

**Peri-Urbanization in Chengdu,
Western China: From “Third
Line” to Market Dynamics**

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May 2004

ISBN: 1-931368-05-8

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Acknowledgments

This research was funded by the Ford Foundation and the Chinese Academy of Sciences, Grant No. KZCX2-SW-318-02. Their support is much appreciated.

This project benefited greatly from the insightful comments and constructive critiques of our Stanford colleague, former APARC director of research, James Raphael. Professor Tom Rohlen's contributions, as principal investigator, in keeping us focused, and working with us in Chengdu during initial stages to frame the work, are greatly appreciated. Similarly, the contributions of Dr. Xiaomin Pang of the Chinese Academy of Sciences in helping us to establish the methodology are much appreciated.

The authors wish to thank Ms. Yanting Zheng, Ms. Yue Peng, and Mr. Baofeng Di for their research support. We appreciate the assistance we received from the Chengdu Planning Commission, particularly Mr. Yongbo Zheng, vice-head of the Comprehensive Planning Department, and the Chengdu Economic Information Center, with special thanks to Mr. Xing Yan, the director of the center, and Mr. Jiquan Wang, who accompanied us in our field work. Our thanks also to the Chengdu Land Bureau, ETDZ Commission, Hi-Tech Zone Commission, Dujiangyan city government, Wuhou district government, the Chengdu Shoe Association, and the enterprises we visited.

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1. Introduction

Background

Western China is the current focus of development efforts in China, as a consequence of a policy initiated in 1999 to compensate for an earlier emphasis on coastal development.¹ Policies and programs in support of this so-called "Go West" initiative emphasize the important role of urban areas in catalyzing western development. Key western urban regions are in the spotlight in terms of their developmental performance, particularly employment creation, absorption of migrants, facilitating the rural-urban transition in nearby rural areas,² and urban-rural linkages (the “radiation” of development outwards). Accordingly, Chengdu, the second largest urban center in western China after Chongqing, was included in our peri-urban research program.

Chengdu plays a very important role in the west. It anchors the northwestern end of the Chongqing-Chengdu corridor, the fourth largest urban cluster in China. Increasingly, Chengdu and Chongqing functionally complement each other within the corridor. Chongqing specializes in manufacturing and orients itself to the Upper Yangtze Basin, while

Chengdu reinforces its role as the major business and producer services center, and aviation hub in the west, looking westward and to Yunnan Province and Southeast Asia. At the same time, manufacturing remains an important economic activity in the Chengdu extended urban region, as indicated in Section 3. Basic data on the Chengdu and Chongqing urban regions are presented comparatively in Appendix 1.

Peri-urbanization in the Chengdu extended urban region is the subject of this discussion paper. Characteristics of peri-urbanization processes in East Asia in general, and China in particular, have been described in previous outputs of the Asia-Pacific Research Center (APARC) and Institute of Geographical Science and Natural Resource Research (IGSNRR) research team. In a nutshell, peri-urbanization refers to the dynamic process of physical and socioeconomic change beyond the contiguously built-up areas of large cities (see “Select Recent Publications of the Asia-Pacific Research Center” listed at the end of this paper). In East Asia, the process is usually driven by investment (foreign and domestic) in manufacturing.³ Development in the Chengdu peri-urban region (and in Chongqing) has taken a different route to date than in coastal China, the subject of previous research by our Urban Dynamics of East Asia Project.⁴

The Chengdu region, in the past, has been shaped to a greater extent by state-owned enterprises (SOEs) and explicit national spatial policy than has the coastal region. It has been significantly influenced by the “Third Line” development program, which Mao Zedong initiated in the 1960s to protect industries strategic to national defense by locating them in interior western China.⁵ Starting in the late 1970s, the movement of “Third Line” firms from extremely remote locations to more central locations drove the development of the ring of peri-urban satellite cities around Chengdu. Unlike other western Chinese urban regions, the Chengdu peri-urban region was the location of considerable Township and Village Enterprise (TVE) development for a twenty-year period, also beginning in the late 1970s.⁶ However, over time, market forces have become the dominant force shaping the development of Chengdu, not unlike coastal cities, albeit with a lag effect.

In sum, the Chengdu Extended Urban Region (EUR) has a considerable history of peri-urbanization, but the process has differed from that in the coastal areas, where foreign direct investment (FDI), multinationals, joint ventures, and Chinese-owned consumer products firms played a much greater role, because the area was opened to market forces much earlier. In the Chengdu EUR, early peri-urbanization was largely associated with Soviet-style satellite industry towns, designed to act as bases for SOEs and their workers. To a considerable extent, this dynamic set the peri-urban structure, and has only recently been challenged by development contiguous to the built-up area, and by in-filling, as will be discussed. Of late, global drivers, such as investments by multinational hi-tech firms (e.g., Motorola, Microsoft) are starting to play a more important role in shaping peri-urban Chengdu. Given this shift, will peri-urbanization in Chengdu continue to plot its own course, or begin to more closely duplicate the trajectory of post-1980 coastal peri-urbanization?

Objective and Themes

The prime objective of this discussion paper is to better understand development processes driving peri-urbanization in the Chengdu EUR, and their implications. To the extent possible, the dynamics and trajectory of peri-urbanization in Chengdu—one of the most important urban regions in China’s Inner West—are compared with those we have observed in coastal China, particularly in Hangzhou, the site of comparative research.⁷ Where applicable,

to better understand western Chinese peri-urbanization, we also draw on the case of the Chongqing extended urban region, the largest in the west, where the research team spent fifteen days assessing emerging development dynamics in the peri-urban area.⁸ Our assessment of the Chengdu EUR focuses on the current drivers of peri-urban development from an economic clusters perspective, identifying emerging firm and spatial dynamics, and labor and community implications of peri-urban based cluster development. As noted, current drivers are primarily market forces, replacing state forces that dominated during the “Third Line” period. In fact, as will be argued, even conventional physical planning processes appear to have limited impact in shaping the EUR.

In the case of the Chengdu EUR, the set of drivers shaping current peri-urban development are as follows:

(i) Because the Chengdu urban region’s comparative and competitive advantage is increasingly in business, producer, and retail services (overwhelmingly located in the urban core), the core plays a vital role in driving the physical and economic development of the city. For example, Chengdu is the site of western China’s financial cluster, the home of the western regional headquarters of the Bank of China. Thus, physical development in the Chengdu EUR is more influenced by the core than in other urban regions where manufacturing is relatively more important, such as Guangzhou and Ningbo, which are to a much greater extent driven by their peripheries. However, manufacturing continues to play a key role in the economy of the core, and a propulsive role in the economy of the peri-urban region. Some of the most interesting spatial dynamics are occurring in the core. There, service activities are rapidly pushing manufacturing out to the fringe of the built-up urban area and beyond, both through market forces and government intervention.

(ii) Manufacturing, tourism, and hi-tech activities continue to drive peripheral development strongly. These forces interact with strong development pressures exerted by the core. Chengdu is the unchallenged research and development (R&D) center in the west, and a leading domestic and international tourist destination. Attractions include the Dujiangyan world heritage designated ancient irrigation site, panda bear reserves, and the birthplace of Taoism.

(iii) Manufacturing in the peri-urban area is currently being driven by new dynamics, overtaking past TVE and SOE enterprise and employment creation, including:

(a) Major corporations relocating large-scale manufacturing capacity from the coastal region, attracted by lower land, labor, and other costs. For example, Nice Corporation, the largest domestic manufacturer of detergents and other household consumables in China, is building a large factory in the western peri-urban region near Xinjin. In the case of land, the availability of large plots in peri-urban areas is a further advantage for large factories such as Nice Corporation. The large western market is also a factor. This dynamic differs from coastal EURs in that outside investment is primarily by domestic coastal firms, rather than foreign corporations.

(b) Emergence of large-scale, labor-intensive clusters, driven from the bottom up by local entrepreneurs, such as the women’s shoe cluster analyzed in this

discussion paper. These clusters are successfully competing with, and taking market share from, previously dominant coastal clusters, e.g., in Wenzhou. Lower production costs in the west, particularly for labor and land, are driving this dynamic, complemented by public policy factors, such as tax incentives, less restrictive environmental regulations,⁹ and easier acquisition of *hukou*¹⁰ status by labor. Firms in these clusters are usually started by locals experienced in the activity in question. In a minority of cases, firms have shifted from the coast. Often coastal firms are involved as joint venture partners, and frequently personnel with critical skills are recruited from the coast.

(c) Revitalization of former SOEs, many of which have relocated in the Chengdu peri-urban region from more remote locations, and are being restructured in terms of ownership, products, and marketing. They often build on the legacy of R&D in the region, bringing established technical and research networks to new life in joint ventures with private firms, such as the *Sichuan Jinghua* Optics Group analyzed in this paper. One consequence of this dynamic is Chengdu's continuing economic reliance on established industries, in contrast to coastal EURs, where new industries now dominate as a result of foreign investment. Moreover, the inward movement of large-size SOEs (instead of private small- and medium-size enterprises (SMEs), as is the case in coastal areas such as Hangzhou EUR), has very different implications for spatial location, clustering dynamics, the nature of employment creation (or losses from SOE downsizing), and long-term economic viability under increasing market competition.

(d) Relocation of firms from the core city (particularly its northwest quadrant, the traditional heavy manufacturing area, to the peri-urban area) to make way for service activity and high-end residential/amenity, and retail development in the core. This dynamic is being led by the municipal government, in conjunction with districts in the city proper. The Economic and Technology Development Zone (ETDZ) analyzed in this discussion paper is a prime recipient of firms being asked to relocate to the periphery.

We argue that this “new” inner west peri-urbanization process exhibits significantly different labor, community, and migration dynamics than the more mature coastal variety. Regardless of whether this is the product of lag effects or more basic differences in peri-urbanization processes between the west and the coast, it calls for different policy and programmatic responses.

