating of 5 or above (Yeh and Li 1999, 378). It appears that the three clusters identified by principal components and cluster analyses have demonstrated different economic and demographic attributes and revealed a pattern to support the acceptance of the first hypothesis outlined above.

Does the peri-urban zone denoted by Group II play an intermediate role between the central cities and the peripheral area in regional economic growth and urbanization, as described by the second hypothesis? An analysis of existing data presents mixed findings. As seen in Table 5, the peri-urban zone did stand behind the central cities in terms of its contribution to the region's urbanization. Its officially defined non-agricultural population accounted for only 35% of the regional total, significantly lower than that of the central cities (45%). However, the position held by this zone in many other aspects of the regional economy moved quite dramatically from one behind the central cities in 1980 to one ahead of both the central cities and the peripheral zone in 1990. This is evident in the regional makeup of in-migrants, industrial and agricultural production, and retail sales, in which contributions by the peri-urban zone moved from behind the central cities to ahead of them in the 1980s (Table 6). This finding lends support to the McGee-Ginsburg proposition that the extended metropolitan region has become the geographic focus of industrialization and economic growth, attracting a great number of migrants, production facilities, and much foreign capital despite the fact that the majority of population in this zone remains officially classified as "agricultural." However, this finding does not lend sufficient support to the second hypothesis of this research.

While the peri-urban zone significantly upgraded its position in the regional economy, the central cities in Group I exhibited only moderate growth in economic production and population. Their regional share in industrial and agricultural production, retail sales, foreign investment and in-migration dropped significantly from 1980 to 1990 (Table 6). This pattern may have been caused by a variety of factors, including government regulation, growing congestion in the cities, the nature of industrialization in the region, and the widespread existence of social capital (Xu and Li 1990; Leung 1993; Fan 1996; Hsing 1997; Johnson and Woon 1997). Whatever the reason, the slow growth of the central cities in the delta region appears to contradict the neoclassic theoretical expectation of polarization, in which economic activities and population are said to concentrate in major urban centers at an early stage of economic growth (Myrdal 1957; Hirschman 1958).

Does the emergence of a zone of urban-rural interaction, coupled with the slowdown of urban expansion in the central cities, result in a reduction of economic and social inequality for the region, as postulated in the third hypothesis? A close examination of the spatial reorganization of population and economic activities in the PRD suggests that this has not been the case. The main reason lies in the persistence of a backward economy in the peripheral area of the region. Despite the fact that the peripheral area accounted for 61% of the PRD's land area and 38% of its total population, it contributed only 14% of industrial and agricultural output, 17% of retail sales, 8% of foreign capital, and 7% of the total in-migrants to the region (Tables 5 and 6). Its regional shares in industrial and agricultural production and acceptance of in-migrants, which were already disproportionately low, dropped even further during the 1980s. Consequently, the disparity between the peripheral area and the other two developed groups in productivity and per capita income remained large and even widened.

This pattern can be further illustrated by a statistical analysis of the coefficients of variation (CV) for major economic and demographic indices (Fig. 3). Although the proportion of urban (nonagricultural) population displayed a reduced coefficient of variation as a result of urban growth outside of the central