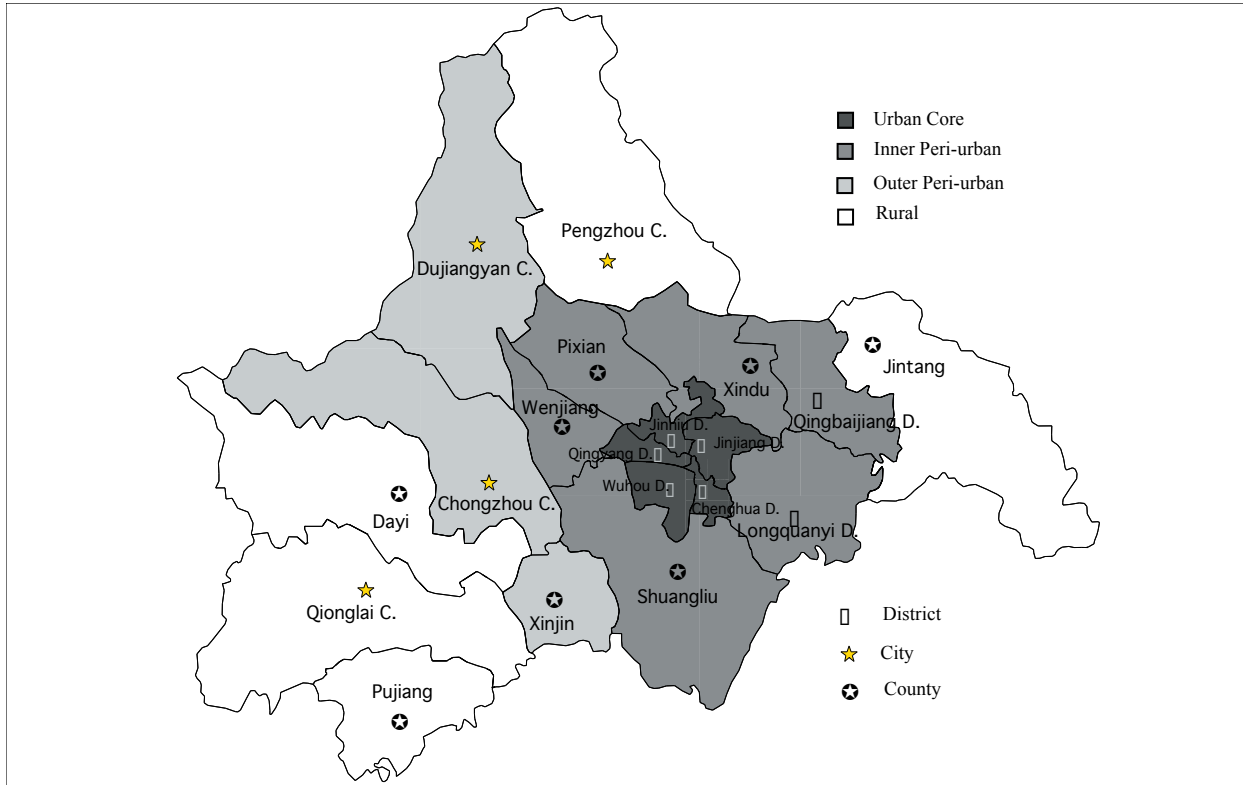
A second theme of the paper is to compare peri-urban dynamics and outcomes to date with official policies and plans. We will argue that official plans are, to a large extent, being overwhelmed by on-the-ground dynamics, which suggests the need for more integration of market and prime public investment drivers (e.g., construction of airports) into physical and social plans. This applies primarily to development plans in Chengdu's peri-urban areas, where official plans are trying to guide the direction of growth using “pull” mechanisms. These are in opposition to more successful core city redevelopment plans that are working with market forces to push manufacturing activities outwards.

Third, based on the foregoing, we put forward policy implications.

2. Methodology

The methodology is micro in focus, based on interviews with firm managers, employees, and relevant local government agencies. The study region is the Chengdu Municipality. Its counties and districts were classified into four settlement types: urban core, inner peri-urban, outer peri-urban, and rural areas, as described in Map 1.

Map 1. Chengdu Municipality Classified by Settlement Type



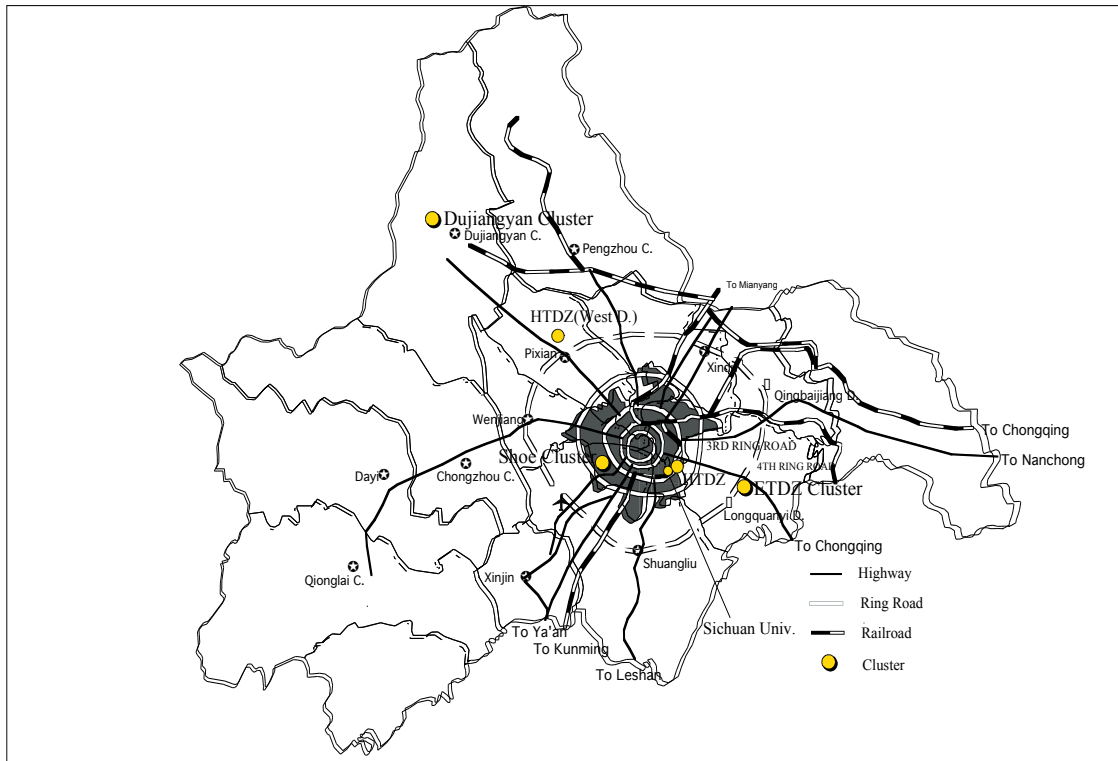
The firm-level micro analysis focused on three clusters:

- (i) the women's shoe cluster in Cu Qiao and Jin Hau Townships of Wuhan District, on the fringe of the urban core along the southwest corridor near the airport;
- (ii) the tourism cluster at Dujiangyan, in the outer peri-urban area to the northwest of the Chengdu City proper, and
- (iii) the Chengdu National Level ETDZ in Longquanyi District, in the inner peri-urban area to the southwest of Chengdu City proper (see Map 2).

At the firm level, we interviewed enterprise managers. Further, we asked the management of each firm to complete a questionnaire on their history, operations, and finances. Employees were interviewed (managerial, production, support staff) based on a stratified sample. In parallel, we conducted interviews with relevant government

departments, particularly at the municipal level, and with the management of industrial and technological zones. In the case of key municipal government bureaus, we visited and interviewed them several times over a one-and-a-half-year period. For example, we held extensive interviews with the Municipal Planning Commission on seven separate occasions between December 2001 and February 2003. Other municipal level government agencies interviewed include the Labor and Social Security Bureau, the Land and Resources Bureau, the Chengdu Information Center, the Comprehensive Department of the Social Bureau, and the Chengdu Employment Service Administrative Bureau. These interviews were structured and oriented toward better understanding the physical, social, economic, and environmental dimensions of the peri-urbanization process and the role that public sector policies have played in the evolution of the case study areas and the Chengdu EUR as a whole. The questionnaires used are provided in Appendices 2, 3, and 4.

Map 2. Case Study Clusters and Key Infrastructure



This cluster-scale and interview-based research approach gave us insight into the intra-firm and inter-firm dynamics that are driving peri-urban processes. Our overall understanding of urbanization dynamics in the Chengdu EUR was supplemented by a more macro assessment of Chengdu Municipality based on secondary data by settlement type, presented in Section 3, plus observations of development patterns during several field visits. In addition, a land conversion assessment from 1978 to the present, using remote sensing imagery, significantly contributed to our understanding of the relationship between micro dynamics and urban form outcomes. The detailed results of the land conversion assessment are described in a companion discussion paper.¹¹

3. The View from Above: The Chengdu Extended Urban Region 1990–2000

This section describes the Chengdu EUR between 1990–2000 by settlement type, using district and county level statistical data. This ten-year perspective is based on census years, both for greater data accuracy and to facilitate comparison with the Hangzhou region. Changes occurring since 2000, when some of the tangible effects of national economic stimulus programs began to gain momentum in Chengdu, are discussed in other sections of this paper.¹²

3.1 Peri-urban Dynamics and Administrative Boundaries

The Municipality of Chengdu is located on a plateau and covers a large area of over 12,390 square kilometers. It is the center of a densely populated, rich agricultural area, but also encompasses sparsely populated mountainous areas in its western border counties. The municipality consists of Chengdu City's seven urban districts (five in the built-up urban area, and two newly annexed counties), four county-level cities, and eight counties. To facilitate empirical analysis, the four settlement types—urban core, inner peri-urban, outer peri-urban, and rural area—have been defined in terms of existing administrative boundaries at the county level (refer to Map 1). Because each county (or county-level city) covers a large area, this categorization results in the overbounding of areas undergoing peri-urbanization—a process which tends to occur disproportionately along key corridors, rather than being spread evenly across the landscape as one moves outward from the core city. Thus, the unavoidable use of administrative boundaries leads to data distortions resulting from an averaging out of more spatially concentrated peri-urbanization effects.

There are two additional distortions. First, the official statistics for the urban core and inner peri-urban areas mute the degree of differentiation in peri-urban dynamics across districts and counties by excluding hi-tech zones and other municipally administered special economic zones from the district/county level data. As a result, the data suggest a surprisingly high degree of similarity in manufacturing levels and GDP per capita across districts within the urban core, and across the districts and counties that comprise the inner peri-urban area (see Section 3.4), despite observed spatial differentiation between certain development corridors and areas away from these corridors in the inner peri-urban area. Most of the areas excluded in the submunicipal statistics are located in Wuhou District (urban core) and Shuangliu County (inner peri-urban), which form part of the southwest corridor where considerable manufacturing activity is occurring.¹³ The development of this corridor has been reinforced by key infrastructure, including construction of the new international airport in Shuangliu County.

Second, most of the area in the outer peri-urban and rural counties, particularly to the west, is sparsely populated, mountainous area. The economy of these counties is, therefore, dominated by the county's major city, which is usually located in the part of the county closest to the municipal core.

The designation of a county or "county-level city"¹⁴ as outer peri-urban versus rural is determined by its role (and especially the role of its major urban center) in the constellation of urban centers and towns that comprise the extended urban form. In some cases, the county/county-level city's major urban area is highly integrated into the greater Chengdu City system. In other cases, its economy is relatively independent. For example, the major urban area of Dujiangyan County-Level City, located in the outer peri-urban

area, serves as the recreational backyard for Chengdu City Proper residents, and therefore functions as part of the extended urban region, even though it is one of more distant county cities from Chengdu City Proper. By contrast, the major urban center of Pengzhou County-Level City, which is closer to Chengdu City Proper, is developing independently, and appears to have only weak linkages (economic, commuting, leisure, etc.) to the Chengdu municipal core. For this reason, it has been classified as rural.