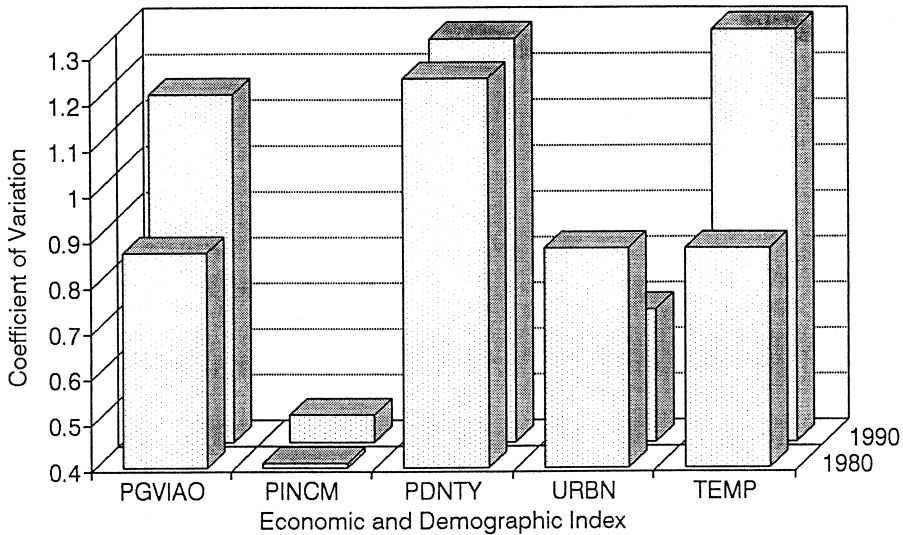


Figure 3 Coefficient of variation for the Pearl River Delta, 1980–1990. PGVIAO—Per capita gross value of industrial and agricultural output measured in the 1980 constant price; PINCM—Per capita income; PDNTY—Population density; URBN—Percent urban (non-agricultural) population; TEMP—Percent temporary population. Raw data are derived from GPSB (1991, 14–407).

cities, key economic indices such as per capita gross value of industrial and agricultural output (PGVIAO) and per capita income (PINCM) demonstrated an increased coefficient of variation between the years 1980–1990. This pattern suggests that there is little evidence in favor of the third hypothesis. The issue of regional inequality in postreform China appears to be more complicated than the conventional wisdom of economic growth and urbanization might have predicted. This finding is consistent with those of several early studies conducted at the national level (Fan 1995; Wei and Ma 1996).

Discussion and Conclusion

Chinese economic reform since 1978 has not only facilitated industrialization and urbanization of the nation but also fundamentally altered the spatial relationships between city and countryside. For ideological and strategic reasons, urban-rural interaction in the prereform era was tightly constrained by the Maoist regime through central resource allocation, price determination, and migration control, which formed an invisible yet effective “wall” separat-

ing cities from the countryside (Parish 1981; Lardy 1983; Kirkby 1985; Chan 1994; Cheng and Selden 1994). The implementation of liberal and flexible economic policies since the reforms has allowed urbanites and peasantry to interact in a direct and spontaneous manner, giving rise to reorganization of the urban-rural relations. While the economic and social implications of these reorganized relations have been well documented (Whyte 1983; World Bank 1985, 25; Zweig 1987, 48; Lin 1999), the spatial manifestations of urban-rural interaction remain vague.

This study has focused on the emerging spatial form of urban-rural interaction in one of the fastest growing economic regions in southern China. Building on the hypothetical model developed by McGee (1989) and Ginsburg (1990) as well as Zhou (1991) and Pannell and Veeck (1991), this study analyzes more specifically and precisely the areal extent of the hypothetical zone of intense urban-rural interaction, its functional attributes, and its implications for regional development. The results of statistical analyzes confirm a hypothesis about the existence of a distinct zone of urban-rural interaction adjacent to and between metropolitan cen-

ters. Despite the fact that the majority of people in this peri-urban zone were officially classified as "agricultural" or "rural," the economy in this zone is found to be much more than simply agricultural. The intensive mixture and growing integration of industrial/agricultural, urban/rural activities in this zone raise significant theoretical questions concerning the usefulness of the urban-rural dichotomy and many of its derived assumptions on which the development theory and the urban transition model have been based.

The contribution of the peri-urban zone to the regional economy has been great and has grown since the 1980s. In many respects, this emerging zone of urban-rural interaction has played a role more significant than the central cities, as revealed by the analysis above of the changing spatial distribution of in-migrants, industrial and agricultural production, retail sales, and foreign investment. From a theoretical standpoint, the continued expansion of the zone of urban-rural interaction in the Chinese context casts serious doubt over the applicability and transferability of the classic model of urban transition, which describes a concentration of population in large cities as an inevitable spatial outcome of economic growth because of the operation of forces associated with the agglomeration economies.

One of the most controversial topics to arise from various studies of regional economic development in post-reform China has been the change in regional inequality (Lo 1990; Fan 1995; Wei and Ma 1996). An early informative study conducted by Xu and Li suggested that rapid economic growth of the PRD since the reforms had not suffered from the negative effect of polarization that is usually believed to take place at the early stage of regional economic growth (Xu and Li 1990, 67). On the other hand, studies by Lo (1989, 306) and Fan (1995, 443) have highlighted the gap between the core and periphery of the PRD. These studies reveal a general pattern of postreform development in the PRD, characterized by the declining dominance of the central cities, the rapid surge of a newly developing peri-urban zone outside and between the central cities, and the persistence of a backward economy in the periphery. Dramatic economic growth in the peri-urban zone outside the central cities has not contributed to the reduction of eco-

nomical inequality for the region primarily because of the underdevelopment in the peripheral area. To the extent that the peri-urban zone has helped prevent the excessive concentration of population in the congested central cities, the continued growth of this zone may be considered a viable or desirable option of urbanization (Ginsburg 1990; McGee 1991; Zhou 1991). However, the backward situation in the periphery and the widening gap between it and the advanced peri-urban zone should not be overlooked if urbanization and regional development are to be achieved in a socially and environmentally sustainable manner.