3.2 Population Dynamics

The total population of Chengdu Municipality in 2000, according to the 5th census, was 11.1 million. The municipality grew at a fairly slow rate over the past ten years, averaging just 1.8 percent annually (see Table 1). However because these growth rates are calculated from a very large base population, they mask the magnitude of people being added to this already populous municipality: 1.84 million more people were absorbed into the municipality in the last ten years. Based on the 1990 and 2000 census data, most of the population growth occurred in the core and inner peri-urban regions. As in the coastal cities, such as Hangzhou Municipality, the majority of the growth occurred in the urban core, which grew at a very rapid average annual rate of 4.6 percent, adding 1.26 million people. But the inner peri-urban area also experienced significant population gains (385 thousand), although at a slower rate (1.3 percent). The outer areas of the municipality, by contrast, grew very slowly at less than 1 percent annually—population in the rural area is stagnating and will probably soon begin to decline, as has already happened in Hangzhou. As a result, the core (city proper) has gained share of the total municipal population. It now accounts for over 31 percent of the population, up from 24 percent in 1990. However, it is not clear that the numbers presented in Table 1 present an accurate picture. It may be that much of the unofficial population, especially in the peri-urban areas, was undercounted in the 5th census. Although the 5th census (unlike previous censuses) was based on the principle of counting people where they actually live, it still may have undercounted the unofficial population, especially in peri-urban areas. Nonetheless, these population dynamics reflect the growth of the service economy in the core, and the growth and increasing spatial concentration of manufacturing, both in the core (occurring at the fringe of the current built-up area) and inner peri-urban areas.

Table 1: Census Population¹⁵

	1990 4 th Census (persons)	2000 5 th Census (persons)	Annual Rate of Change (%)	1990 Share of Total Population (%)	2000 Share of Total Population (%)
Urban Core	2,208,051	3,470,478	4.6	23.8	31.2
Inner Peri-urban	2,776,859	3,161,837	1.3	30.0	28.5
Outer Peri-urban	1,424,272	1,563,699	0.9	15.4	14.1
Rural	2,857,336	2,912,520	0.2	30.8	26.2
Municipality	9,266,518	11,108,534	1.8	100.0	100.0

Source: Based on data from the 4th and 5th National Census, 1990 and 2000.

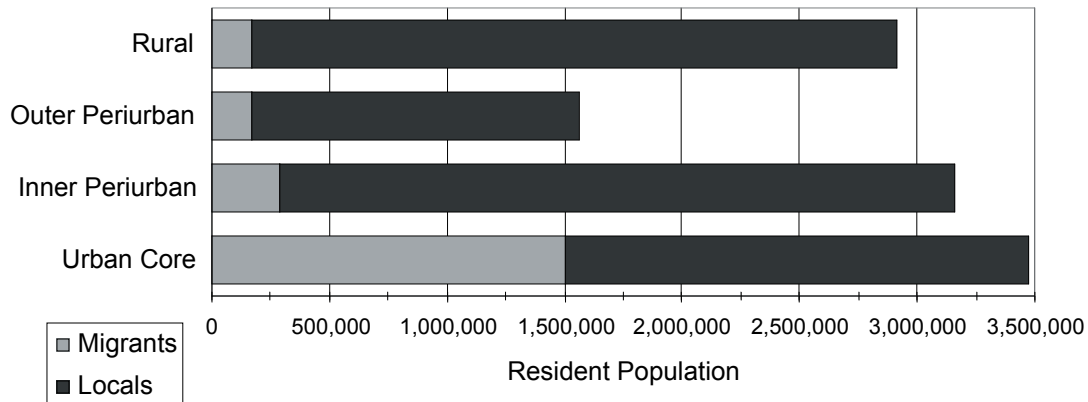
The fastest growing districts and counties were Wuhou District (averaging 8.3 percent annual growth), where the shoe cluster is located, and Jinniu District (at 6.6 percent).¹⁶ Both are located in the urban core, and comprise two of the three most populous districts/counties in the municipality, with 822.9 thousand people and 922.8 thousand people respectively. The third fastest growing jurisdiction was Longquanyi District, site of the Chengdu National Level ETDZ, in the inner peri-urban region. It grew at 2.5 percent to reach its 2000 population of 478.4 thousand. Dujiangyan City, where the tourism cluster is located, was the fastest growing outer peri-urban jurisdiction, with an average annual growth rate of 1.45 percent. It had 622.0 thousand people in 2000.

3.3 Migration Dynamics

The best available migration figures are from the 5th census. However, official migration statistics count only those migrants who have local *hukou* status; thus the figures do not accurately portray the migration dynamics in the region. (Unfortunately, equivalent figures from the 4th Census are not available.)¹⁷ According to the 2000 census figures, the municipality attracted over two million migrants, which means one in five residents are migrants.¹⁸ Over 70 percent of migrants to Chengdu reside in the urban core. As a result, the core has the highest migrant-to-local ratio among the four settlement types: for every 1,000 local residents, the core attracted 762 migrants (see Figure 1.) This is a shockingly high ratio. The implications of having so many recently arrived residents living in the urban core (e.g., in terms of infrastructure needs or social cohesion) warrants further exploration. However, the fact that the core is free of obvious slums and homelessness suggests that Chengdu City Proper has more capability than average core regions to respond to the attendant pressures of massive in-migration. The inner peri-urban area absorbed the second largest number of migrants, approximately 285,000 or 13 percent of total in-migrants. But the outer peri-urban area has a higher migrant-to-local ratio: there were 125 migrants for every 1,000 locals, versus 99 in the inner peri-urban region. The rural area has the lowest, at 63 per 1,000.

As discussed in the companion discussion paper on Hangzhou,¹⁹ these regional averages mask differentials in growth rates of individual towns and cities. Migrants tend to cluster in just a few host towns and cities that offer employment opportunities, thus the migrant-to-local ratios in highly favored localities can be significantly higher than their regional average, in some cases exceeding 1:1.

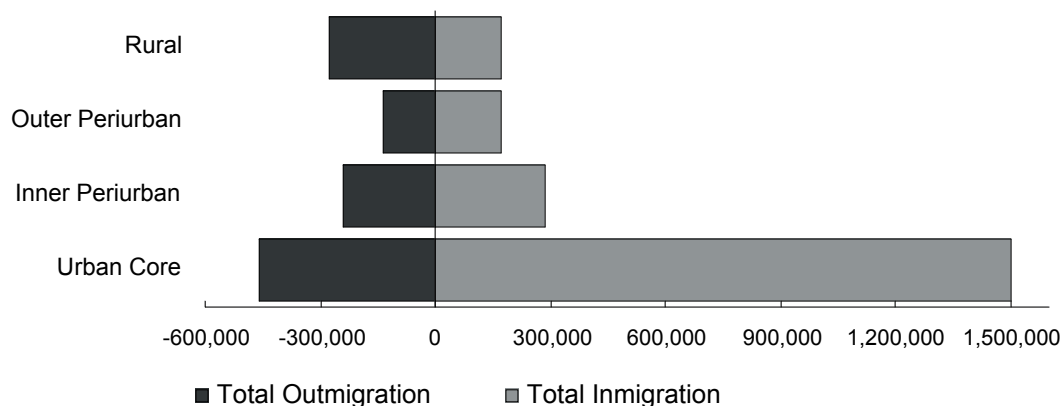
Figure 1: Composition of Resident Population by Settlement Type, Chengdu Municipality, 2000



Source: Based on figures in the 5th National Census, 2000.

Although many Sichuan residents have left to make their livelihood in other provinces, as a vibrant urban center in the otherwise lagging Western Region, Chengdu attracts more migrants than it loses residents. For every resident that leaves Chengdu (out-migration reached 1.1 million in the five-year period from 1995 to 2000), the municipality gains two new ones. As a result, the municipality was a net recipient of one million migrants in just a five-year period. Net migration dynamics vary greatly across the four settlement types, however. As shown in Figure 2, rural areas have experienced a net exodus of people, while the other regions have experienced net migration gains. The largest amount of population churn is occurring in Chengdu urban core. Demographic profiles of the core can change rapidly, making it difficult to predict specific needs and demands for urban services. In addition, with more than three newcomers for every departing resident, the core is experiencing enormous pressures to build new housing and infrastructure, and provide additional services, in order to accommodate huge influxes of new population. This task is made even more challenging by the fact that new residents tend to have few established social networks within the city to provide information and support.

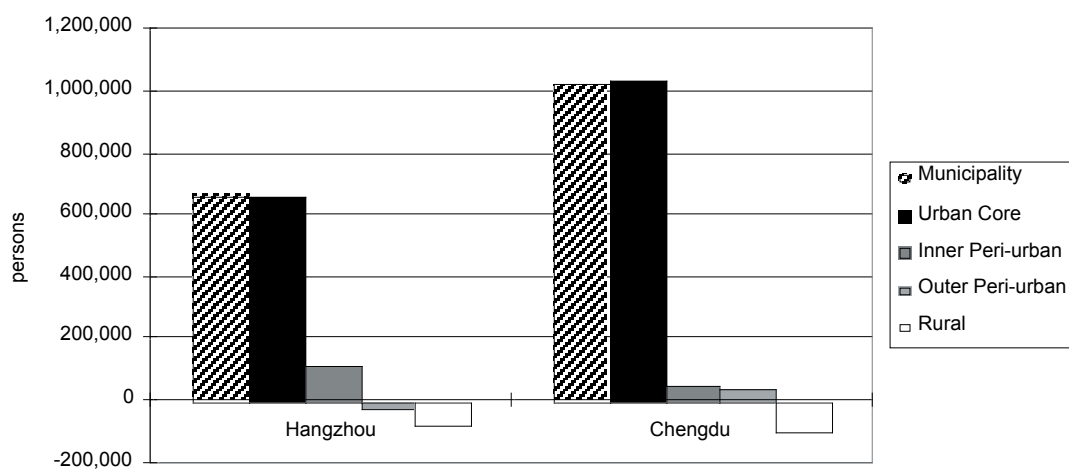
Figure 2: In-Migration and Out-Migration by Settlement Type, 1995–2000



Source: Based on data from the 5th National Census, 2000.

Compared to Hangzhou Municipality, Chengdu is still attracting a disproportionate share of net migration to the core (see Figure 3). The inner peri-urban share of in-migrants is comparatively low, but like the outer peri-urban area, is still a net gainer. This could change if Chengdu progresses into the later stages of peri-urbanization,²⁰ where manufacturing increasingly moves out of the core in search of cheaper land and labor, manufacturing in the peri-urban area expands, and more remote outer peri-urban locations stagnate. Massive

Figure 3: Net Migration in Hangzhou and Chengdu by Settlement Type, 1995–2000



Source: Based on data from the 5th National Census, 2000.

on-going commercial and residential redevelopment of Chengdu's core, which effectively blocks new industrial development in the Central Business District (in fact, industry is being moved out), could result in much faster net migration to the inner peri-urban area. This will show up in data during the second half of this decade. (On the other hand, SOEs being relocated to the periphery are often downsizing, and rarely hiring, so they are unlikely to attract migrants. It is new, private start-ups in manufacturing that will attract migrants.)

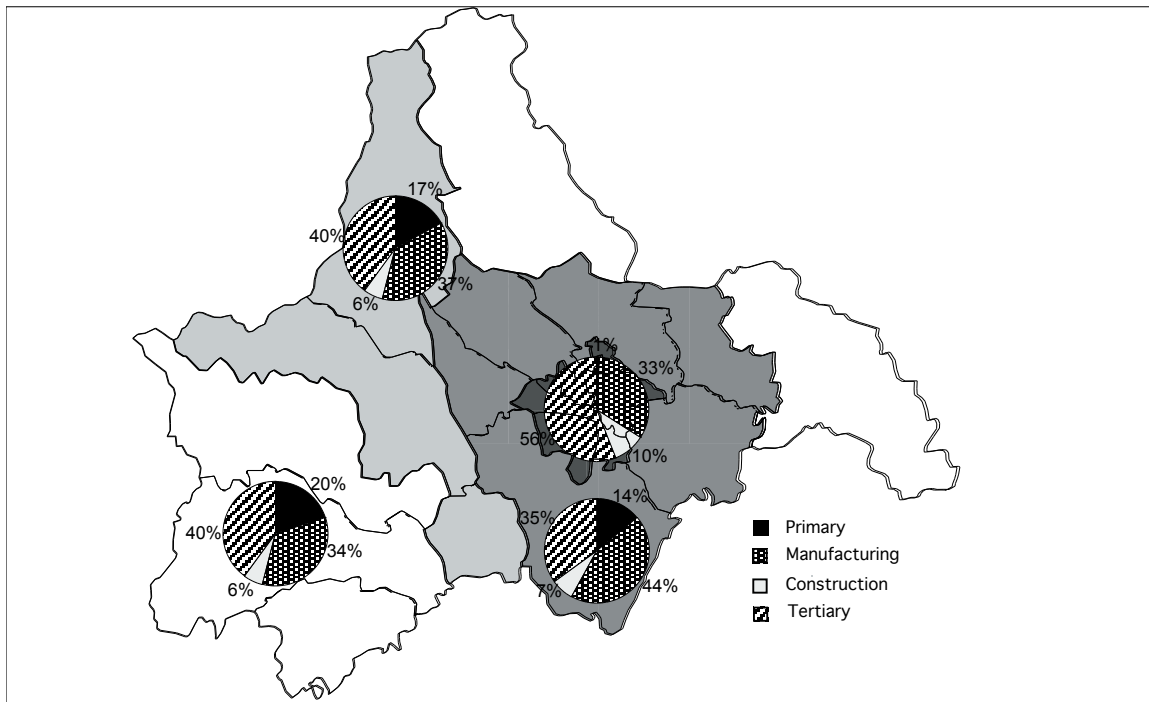
3.4 Economic Structure

The economic structure of the core is quite distinct from the remainder of the municipality, deriving a much lower share of GDP from primary sector activities (1 percent) and a much higher share from tertiary activity (56 percent) (see Figure 4). This structure is quite typical of Chinese municipalities, especially provincial capitals—for example, corresponding figures for Hangzhou urban core were 2 percent primary and 53 percent tertiary. It is quite surprising that Chengdu has a higher percentage of service activity in its core than Hangzhou, a wealthy coastal city—illustrating the importance of Chengdu as the west's leading service center. Yet, in spite of these structural similarities, the dynamics in Chengdu are quite different from the coast. GDP share of secondary activity (manufacturing and construction) have risen since 1995, from 36 percent to 43 percent in 2000, whereas they fell in Hangzhou over the same period. Much of the gain, however, has been in construction associated with the emergence of an increasingly high-rise-based, services-oriented core, and large-scale redevelopment in the urban core. Recent efforts by the Chengdu municipal government to move polluting industries, and encourage new manufacturing development, to locate outside of the urban core could result in lower shares of manufacturing in the core in the future. However, redevelopment of the outer edges of the core (not in the Central Business District) includes a significant role for several manufacturing zones focused on hi-tech, R&D, and higher value production activities, which are likely to sustain high GDP levels in manufacturing for some time to come. The hi-tech areas, located primarily in the core and officially treated as a separate district, already account for 38 percent of the manufacturing GDP in the core.²¹

The inner peri-urban area also exhibits distinct economic characteristics. The majority of its economy is in secondary activities (53 percent), and it has the smallest share of tertiary activity of the four settlement types. The inner peri-urban districts/counties are geographically compact and proximate to Chengdu City, and therefore can easily access urban services offered in the core, reducing the need to develop a strong service sector in the inner peri-urban area.

Economic distinctions between the outer peri-urban and rural areas are not particularly pronounced. The rural area has a slightly higher share of primary activity, and slightly lower share of manufacturing, but both have surprising high levels of tertiary activity (40 percent). Part of the similarity is explained by the fact that most of the outer peri-urban and rural counties share a similar landscape of relatively sparsely populated, hilly terrain. Apart from orchard farming, most of the population and economic activity is centered in or near the county capital cities. As a result, these outer regions have an economic structure that appears quite urban, in contrast to the coastal extended urban regions, where the outer peri-urban and rural areas have stronger manufacturing economies, and more closely resemble the economic structure of the inner peri-urban area.

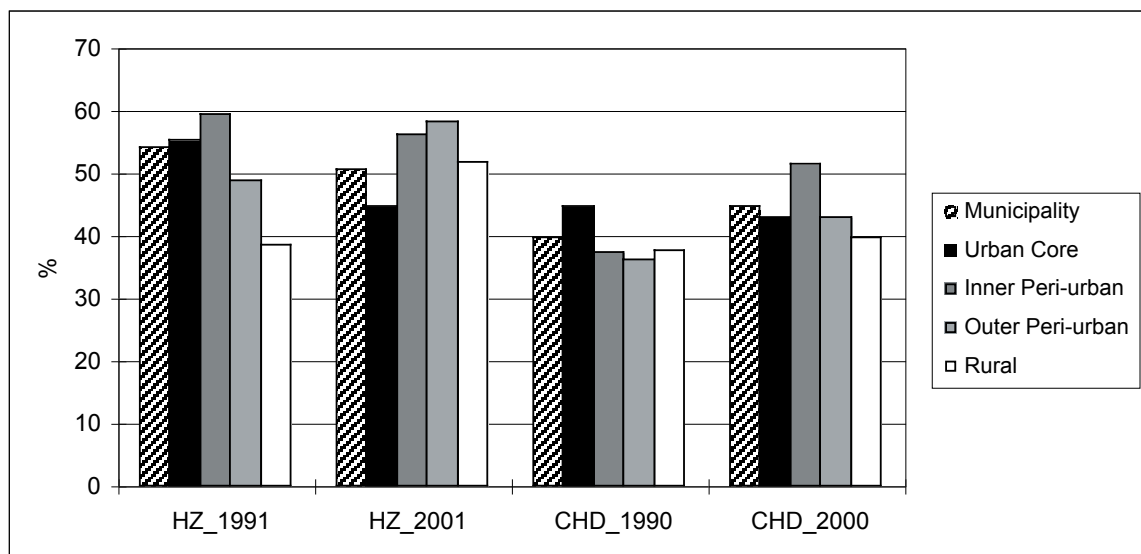
Figure 4: Economic Structure by Settlement Type, based on GDP in 2000



Source: Based on data from the *Chengdu Statistical Yearbook* 2002.

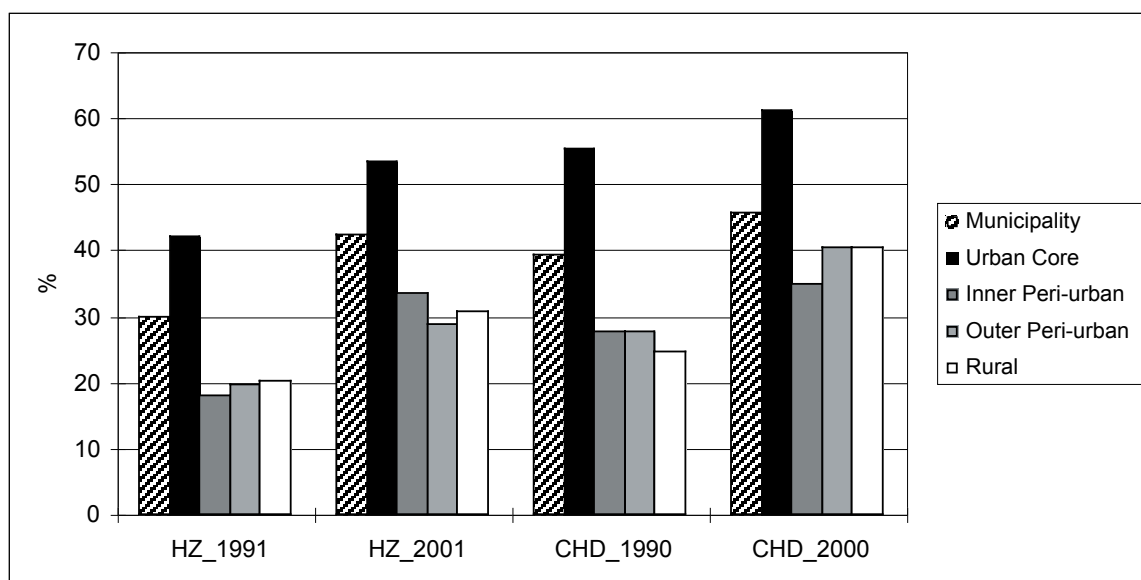
Nonetheless, the three noncore areas of Chengdu have experienced similar dynamics throughout the 1990s, paralleling the Hangzhou case. The share of GDP derived from the primary sector of the economy has fallen dramatically in noncore areas. In 1990, the primary sector accounted for 40 percent of the economy of outer peri-urban and rural areas, now it accounts for less than 20 percent. In the inner peri-urban area, it fell from 35 percent to just 14 percent. These declines in share of GDP in agriculture (primary sector) parallel dramatic declines in agricultural employment in the municipality, described in Section 6.2. Between 1995 and 2000, economic share in secondary activity fell slightly, having peaked at 55 percent, 45 percent, and 43 percent in the inner peri-urban, outer peri-urban, and rural area, respectively. Finally, in all three noncore areas, the tertiary sector gained share. The corresponding 1990 share figures were 28 percent, 28 percent, and 36 percent respectively, compared to the 2000 figures of 35 percent, 40 percent, and 40 percent. These trends closely parallel GDP share trends in Hangzhou's municipal settlement areas. However, all four settlement areas in Chengdu municipality have a larger share of GDP in tertiary and a smaller share in manufacturing than corresponding areas in Hangzhou in each of the time periods (see Figures 5 and 6). Because Chengdu's economy opened after the coastal region, the Chengdu GDP structure across the four settlement types in 2000 most closely resembles the Hangzhou structure a decade earlier.

Figure 5: Share of GDP in Secondary Activities: Hangzhou/Chengdu Comparison



Note: HZ=Hangzhou; CHD=Chengdu

Figure 6: Share of GDP in Tertiary Activities: Hangzhou/Chengdu Comparison



Note: HZ=Hangzhou; CHD=Chengdu

The average GDP per capita in Chengdu in 2000 was 11,820 yuan.²² Contrary to expectations, since 1990, spatial disparities in GDP per capita across the four municipal settlement categories have declined. As Table 2 indicates, the GDP per capita in the core is currently 1.5 times greater than the inner peri-urban GDP per capita, and up to twice as high as in the rural area, but down from 3.2 and 4.0 respectively in 1990. (For China as a whole, urban incomes are three times rural, and the disparity is increasing.)²³ These dramatic declines in geographic disparity are almost certainly associated with rapid declines in the

agricultural labor force from 1990–2000, appearing to vindicate the Chinese development policy of rapidly converting surplus agricultural labor to urban workers as rapidly as possible, within localized systems (e.g., within a municipality), to the extent feasible. The disparities between settlement types are somewhat less pronounced than in the Hangzhou case. However, Hangzhou has a much higher average GDP per capita income of 24,923 yuan.