The evolving spatial form of urban-rural interaction identified in this study has been a result of the interaction of various local and global forces underlying the special political economy of the Chinese region (Lo 1989; Fan 1995; Lin 2000). The existence of extensive social and economic linkages between Hong Kong and the PRD has not only brought much external capital into the region but also greatly facilitated the production of agricultural commodities and consumer goods for the international market. Much of the processing industry established by Hong Kong firms has been located in the peri-urban zone because of the existence of kinship ties, a large pool of cheap labor, greater supply of land, and less government control over environmental pollution than that in the large cities. The liberal and pragmatic approach adopted by the new socialist regime since the reforms toward rural-urban migration, which allows rural exodus to move into towns nearby but continues to restrain migration to large cities, has also contributed to the prominence of the peri-urban zone. Finally, the entrepreneurial role played by local governments in developing township and village enterprises and building up a transportation infrastructure has greatly facilitated economic expansion in a zone outside of the large cities. While some of these conditions are unique to the PRD, there is significant evidence to suggest that similar spatial forms of urban-rural interaction are taking shape in other coastal Chinese regions that have just been exposed to forces of agricultural marketization, rural industrialization, and opening up (Pannell and Veeck 1991; Zhou 1991; Marton 1995; Wang 1997). Given China's great regional diversity, the conditions and processes underlying urban-

rural interaction may also vary. Further studies are needed to investigate how local and global forces interact in different regional contexts and what spatial forms of urban-rural interaction have evolved under various historical and geographic circumstances. ■

Notes

- ¹ Urban-rural interaction is generally considered to be a highly sophisticated process, which is extremely difficult to measure in quantitative terms. For the purpose of illustration and based on available data, this study analyzes urban-rural interaction in terms of the movement of people, the exchange of goods, and competition for land resources.
- ² This study adopts the 1990 statistical definition of the Pearl River Delta (*Zhujiang shanjiaozhou*), which includes the provincial capital city of Guangzhou, two Special Economic Zones (Shenzhen and Zhuhai), and twenty-eight other cities and counties. The delta region so defined covers an area of 47,430 km² and has a population of over 20 million. See Figure 1.
- ³ Since the introduction of the household registration (*hukou*) system in 1958, the population in China has been divided by the government into agricultural and nonagricultural households. Only the officially registered nonagricultural population (*feinongye renkou*) are entitled to rationed food and various urban services including housing, schooling, employment, medical care, and other social welfare. The distinction of agricultural and nonagricultural population has therefore become an effective means by which the socialist regime not only demarcates the urban population but also controls rural-urban migration. For detailed discussions, see Chan and Xu (1985), Kirkby (1985), Ma and Cui (1987), Chan (1994), Cheng and Selden (1994), and Zhang and Zhao (1998).