Table 2: GDP Per Capita—Spatial Disparities: Hangzhou/Chengdu Comparison

Unit: Expressed as a ratio of the urban core GDP per capita to the GDP per capita of other settlement types

	Hangzhou* 1991	Hangzhou* 2001	Chengdu 1990	Chengdu 2000
Urban Core	1.0	1.0	1.0	1.0
Inner Peri-urban	2.5	1.9	3.2	1.5
Outer Peri-urban	3.3	2.5	3.7	1.8
Rural	4.0	3.6	4.0	2.0

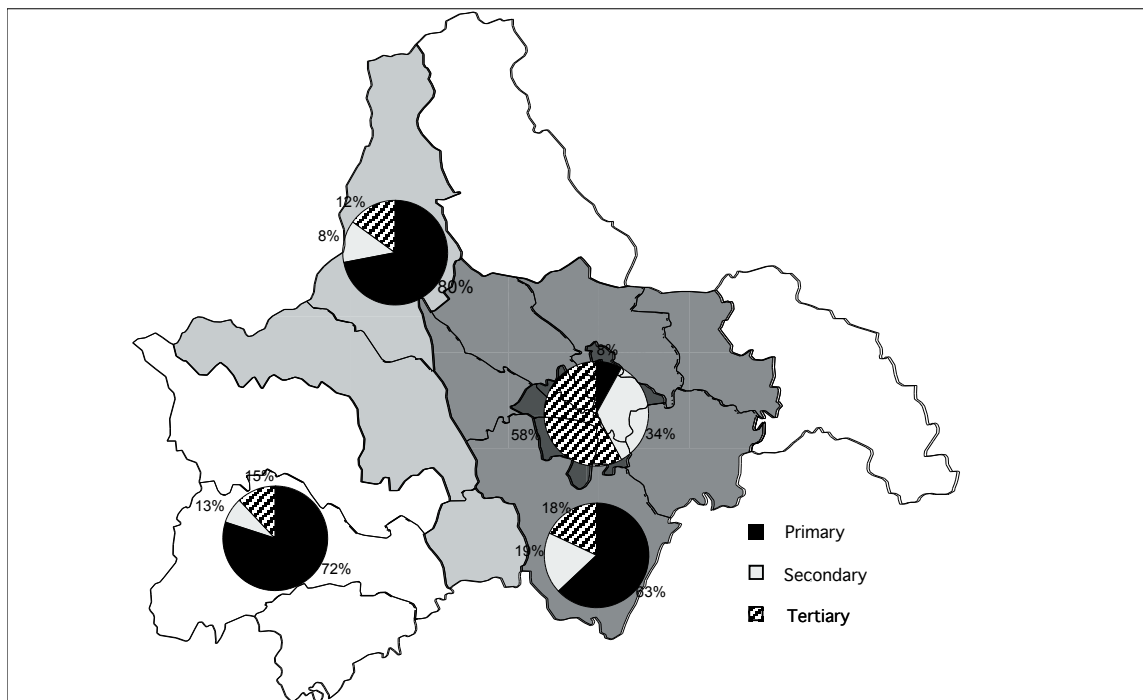
*Hangzhou per capita GDP based on official population (registered) statistics. Chengdu is based on census population.

Source: Based on data from the Hangzhou and Chengdu *Statistical Yearbooks*, and census data.

3.5 Employment Structure

The distinctions in employment structure across the four settlement types, from urban core to rural, are marked by progressively higher shares of employment in the primary sector and declining shares of secondary and tertiary employment, as illustrated by Figure 7. According to the employment survey from the 2000 census, the primary sector still accounts for the majority of employment outside the urban core, for over 60 percent of employment in the inner peri-urban area, and for up to 80 percent in the rural area.²⁴ The secondary sector only accounts for 19 percent of employment in the inner peri-urban area, even though over 50 percent of the area's GDP is derived from this sector. In the urban core, the service sector employs over half the workforce, with most of the remaining employment is in secondary activities. These figures underscore the magnitude of employment creation still needed in secondary and tertiary sectors in order to absorb the excess farm workers in Chengdu's peri-urban and rural areas.

Figure 7: Employment Structure by Settlement Type, 2000

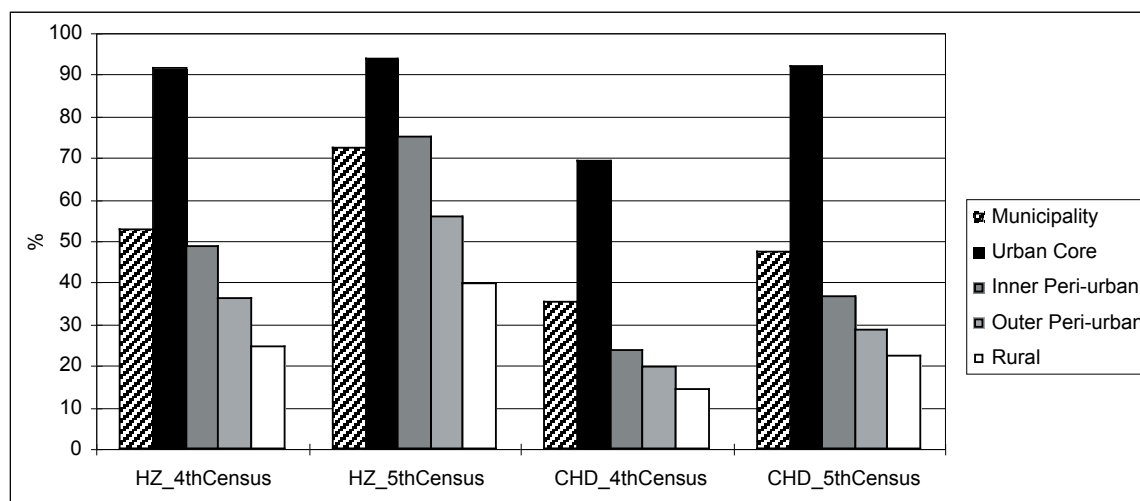


Source: Based on figures from the 5th National Census, 2000

Paralleling trends in the economic structure, employment is shifting out of primary and into secondary and tertiary activities. In all four settlement areas, employment shares in the primary sector fell and tertiary shares rose from 1990 levels. Secondary shares have also risen in all areas except the urban core, where the share has held steady. As a result, between 1990 and 2000 municipal primary employment share has fallen from 65 percent to 55 percent.²⁵ In the urban core, secondary and tertiary employment shares, combined, rose from 71 percent to 92 percent. The inner peri-urban saw the share of secondary and tertiary employment rise from 24 percent to 37 percent. The corresponding increase for the outer peri-urban area was from 20 percent to 28 percent, and from 14 percent to 20 percent for rural.

As indicated in Figure 8, the shares of secondary and tertiary employment in Chengdu in 2000 lag only slightly behind Hangzhou's 1990 employment structure, just as Chengdu's 2000 GDP shares in secondary activity lagged slightly behind Hangzhou's 1990 shares. These figures would appear to confirm that Chengdu is in an earlier stage in the development trajectory—approximately ten years behind Hangzhou—and employment will likely continue to shift away from primary and into secondary and tertiary activities.

Figure 8: Share of Employment in Secondary and Tertiary Sectors: Hangzhou/Chengdu Comparison



Note: HZ=Hangzhou; CHD=Chengdu

Source: Based on figures from the 4th and 5th National Census, 1990 and 2000.

3.6 Cultivated Land Lost

In the five-year period between 1995 and 2000, the municipality lost 6.7 percent of its total cultivated land (see Table 3). Most of the loss (approximately 11,000 ha) has occurred in the inner peri-urban area, where 45 percent of the total cultivated land in the municipality is located. The urban core lost 25 percent of its remaining cultivated area, as the core became more fully built-up, but the total amount of cultivated land lost is small compared to the loss in the inner peri-urban area. The loss of cultivated land is closely related to population growth rates, except in the case of rural areas. A significant amount of cultivated land was lost in the rural areas, totaling almost 7,000 ha, not explainable by population growth. The reason behind this loss is of concern and needs to be explored further, since it does not correspond to development pressures associated with a growing population. Population growth is stagnant in the rural area unlike in the core and inner peri-urban area.

Table 3: Cultivated Land

	Amt of Cultivated land (ha)		Percentage Change (%)
	1995	2000	1995-00
Urban Core	15,390	11,507	-25.2
Inner Peri-urban	162,450	151,503	-6.7
Outer Peri-urban	86,380	83,578	-3.2
Rural	100,510	93,598	-6.9
Total Municipality ²⁶	364,730	340,186	-6.7

Source: Based on data from the *Chengdu Statistical Yearbook* (various years).

4. Firm and Cluster Dynamics

We turn now to our case studies of three economic clusters: the shoe cluster, the tourism cluster, and the ETDZ. The purpose of these case studies is to gain a deeper understanding of the dynamics and pressures at the firm-level that are having an impact on the peri-urbanization process in Chengdu. In selecting our case study clusters, we sampled across a range of settlement types, i.e., one in each of the urban core, inner peri-urban, and outer peri-urban areas, and a range of firm/industry types. We chose those clusters that were of sufficient economic importance in their district or county so as to influence outcomes in the area.

We chose the women's shoe cluster because it is the largest of the bottom-up manufacturing clusters (started by local entrepreneurs) in the Chengdu EUR, employing upwards of 80,000 people.²⁷ The Chengdu National Level ETDZ was chosen because it is the focus of the municipal government's attempt to restructure the urban spatial economy and shift industrial location away from the northwest quadrant of the city proper, by providing SOEs (former and present), and local and relocating (from outside the region) private firms an efficient environment in which to undertake manufacturing. Located 13.6 kilometers to the southeast of the core city, the Chengdu National Level ETDZ is designed to be the new industrial core of the Chengdu extended urban region. It is also the largest "new town" project in the municipality. It currently employs over 35,000 people directly; if multiplier and linkage effects are factored in, total job creation in the area exceeds 70,000. The third cluster assessed, tourism at Dujiangyan, employs approximately 85,000 people.²⁸ It was chosen because of the growing importance of tourism and related amenities to urban economies in China, and because of its location in the outer peri-urban area, which diversified the sample geographically. The Chengdu National Level ETDZ is in the inner peri-urban area, while the shoe cluster is located at the fringe of the urban core. Although the shoe cluster has moved outward three times, each time further from the city center, it is increasingly being enveloped, and pushed outwards, by the built-up urban fabric as the city expands most quickly along the airport corridor, where the shoe cluster is located.

4.1 The Shoe Cluster

The women's shoe cluster, the leading women's boot cluster in Asia, consists of 3,000 firms producing 80 million pairs of shoes, mostly women's boots, annually. Its output value is 5 billion yuan annually. The cluster's location in Chengdu is a product of two main factors: (i) a historical leather craft tradition in the area; (ii) and rising costs of production in the coastal area (Guangdong, Fujian, Zhejiang) where most shoes were produced until recently (by the early 1990s, coast areas were under significant pressure), and before that, in Taiwan. The main market for the output is Russia, East Europe, Southeast Asia, and the domestic market, although the goal of leading cluster producers is to penetrate the more demanding North American and Western European markets. The cluster emerged in 1985, coalescing around a few entrepreneurs, and many laid-off SOE workers with technical skills. In some cases, coastal shoe producers are investors in the Chengdu shoe cluster. Chengdu has historically been known for its "shoe street" (Jiangxi Street)—much of the entrepreneurial and technical energy came from that street. More important, this historical tradition has resulted in an understanding of what constitutes good design and craftsmanship in shoes—shoemaking is "in the air." The cluster has been located in Wuhou District (in the city proper) since its

inception but has moved three times—primarily at the district government’s prompting. Spatial dynamics are discussed in more detail below. Being a pillar industry of the district, local governments (primarily the district government, but including the municipal and provincial governments) play a strong role in its evolution. The cluster association (the Chengdu Shoe Trades Association), established in 1995 (discussed below), works closely with its members and the local governments (especially the district government) so that guidance of cluster dynamics has evolved toward public-private collaboration.