Literature Cited

- Bryd, William, and Qing-song Lin, eds. 1990. *China's rural industry*. Washington, DC: World Bank.
- Buck, David. 1981. Policies favoring the growth of smaller urban places in the People's Republic of China, 1949–1979. In *Urban development in modern China*, ed. L. J. C. Ma and E. W. Hanten, 114–46. Boulder, CO: Westview.
- Chan, Kam Wing. 1992. Economic growth strategy and urbanization policies in China, 1949–1982. *International Journal of Urban and Regional Research* 16 (2):275–305.
- . 1994. *Cities with invisible walls*. Hong Kong: Oxford University Press.
- Chan, Kam Wing, and Xueqiang Xu. 1985. Urban population growth and urbanization in China since 1949: Reconstructing a baseline. *China Quarterly* 104:583–613.
- Cheng, Tiejun, and Mark Selden. 1994. The origins and social consequences of China's Hukou system. *China Quarterly* 139:644–68.
- China State Statistical Bureau (CSSB). 1991a. *Zhongguo tongji zhaiyao (A statistical survey of China) (1991)*. Beijing: Zhongguo tongji chubance.
- . 1991b. *Zhongguo fexian nongcun jingji tongji gaiyao (Statistical abstract of China's county-level rural economies) (1990)*. Beijing: Zhongguo tongji chubance.
- . 1996. *Zhongguo tongji nianjian (China's statistical yearbook) (1996)*. Beijing: Zhongguo tongji chubance.
- Corbridge, Stuart. 1982. Urban bias, rural bias, and industrialization: An appraisal of the works of Michael Lipton and Terry Byres. In *Rural development: Theories of peasant economy and agrarian change*, ed. J. Harriss, 94–116. London: Hutchinson.
- . 1989. Urban-rural relations and the counterrevolution in development theory and practice. In *The geography of urban-rural interaction in developing countries*, ed. R. Potter and T. Unwin, 233–57. London: Routledge.
- Davis, Deborah S. 1995. Introduction: Urban China. In *Urban spaces in contemporary China*, ed. Deborah S. Davis, Richard Kraus, Barry Naughton, and Elizabeth J. Perry, 1–22. Cambridge: Cambridge University Press.
- Douglass, Mike. 1998. A regional network strategy for reciprocal rural-urban linkages. *Third World Planning Review* 20 (1):1–33.
- Fan, C. Cindy. 1995. Of belts and ladders: State policy and uneven regional development in post-Mao China. *Annals of the Association of American Geographers* 85 (3):421–49.
- . 1996. Economic opportunities and internal migration: A case study of Guangdong Province, China. *Professional Geographer* 48 (1):28–45.
- Fei, J. C. H., and G. Ranis. 1961. A theory of economic development. *American Economic Review* 51:533–65.
- Friedmann, John. 1996. Modular cities: Beyond the rural-urban divide. *Environment and Urbanization* 8:129–31.
- Friedmann, John, and Robert M. Wulff. 1975. *The urban transition: Comparative studies of newly industrializing societies*. London: Edward Arnold.
- Gilbert, Alan, and Josef Gugler. 1982. *Cities, poverty and development: Urbanization in the Third World*. Oxford: Oxford University Press.
- Ginsburg, Norton. 1990. *The urban transition: Reflections on the American and Asian experiences*. Hong Kong: The Chinese University Press.
- Ginsburg, Norton, Bruce Koppel, and Terry G. McGee, eds. 1991. *The extended metropolis: Settlement transition in Asia*. Honolulu: University of Hawaii Press.
- Goldstein, Sidney. 1990. Urbanization in China, 1982–87: Effects of migration and reclassification. *Population and Development Review* 16 (4):673–701.

- Gould, W. T. S. 1982. Rural-urban interaction in the Third World. *Area* 14:334.
- Guangdong Province Population Census Office (GPPCO). 1991. *Guangdongsheng disici renkou pu-chu shougong buizhong ziliao* (Manual processed data for the 4th population census for Guangdong Province). Guangzhou: GPPCO.
- Guangdong Province Statistical Bureau (GPSB). 1991. *Guangdongsheng xian(qu) guomin jingji tongji ziliao* (Guangdong Province county and district economic statistical materials) (1980–1990). Yichun: Guoying Jiangxi Yichun Ziliao Yinshuachang.
- . 1992. *Zhujiang sanjiaozhou guomin jingji tongji ziliao* (The Pearl River Delta economic statistical materials) (1980–1991). Guangzhou: Zhonggong Guangdong Shengwei Bangongting Yinshuachang.
- . 1995. *Zhujiang sanjiaozhou jingji qu tongji ziliao* (The Pearl River Delta Economic Region statistical materials) (1980–1994). Guangzhou: Zhonggong Guangdong Shengwei Bangongting Yinshuachang.
- . 1996. *Guangdongsheng tongji nianjian* (Statistical yearbook of Guangdong Province) (1996). Beijing: China Statistical Press.
- Gulger, Josef, ed. 1996. *The urban transformation of the developing world*. Oxford: Oxford University Press.
- Harris, John, ed. 1982. *Rural development: Theories of peasant economy and agrarian change*. London: Hutchinson.
- Harvey, David. 1985. *The urbanization of capital*. Oxford: Blackwell.
- Hirschman, Albert O. 1958. *The strategy of economic development*. New Haven, CT: Yale University Press.
- Ho, Samuel P. S. 1994. *Rural China in transition*. Oxford: Clarendon.
- Hsing, You-tien. 1997. *Making capitalism in China: The Taiwan connection*. New York: Oxford University Press.
- Jackson, Barbara B. 1983. *Multivariate data analysis: An introduction*. Homewood, IL: Irwin Publishing.
- Johnson, Graham E., and Yuen Fong Woon. 1997. Rural development patterns in post-reform China: the Pearl River Delta region in the 1990s. *Development and Change* 28:731–51.
- Kirkby, Richard J. R. 1985. *Urbanization in China: Town and country in a developing economy 1949–2000AD*. New York: Columbia University Press.
- Lardy, Nicholas R. 1983. *Agriculture in China's modern economic development*. Cambridge: Cambridge University Press.
- Leung, Chi Kin. 1993. Personal contacts, subcontracting linkages, and development in the Hong Kong-Zhujiang Delta region. *Annals of the Association of American Geographers* 83 (2):272–302.
- . 1996. Foreign manufacturing investment and regional industrial growth in Guangdong Province, China. *Environment and Planning A* 28:513–36.
- Lewis, W. A. 1954. Economic development with unlimited supplies of labour. *Manchester School of Economics and Social Studies* 20:139–92.
- Lin, George C. S. 1994. Changing theoretical perspectives on urbanization in Asian developing countries. *Third World Planning Review* 16 (1):1–23.
- . 1997. *Red capitalism in South China: Growth and development of the Pearl River Delta*. Vancouver: UBC Press.
- . 1998. China's industrialization with controlled urbanization: Anti-urbanism or urban-biased? *Issues & Studies* 34 (6):98–116.
- . 1999. State policy and spatial restructuring in post-reform China, 1978–95. *International Journal of Urban and Regional Research* 23 (4):670–96.
- . 2000. State, capital, and space in China in an age of volatile globalization. *Environment and Planning A* 32 (3):455–71.
- Lipton, Michael. 1976. *Why poor people stay poor: Urban bias in world development*. Cambridge: Cambridge University Press.
- Lo, C. P. 1989. Recent spatial restructuring in Zhujiang Delta, South China: A study of socialist regional development strategy. *Annals of the Association of American Geographers* 79 (2):293–308.
- . 1990. The geography of rural regional inequality in Mainland China. *Transactions of the Institute of British Geographers* 15:466–86.
- Ma, Laurence J. C. 1976. Anti-urbanism in China. *Proceedings of the Association of American Geographers* 8:114–118.
- Ma, Laurence J. C., and Gonghao Cui. 1987. Administrative changes and urban population in China. *Annals of the Association of American Geographers* 77 (3):373–95.
- Ma, Laurence J. C., and Edward W. Hanten, eds. 1981. *Urban development in modern China*. Boulder, CO: Westview.
- Ma, Laurence J. C., and Chusheng Lin. 1993. Development of towns in China: A case study of Guangdong Province. *Population and Development Review* 19 (3):583–606.
- Marton, Andrew M. 1995. Mega-urbanization in southern Jiangsu: Enterprise location and the reconstitution of local space. *Chinese Environment and Development* 6 (1&2):9–42.
- McGee, Terry G. 1989. *Urbanisasi or Kotadesasi?* Evolving patterns of urbanization in Asia. In *Urbanization in Asia*, ed. Frank J. Costa, Ashok K. Dutt, Laurence J. C. Ma, and Allen G. Noble, 93–108. Honolulu: University of Hawaii Press.
- . 1991. The emergence of desakota regions in Asia: Expanding a hypothesis. In *The extended metropolis: Settlement transition in Asia*, ed. Norton Ginsburg, Bruce Koppel, and Terry G. McGee, 3–25. Honolulu: University of Hawaii Press.
- Mumford, Lewis. 1961. *The city in history: Its origins, its transformations, and its prospects*. London: Secker & Warburg.
- Murphy, Rhoads. 1976. Chinese urbanization under Mao. In *Urbanization and counterurbanization*. ed. B. J. Berry, 311–28. Beverly Hills: Sage.