The three firms analyzed are typical of those in the cluster:

(i) *Aiminer Leather Products Co. Ltd*

Aiminer Leather Products is one of the largest, most successful, and most innovative firms in the cluster. The founder, after finishing middle school (grade 9) learned the business as a shoe retailer (5 years), then a wholesaler (6 years), before starting the firm in 1996. A self-made woman, the owner is more entrepreneurial than the other two firms assessed, preferring to minimize interface with government bureaucracy in matters such as labor. The firm now employs 1,200 workers and its export sales top U.S. \$40 million annually. The firm has developed a strong corporate culture that stresses “learning by doing” and “never repeating a mistake.” Management—the deputy manager was lured back from Toronto, Canada—recognizes that to stay a leading firm they will have to innovate constantly and enter higher value markets. Accordingly, they are developing world-class strengths in producing shoes for diabetics,²⁹ a very fast-growing global market. The firm understands the importance of design in commanding market power. It retains design consultants in coastal China and northern Italy, and engages multinational corporations (MNCs) in product development, (e.g., world leader, Canadian-based Bata shoes).

(ii) *Yibailan*

Yibailan was started in 1997 by a former government official from the Chengdu Transportation Bureau (the Bureau had previously run its own shoe factory). After quitting government service in the late 1980s, the owner engaged in shoe wholesaling before establishing *Yibailan* as a private company. The firm prides itself on a highly automated customized assembly line based on specialized equipment from China, Italy, and Taiwan. Typical of firms in the cluster, 95 percent of production is for export. The firm is known for its high quality dormitories and extensive welfare programs for its workers. Perhaps because it is owned by a former government official, the firm relies much more on government services. For example, 70 percent of the firm’s labor is obtained through local government labor exchanges. *Yibailan* indicates that there is a strong market for its products. Its main problem is obtaining capital to expand and improve product quality to enable the firm to enter the high-end North American and Western European markets.

(iii) *Chengdu Wujun Leather Shoes*

Chengdu Wujun Leather Shoes, which employs 350, also was started in 1986 by a seventeen-year old entrepreneur who now owns and manages the firm with his two brothers. Unlike most other firms in the cluster, this firm specializes in men’s shoes. Most men’s shoes are made in a cluster in Wenzhou in Zhejiang Province. There is also a fast-growing men’s shoe production cluster in Bishan County in peri-

urban Chongqing, indicating that the production of men's shoes is also moving to the West. *Wujun* produces shoes for Pierre Cardin, making 70–80 percent of the shoes marketed under the Pierre Cardin brand in China. The owner is head of the Chengdu Shoe Trades Association. Like *Yibailan*, the company indicates demand is not a problem; the firm's emphasis is on improving production effectiveness.

Cluster Competitiveness

Why is the shoe cluster so successful in spite of its land-locked location (raising transportation costs of shoe exports), and its reliance on coastal areas for leather (leather tanning is banned locally for environmental reasons)? One reason is Chengdu's long history of local shoemaking. Shoe production technology has changed dramatically, and the modern companies indicate that workers trained in the traditional shoe handicraft do not adapt well to mass production methods currently utilized in the cluster. Nonetheless, the appreciation of good shoe design and desire for quality is rooted in the handicraft tradition. The good reputation of Chengdu's earlier shoe industry is conferred on the modern production firms. A second reason is the fact that the cluster is highly specialized (in women's footwear), which facilitates rapid inter-firm and overall cluster learning. The abundance of low-cost, productive labor is another important factor in this labor-intensive industry. Most shoe factory workers are migrants from rural areas in Sichuan Province, and salaries for production workers and technicians are lower than in the coastal regions. Average production worker salaries vary among firms from a low of 450 yuan per month to 800; but skilled managers and designers make 2,000 yuan or more. Many of the latter previously worked in the shoe industry on the coast. The decline of the industry there led them to seek employment in Chengdu's shoe industry. In addition, as discussed below, technical resources at Sichuan University play a key role in keeping the cluster competitive. All the firms interviewed place particular emphasis on creating brand names and/or producing for international brands. For example, there are 182 locally registered brand names for shoes.

Cluster Dynamics

Of the three case study clusters, the cluster dynamics within this bottom-up, highly entrepreneurial shoe cluster are by far the strongest. The cluster is essentially a learning environment, manifest, for example, in the fact that managers and owners regularly lunch together and share information on materials and the latest fashions. The Department of Leather at Sichuan University plays an important role in supporting the cluster. For example, professors are hired as consultants by firms such as *Aiminer*. Students studying at Sichuan University and in relevant vocational programs are involved in practical studies at *Aiminer* and some are hired when they graduate. The district, municipal, and provincial governments work with the firms to establish product standards. The municipal and provincial governments play a key role in supporting international marketing. The district government is supporting its pillar industry by developing a new Shoe Making Industry Park that will house one hundred enterprises by 2005. The goal is to move the cluster up the value chain by bringing in more sophisticated producers/competitors. Nonetheless, the relationship between the local government and the shoe producer firms are not as close or coordinated as was the case of the down cluster—a comparable grassroots-based cluster in Hangzhou.

Importantly, the shoe producers have formed the Chengdu Shoe Trades Association to help establish standards and to limit conflicts among firms rooted in severe competition.

One of its most important roles is to deal with the district government.³⁰ Association member firms indicate that they are asked to move location too often by the local government causing financial hardship in many cases, even bankruptcies. They are also upset that the local government will not allow most members to move into the Shoe Making Industry Park because it will be reserved mainly for leading firms moving from the coast. The association performs many functions including publishing a newspaper (*Chengdu Footwear*) and a monthly glossy magazine (*Shoe King*), representing the cluster in international exhibitions (e.g., in Italy, Russia, Germany), and supporting local community efforts (e.g., organizing blood donor drives).

Suppliers to the shoe producers are geographically scattered. Most raw materials (50–60 percent by value) come from the coast, and some specialized fittings (10 percent by value) are purchased from international sources through Guangdong or Shanghai. However, other products are produced locally (20–40 percent by value), such as plastic heels and zippers. All the firms use local trucking firms, which in turn often subcontract to individual truckers, to move their products to market. The low cost of land and labor compensates for the long distance shipping costs.

Spatial Dynamics

The shifting location of Chengdu's shoe cluster over time illustrates how the expansion of the built-up area is driving manufacturing continually outwards, along key corridors, into peri-urban areas at the urban fringe. The cluster started near the second ring road in the mid-1980s, where the district administrative office is now located.³¹ At that time, the location was on the edge of the built-up city. The district government encouraged the firms to move to a second location, near the third ring road in the mid-1990s, which was designated the Sichuan Leather Processing and Trade Experimental Zone. Of late, most firms are establishing factories further out, beyond the third ring road. The Shoe Making Industry Park will be situated outside the third ring road as well, although construction has not yet started.

Although the shoe cluster remains in the Wuhou district, officially in the urban core, it has relocated to the outer fringes of the built-up area, where a typical peri-urban landscape—factories intermixed with green fields and scattered housing—prevails. In part, this is firm-driven. The companies require more land for expansion. But it is also being pushed by the district government, which would like the land closer to the Central Business District (CBD) to be redeveloped for offices and other higher value uses. Concurrent with the rise of the current firms has been the demise of the craft firms that numbered 2,000 in the 1980s. Since the latter were located closer to the city, this has further propelled the center of gravity of the industry outwards.

The cluster is clearly on a growth trajectory, with investment and activity still shifting from the coast, and production continuing to grow. Thus, the expansion of the cluster in Chengdu appears set to continue. In micro-locational terms it is highly probable that it will stay in the southwest quadrant, but may continue to move outwards in response to pressures from higher value land uses. As a labor-intensive, cost-sensitive industry, it appears to best suit locations at the edge of the built-up area, but not too distant from technical resources, such as Sichuan University.

4.2 The Dujiangyan Tourism Cluster

This cluster is primarily the product of an historical landscape. It is the only place in the world with two world heritage sites—the Dujiangyan weir ancient irrigation works (third century B.C.) and the birthplace of Taoism at Qingcheng Mountain. It is also the site of famed panda reserves, and attractive highland scenery with mountains as high as 4,500 meters. The result is 4.28 million tourist visits per year, generating spending of over one billion yuan (2001 data). There are more than two hundred hotels, including one of only five four-star hotels in Sichuan Province. Tourism accounts for 19.2 percent of the GDP of the city. About half the visitors are short-term (including day visitors) from Chengdu and Chongqing; the remainder are mainly from coastal China and Southeast Asia. The county level city itself, 40 kilometers from Chengdu's CBD, is home to over 200,000 people and is forecast to grow to 300,000 by 2010. Most employees in the tourist cluster are local people, the opposite of the shoe cluster, where most employees were migrants from rural Sichuan.³² Despite the vibrancy of the tourism cluster, the city is still experiencing net out-migration with local rural people moving to the coast or to Chengdu and its inner peri-urban area for employment. Local officials indicated that much of the employment growth in the tourist sector was informal—these jobs may be less attractive than more structured factory jobs found elsewhere. The cluster faces increasing competition as other destinations become accessible. For example, the new airport to the north has opened up spectacular alpine scenery on the Tibetan plateau.

We assessed three enterprises in the Dujiangyan tourism cluster:

(i) Dujiangyan Weir

The ancient irrigation works, designated a World Heritage site in 2000, are managed by a state-owned enterprise. Three years ago, key attractions in the Dujiangyan area were combined under the authority of this one enterprise. This state enterprise operates at the highest levels of the city government, higher than a bureau. The value of ticket sales continues to rise, totaling 45 million yuan in 2001. This figure did not include revenues from the tea house, souvenir stores, the Dujiangyan dancing school, or other enterprises on site. The SOE pays two million yuan in taxes to the local government. It employs over 600 workers, of which 113 are tour guides. Management indicates that, typical of SOEs, the operation is overstaffed and measures are being taken to downsize, including using competitive examinations to weed out staff. Virtually all employees are locals, typical of the tourist cluster in general, and SOEs in particular, which are required to hire local people.

(ii) Gold Leaf Hotel

The *Gold Leaf Hotel* was established in 1996 by the Sichuan Tobacco Company, a SOE. However, ten private companies now own 49 percent of the firm; even the manager we interviewed was not clear whether it was an SOE or private firm, but indicated that to a large extent it was managed like a private company. The hotel faces strong competition; there are a total of 30,000 beds in Dujiangyan, sufficient to meet demand, even during peak tourist season. As with the Dujiangyan Weir, most of the 328 staff members are local, although upper management is from the coast. The company is strongly embedded in the local economy, having close relationships with the local government, taxi drivers, farmers, and business service providers, in addition to recruiting labor locally.