- Myrdal, Gunnar. 1957. *Economic theory and underdeveloped regions*. London: Duckworth.
- Orleans, L.A., and L. Burnham. 1984. The enigma of China's urban population. *Asian Survey* 34:788–804.
- Pannell, Clifton W., and Gregory Veeck. 1991. China's urbanization in an Asian context: Forces for metropolitanization. In *The extended metropolis: Settlement transition in Asia*, ed. Norton Ginsburg, Bruce Koppel, and Terry G. McGee, 113–35. Honolulu: University of Hawaii Press.
- Parish, William L. 1981. Egalitarianism in Chinese society. *Problems of Communism* 1:37–53.
- . 1985. *Chinese rural development: The great transformation*. Armonk, NY: Sharpe.
- Perkins, Dwight, and Shahid Yusuf. 1984. *Rural development in China*. Baltimore: John Hopkins University Press.
- Petersen, William. 1975. *Population*. New York: Macmillan.
- Potter, Robert, and Tim Unwin. 1995. Urban-rural interaction: Physical form and political process in the Third World. *Cities* 12 (1):67–74.
- Preston, D. 1975. Rural-urban and inter-settlement interaction: Theory and analytical structure. *Area* 7:171–74.
- Ravenstein, E.G. 1889. The laws of migration. *Journal of the Royal Statistical Society* 51:241–301.
- Roberts, Bryan R. 1978. *Cities of peasants: The political economy of urbanization in the Third World*. London: Edward Arnold.
- Sit, Victor F.S., ed. 1985. *Chinese cities*. Oxford: Oxford University Press.
- Skinner, George William. 1977. Regional urbanization in nineteenth century China. In *The city in late imperial China*, ed. G.W. Skinner, 211–29. Stanford, CA: Stanford University Press.
- Smart, Josephine, and Alan Smart. 1991. Personal relations and divergent economies: A case study of Hong Kong investment in China. *International Journal of Urban and Regional Research* 15 (2):216–33.
- Tacoli, Cecilia. 1998. Rural-urban interactions: A guide to the literature. *Environment and Urbanization* 10 (1):147–66.
- Timberlake, Michael. 1985. *Urbanization in the world economy*. Orlando: Academic Press.
- Unwin, Tim. 1989. Urban-rural interaction in developing countries: A theoretical perspective. In *The geography of urban-rural interaction in developing countries*, ed. Robert Potter and Tim Unwin, 11–33. London: Routledge.
- Veeck, Gregory, and Clifton W. Pannell. 1989. Rural economic restructuring and farm household income in Jiangsu, People's Republic of China. *Annals of the Association of American Geographers* 79 (2):275–92.
- Vogel, Ezra. 1989. *One step ahead in China: Guangdong under reform*. Cambridge: Harvard University Press.
- Wang, Mark Y.L. 1997. The disappearing rural-urban boundary: Rural socioeconomic transformation in the Shenyang-Dalian region of China. *Third World Planning Review* 19 (3):229–50.
- Wei, Yehua, and Laurence J.C. Ma. 1996. Changing patterns of spatial inequality in China, 1952–1990. *Third World Planning Review* 18 (2):177–91.
- Whyte, Martin K. 1983. Town and country in contemporary China. *Comparative Urban Research* 10 (1):9–20.
- . 1986. Social trends in China: The triumph of inequality? In *Modernizing China: post-Mao reform and development*, ed. Arthur D. Barnett and Ralph N. Clough, 103–26. Boulder, CO: Westview.
- Whyte, Martin K., and William L. Parish. 1984. *Urban life in contemporary China*. Chicago: University of Chicago Press.
- World Bank. 1985. *China: Agriculture to the Year 2000*. Washington, DC: The World Bank.
- Xu, Xueqiang, and Si-ming Li. 1990. China's open door policy and urbanization in the Pearl River Delta region. *International Journal of Urban and Regional Research* 14 (1):49–69.
- Yeh, Anthony G.O., and Xia Li. 1999. Economic development and agricultural land loss in the Pearl River Delta, China. *Habitat International* 23 (3):373–90.
- Zhang, Li, and Simon X.B. Zhao. 1998. Reexamining China's "urban" concept and the level of urbanization. *China Quarterly* 154:330–81.
- Zhou, Yixing. 1991. The metropolitan interlocking region in China: A preliminary hypothesis. In *The extended metropolis: Settlement transition in Asia*, ed. Norton Ginsburg, Bruce Koppel, and Terry G. McGee, 89–112. Honolulu: University of Hawaii Press.
- Zhou, Yixing, and Y.L. Shi. 1995. Towards establishing the concept of physical urban area in China. *Journal of Chinese Geography* 5 (4):1–15.
- Zweig, David. 1987. From village to city: Reforming urban-rural relations in China. *International Regional Science Review* 11 (1):43–58.

GEORGE CHU-SHENG LIN (Ph.D. University of British Columbia) is Associate Professor in the Department of Geography at the University of Hong Kong, Pokfulam Road, Hong Kong. E-mail: GCS-LIN@hkucc.hku.hk. His current research interests include urban and regional development, land use transformation in rural China, and the geography of Chinese diaspora.