(iii) *Dacheng Art Company (Wood Carvings)*

The *Dacheng Art Company*, which currently specializes in wood carving production and sales, has a very unusual genesis. The original three partners comprised D.G. Magnelev at Southwestern University in Chengdu, the township government, and a private Chengdu company. The original business plan was to create floating Buddhas for sale to tourists, using magnelev technology to make Buddha statues hover above the artifact's base. But after running into technical problems, the firm was privatized and sold to six out-of-town investors. The investors turned the firm into a root-wood carving enterprise after ascertaining demand for such products at a tourism exhibition in Chengdu in early 2001. The firm located near Qingcheng Mountain, because of strong support from the local township government and the large local tourist market. The firm employs seven masters, several dozen carvers, a number of sales representatives, including six vendors on the mountain, and management personnel. Although a small firm, it hopes to diversify into household products, as well as expanding its range of metal and plastic souvenirs, that complement the wood carving offerings.

Cluster Competitiveness

Although the area is richly endowed in terms of natural beauty and heritage resources, most stakeholders interviewed indicated that attracting tourists was a highly competitive endeavor, because there are so many attractions in Sichuan Province, in China, and elsewhere in East Asia.

The cluster's competitiveness is the product of marketing by the County Tourism Bureau and municipal authorities. The city has indicated that its mission is to promote itself as a *Tourist City with World-Wide Recognition*. The national government's increased developmental emphasis on the west has resulted in the area receiving increased national publicity on TV and other media. And Chengdu's emergence as the major aviation center in western China has resulted in increased accessibility, and ancillary promotion by international airlines. For example, Thai Airways International flies wide-bodied jets to Chengdu four times weekly, and passenger loads are increasing rapidly. The area has characteristics and attractions not found in the nearby market of Southeast Asia, such as snow, downhill skiing, and outdoor ice skating. As with manufacturing, tourists are attracted by cost incentives. For example, a South Korean golfer can fly to the area on a nonstop flight, golf for a few days, and return home, for less than it would cost to golf near Seoul.

Cluster Dynamics

Both local (Dujiangyan county-level city and its townships) and Chengdu Municipal governments recognize that the tourism industry is the basis of the economy in the area. As the pillar industry of the county-level city, the Dujiangyan City Government, through its Tourism Bureau, has taken an active role in promoting tourism using a panda bear logo, although it has been less active in strategic planning in support of the tourist industry and landscape preservation and planning.

The cluster has a significant degree of local integration and synergy. Most employees are local, and the two-year tourism course specialty at the local vocational middle school supplies trained labor for the cluster. Agricultural purchases are made from local farmers. Tourism supports the Dujiangyan dancing school, a branch of the Sichuan dancing school, located on site at the *Dujiangyan Weir*. Local travel agencies benefit from contracts with tourist attractions, for example with *Dujiangyan Weir*. The cluster relies on Chengdu core

city for air travel and some business services, such as printing and advertising. Professors are contracted from the Sichuan Tourism College in Chengdu, to provide training to hotel managers, such as those at the *Gold Leaf Hotel*. However, the cluster could be more dynamic. For example, surprisingly, there is no private sector tourism association, although there is a local restaurant association.

Spatial Dynamics

The role of tourism and amenity regions in urban economic development has grown immensely, not only in China, but throughout the world. It is a trend that will likely increase over time in China, as local and national discretionary spending on recreation and leisure activities increase approximately two times faster than GDP growth. Because the cluster itself is obviously locationally bound, its success or lack thereof will influence the rate and nature of peri-urban development in the northwest corridor out of Chengdu City. This corridor has been strengthened by the construction of an expressway in the late 1990s, which has facilitated travel between Chengdu City and Dujiangyan City and led to faster growth. Given that Dujiangyan is one of two official subcenters (the other being Longquanyi, discussed below) in the peri-urban area, its rates of economic and demographic growth will be of some importance in shaping the overall extended urban region.

4.3 The Chengdu Economic and Technology Development Zone

The Chengdu National Level ETDZ is the centerpiece in the municipality's attempt to drive the EUR's development along the southeast corridor to Chongqing. However, as is argued below and in a companion discussion paper,³³ to date the policy has had limited success. Most growth since the early 1990s has occurred to the southwest (the Shuangliu airport corridor) and to the west toward Wenjiang.

The Chengdu National Level ETDZ is being developed by a SOE established and overseen by the municipality. Several objectives underlie its development, namely:

- (i) To encourage urban expansion of Chengdu to the east and south of Chengdu EUR, based on the fact that agricultural land is of high capability while groundwater is limited to the west of the core city, and thus should be protected. Further, heritage resources are more abundant and vulnerable west of the city on the Sichuan plain, one of the early centers of world civilization. Prevailing winds and water flows are to the east, meaning it is preferable to locate major industries downwind/stream.
- (ii) To relocate industry (primarily SOEs) away from the city's historically heavy industry-oriented northeast quadrant so that that area of the city can be redeveloped for tertiary and residential purposes. Chengdu is the major financial center of western China. The financial cluster is located on the east side of the CBD and is expanding eastward. Amenity-oriented redevelopment is being undertaken in the northeast quadrant of the city, and features high quality river front development (parks backed by offices, residences).
- (iii) To provide a site for 200,000 people to be relocated from northeast Chengdu, many of them employees or former employees of the heavy industries in the area.³⁴

- (iv) To provide industrial sites (and associated community facilities for their employees) for firms moving from more remote “Third Line” locations and seeking a more efficient production location.

The ETDZ grew out of aerospace development in the area (*Sichuan Aerospace*), with initial investment starting in 1990, by the municipality and the district. It was upgraded to a provincial ETDZ in 1992. In February 2000, the ETDZ was given national status, a designation sought since 1993—Chongqing had a national status ETDZ by 1994—and is the only national-level ETDZ in Sichuan province.

The ETDZ has an area of 26 square kilometers, of which 10 square kilometers has been developed (Phase I). It is adjacent to the Longquanyi District seat/headquarters, essentially forming an industrial city complex. As a recently developed “new town” in a rural administrative area, the industrialization and urbanization levels are still fairly low. As of early 2002, 1.2 billion yuan had been invested in the ETDZ. The intention is that the ETDZ will be characterized by industries in the following areas: (i) machinery, (ii) electronics and optics, (iii) new building materials, and (iv) foodstuffs. This list parallels stated specialties of many ETDZs in China. However, as argued below, cluster dynamics to date within the ETDZ are minimal.

There are five relocated enterprises from “Third Line” locations; several international joint ventures with firms from Canada, the United States, Japan, and Taiwan; and three enterprises that could be termed hi-tech, including a biopharmaceutical firm undertaking considerable R&D.³⁵ Enterprises are encouraged to locate in the ETDZ through a variety of incentives including tax preferences, good infrastructure, abundant natural gas, free business development consultations, attractively priced land, and reduced highway tolls. Polluting and other undesirable firms are banned.

Four firms were assessed in the ETDZ:

(i) Yashi Food Manufacturing

Started as an advertising firm in 1994 by the former head of the Sichuan Communist Youth group, by 1998 the firm was a distributor of well-known Chinese and international food products, such as Coca Cola and Nescafe. However, the firm found food distribution very competitive and decided to mass produce prepared Sichuan foods. The rationale was that Sichuan is famous for its food, but no firms were preparing it in processed, quick to eat/drink form. From a base in noodles, the firm has diversified into “green” drinks utilizing abundant fruit in the area, and food flavoring products. In 2001 it entered into a joint venture with New Dragon of Hong Kong, which had offices in downtown Chengdu, and moved production to the ETDZ, employing 600 people. Production is for both domestic and international markets including the United States, Japan, and Singapore.

(ii) Zigong Hard Alloy—Chengdu Branch

This firm is a SOE, one of the five leading hard alloy (used for knives, screwdrivers, and the like) firms in China. In 1972, the firm moved to Zigong, a remote location near the Sichuan-Yunnan border, as part of the “Third Line” program. In 1992, the firm signed a contract to locate in the ETDZ, but because of limited capital, construction of the plant stretched over a six-year period until 1998 when operations started in the ETDZ. *Zigong Hard Alloy* moved to Chengdu primarily

because 40–50 percent of its output is for export and Chengdu offered much better transportation facilities and accessibility. The company headquarters is still located in Zigong. An upgraded transportation corridor has more than halved travel times between Chengdu and Zigong from eight to three hours. Nevertheless, the company would like to move its headquarters and R&D functions to the Chengdu ETDZ because of the centrality of Chengdu. Production is expanding by 40 percent per year, and the firm's output was 150 million yuan in 2001. It currently employs 450. The prime challenges facing the firm are finding capital for expansion, and recruiting and training high quality staff.

(iii) Sichuan Dongtai New Materials Ltd.

This firm, which produces specialized steel belts and PCV pipe products, was formed in 2001 as the result of a merger between a Taiwanese and a local firm, the latter based in Jinniu District, the northwest jurisdiction in the city proper. The firm was attracted to the ETDZ because of the low land price. Demand is not a problem—the steel belts that the firm produces are in high demand. The firm holds ten patents, and conducts adaptive R&D on site that give its products an edge in the market. The major constraint to growth is obtaining skilled labor—the firm estimates that it is short twenty skilled workers. It currently employs 900. *Sichuan Dongtai's* headquarters are still located in the original Chengdu Hi-Tech Park, but will move to the EDTZ location in 2003, as there is no room for expansion in the old location.

(iv) Sichuan Jinghua Group

The *Sichuan Jinghua Group* produces optical products for export, employing 874 people. The firm accounts for 48 percent of optical lenses produced in China; the other major producer is located in Hubei Province. Its competitive advantage is closely associated with its ownership structure. Its primary owners include a long-established (1953) optical SOE (started with USSR development cooperation); a United States firm which is key to marketing there; and a Guangzhou partner who handles export shipping. Its competitiveness is also derived from close links with universities and research institutes, particularly Zhejiang University,³⁶ the Optical Institute of the Chinese Academy of Sciences at Xindu in Sichuan Province, and significantly, the Military Optics Institute at Mianyang, northeast of Chengdu. *Jinghua* was one of the first occupants of the ETDZ and is a flagship firm in the development zone, located on a prime corner lot. Originally the firm made only lenses, but now it makes completed products, which account for 30 percent of its output. Its main product is binoculars for the U.S. market, but the firm is trying to diversify its markets, targeting Japan and Taiwan.

ETDZ Competitiveness

The ETDZ's competitiveness is primarily based on the low cost of land, large amounts of available land for expansion, abundant natural gas (700 cubic meters per day), the existence of an adjacent district city, relatively liberal *hukou* regulations (see below), and a desirable location along the expressway to Chongqing. The opening of the Outer (4th) Ring Road in 2002 enabled access to the airport in twenty minutes, formerly fifty minutes. The attractive nearby countryside, known for its picturesque fruit orchards and small country hotels, is another asset. Furthermore, firms generally give high marks to ETDZ management, which is lean (58 employees, of whom 18 have postgraduate degrees) and effective.

Wages in the ETDZ vary among firms, but are generally low, especially by coastal norms. In the food industry workers tend to earn about 600 yuan per month; technicians and middle managers, 1,200 yuan; and high-end managers approximately 4,000 yuan. In new materials industries, technicians and management only average 800 and 2,500 yuan per month, respectively. In the optics industry, production workers' wages are somewhat higher, in the range of 800 to 1,200 yuan per month, with high-end staff making as much as 5,000 yuan per month.

One reason that the ETDZ has not grown as fast as hoped is that some firms (six to date) have contracted for land in the ETDZ but have not move to the site promptly because of capital constraints (as was the case of Zigong Hard Alloy, described above). These firms indicate that they are waiting for land values to rise in the core city to finance the move, an indication that land market dynamics pushing peri-urbanization are not as advanced as in coastal EURs. In coastal EURs, such as Hangzhou, land price differentials between the core and peri-urban areas (driven primarily by dramatic rises in core land prices) are of such magnitude as to readily finance all costs of shifting production to peri-urban locations and still yield a windfall. This situation again illustrates that the Chengdu EUR is much earlier on the peri-urban development trajectory. Other negatives indicated by firms include water supply and waste water system shortcomings, the lower quality of local (district) secondary school education, and a feeling of social isolation (the bright lights phenomenon) from the core city. These shortcomings make it more difficult to attract and retain more highly skilled labor, of which there are shortages in Sichuan. Nevertheless, there are 35,000 workers in the ETDZ, which is not insubstantial. It ranks third in western China in terms of ETDZ employment. The ETDZ is the prime driver of Longqanyi District's economy (population: 478,389)³⁷ when linkage, expenditure, multiplier, and family dependents effects are factored in.

Cluster Dynamics

Of the five Hangzhou and Chengdu clusters assessed by the APARC/IGSNRR team, the Chengdu National Level ETDZ is the one case that lacks any significant cluster dynamics. It is primarily a set of firms that operate autonomously, only sharing physical space. This is typical of many Chinese ETDZs, where the diversity of firm types works against integration, contrasting sharply with the dynamics found in spontaneous clusters and some hi-tech zones where greater firm complementarity and/or homogeneity prevails. Spatial grouping of unrelated firms offers few competitive advantages aside from economies of scale in the provision of common infrastructure (roads, electricity, and water supply). Spatial clustering of related firms, such as in the shoe cluster, on the other hand, creates specialized labor pools and suppliers, and opportunities to collaborate and benefit from technical and knowledge spill-overs.

The weak intra-ETDZ linkages among firms limit the dynamism, potential for innovation, and growth of the ETDZ. The only evidence of intra-ETDZ linkages among firms was the case of *Yashi Food Manufacturing*—which buys packaging materials (extruded plastic, paper) from other firms in the ETDZ—and *Zigong Hard Alloy's* purchase of telecommunications and insurance services within the zone. These linkages do not appear to convey any particular competitive or spatial advantage. However, there are a few localized dynamics of note. A private school, teaching in Chinese and English, has been established in the area. After just two years in operation, it already has an enrollment of 1,000 students. This school could play a significant role in attracting talented labor, a bottleneck to expansion and development in many of the firms. Second, the district government has a

close relationship with some firms. For example, it is involved in providing raw materials to *Yashi Food Manufacturing*. The agricultural bureau of the district government introduces the firm to township governments in the district who in turn deal directly with the farmers to provide sweet potatoes and some natural flavors.

Firm linkages tend to be stronger at the Chengdu EUR, Sichuan Province scales and beyond, particularly in terms of knowledge resources. The strong linkages between *Jinghua*, the optical lenses and binocular firm, and optical research institutes in Sichuan province are a case in point. *Zigong Hard Alloy—Chengdu Branch* has close relationships with Sichuan University for support related to special materials (chemicals). In fact, all firms in our study use local colleges and universities for in-house and external training (e.g., night classes). But linkages extending beyond the province were often just as strong, if not stronger. Firms indicated that although they were members of provincial level associations, given the level of their technology, competition, and innovation aspirations, they valued national level association involvement much more. Accordingly, most firms are actively involved in national networks, as in the case of *Jinghua* (optics) with Zhejiang University and *Sichuan Dongtai* (new materials) with the China Plastics Association. Many other examples could be described. For example, *Zigong Hard Alloy* obtains specialized metallurgy knowledge from Hong Kong. On the other hand, some firms indicated active involvement in local networks, especially the Chengdu Industrial Association, a group representing industry in the Chengdu EUR. But, the broad membership of this association reduces the opportunities for cooperation and joint activities for mutual benefit.

The ETDZ management has indicated that they want to attract larger, higher profile firms, and ideally a few Fortune 500 firms. Although an understandable worthy objective, another priority objective, perhaps more realistic, would be to promote and support localized cluster dynamics.

Spatial Dynamics

The spatial dynamics of the ETDZ illustrate two drivers that are impacting peri-urbanization outcomes: the relocation of “Third Line” industries closer to Chengdu, and policy-driven creation of peri-urban subcenters. The locational advantages of (re)locating close to Chengdu City cannot be overstated. This is particularly true with respect to the transport of products to domestic and international markets—most ETDZ firms serve nonlocal markets, and trucking costs are a significant expenditure given the long distances to the coast. (Logistics is one area in which China does not display competitive advantage relative to several East Asian competitors.) Chengdu is the most important distribution entrepôt in the Inner West Region, after Chongqing.³⁸ All firms purchase trucking services in the EUR, (although some bulky products such as those of *Zigong Hard Alloy—Chengdu Branch* are moved to Chongqing, where they are shipped by barge on the Yangtze River). Moreover, Chengdu is the primary air freight center in the west. Several firms in the ETDZ indicate that they use air freight, often for products not normally moved by air, because air freight is relatively inexpensive as a result of high competition in the aviation industry, and Chengdu’s airport is within easy access. The benefits of specifically locating within the ETDZ and in the southeast corridor, however, are less compelling, particularly in terms of cost savings or competitive advantage.

As is argued in a companion discussion paper,³⁹ although Longquanyi ETDZ and the adjacent district city are not insignificant in population and economic output, the municipal objective (and corresponding urban development plans and generous allocation of land

development [conversion] quotas to the southeast corridor)⁴⁰ to use the ETDZ to drive development south-eastward has not been as successful as envisaged. Since the early 1990s, physical, economic, and demographic growth in the Chengdu EUR has been overwhelmingly to the west. Aside from local preferences of both residential and business decision-makers (based on factors such as higher status) to locate to the west if possible, the construction of the successful new airport southwest of the core in Shuangliu County,⁴¹ and the Chengdu National Hi-Tech West Zone⁴² along the corridor to Dujiangyan, has created market forces that well-intentioned (and rational) plans are unlikely to counter. Other public works are having a similar effect. For example, the construction of expressways to the northwest, west, and southwest are reinforcing these favored corridors.

The municipal government envisages a target population (new town) of 1.36 million people in the Longquanyi area, including 360,000 in the development zone (ETDZ) itself.⁴³ However, at the same time, the municipal government plans contiguous development (another “new town” directly to the south in the Shuangliu area) with a population of 700,000–900,000. The Shuangliu new town would house the municipal administration, freeing up land in the core city. Given development trends over the last decade, and likely market forces, it is problematic whether the Longquanyi area will realize its target population in the foreseeable future. And, of course, if Longquanyi and Shuangliu, increasingly contiguous peripheral development areas, were to attract the forecast populations, what would be the implications for satellite towns, the Central Business District, and the outer peri-urban area? These areas might grow slower than would otherwise be the case—not necessarily a negative outcome.

Spatially, the Chengdu ETDZ strategy is typical in China in that it represents a destination site for firms being relocated from the core city (in this case the northeast quadrant), a wise policy. However, in Chengdu’s case, the proposed relocation site seems to counter market and, correlated, large-scale infrastructure investment forces, more than in most Chinese urban regions. (For example, in the Chongqing EUR, planned development of its peri-urban “Western Corridor” corresponds more closely with market forces and infrastructure investment.) The result is that the ETDZ incentives mostly attract older, less propulsive industries and, therefore, fewer complementary activities, stifling the intended growth pole effect.

The relocation of “Third Line” industries to peri-urban Chengdu and the encouragement of development in the inner peri-urban area (often contiguous to the built-up city) are consistent with Chinese urban development policy in the 1990s. That is, dispersed development of firms, including SMEs, in outer peri-urban areas has been discouraged. In efficiency and competitiveness terms, it is a wise policy, but may result in stagnant development, and related social and economic problems, in parts of the outer peri-urban area and in some satellite towns. Outer peri-urban areas away from satellite towns are likely to be affected most.

Finally, it is important to keep in mind that the ETDZ represents just one of several inner peri-urban dynamics at play. Peri-urbanization is highly spatially concentrated around a few nodes, and the characteristics of each node vary widely. For example, the ETDZ, being municipal-policy driven, contrasts sharply with cluster dynamics occurring at the Hi-Tech Development Zone (HTDZ) in Pixian, which is national-policy driven and located within the faster growing northwest corridor—the HTDZ being a significant driver of this growth. These in turn contrast with the characteristics of the airport cluster, which is based on spontaneous development around strategic infrastructure investment.

5. Labor Dynamics, Relationships, and Perspectives

Extensive employee interviews were undertaken in the three clusters.⁴⁴ The following discussion is based on both formal questionnaire responses and open-ended discussions with employees and employers. The employee profiles of each cluster can vary widely, so where relevant, we differentiate employee characteristics and perspectives by cluster, recognizing that sample size becomes a problem. To gain insight into the opportunities and pressures faced by workers, we asked a subset of interviewees to describe their life histories. Five life history case studies are presented in a series of boxes on the following pages.

Employee Composition and Recruitment

Based on our sample, the share of local versus migrant workers varies considerably by cluster. The majority of workers in the core and inner peri-urban clusters (shoe and ETDZ respectively) are migrants, whereas the tourism cluster in the outer peri-urban area primarily hires locals (see Table 4). Most migrants to Chengdu peri-urban production jobs tend to be originally from a 100 kilometer radius (although some have worked elsewhere in China before returning to Sichuan), and virtually all from within a 300 kilometer distance.

According to firm questionnaires, only 5 percent of workers in the firms interviewed are from outside the province. But again, there is variation across the clusters in terms of the points from which most migrant workers originate. Most (79 percent) of the tourism cluster's migrant workers come from outside the province, whereas migrant workers in the ETDZ and shoe cluster typically come from within Sichuan province (70 percent). This reflects the fact that the tourism cluster only hires nonlocals for more technical or managerial positions, and more skilled workers migrate from a wider geography. The ETDZ and shoe cluster, by contrast, take advantage of the abundance of low-cost labor in the area, absorbing a large number of workers from rural Sichuan for less skilled production positions. This reinforces the macro data findings that the core and inner peri-urban areas of Chengdu function as a key staging area for rural-to-urban migrants within Sichuan Province. This data also underscores a key difference in labor dynamics with the coastal area. Major employment nodes in Chengdu EUR are attracting labor from the whole province, whereas in coastal areas, most of production-level workers were found in-situ at a level of development comparable to the contemporary Chengdu EUR. Those that migrated to coastal factories usually came from other provinces, increasingly so.

A number of the workers from Sichuan province are, in fact, return migrants from coastal areas such as Guangdong, and the Yangtze Delta Region (see Case Studies 1 and 3). However, the return migration, based on our data, does not constitute a complete circle. Workers originate in rural Sichuan but return to the Chengdu extended urban region. They resettle in the Chengdu area, particularly the core and inner peri-urban areas, where they can readily find employment in the manufacturing and service sectors. This enables return workers to be reasonably close to family and friends living in surrounding rural areas and small towns, but at the same time to take advantage of the economic, career, educational, and lifestyle advantages of a large EUR. However, push factors are also involved. In some cases, the Sichuan migrants felt unwelcome in the coastal area (with the exception of Shenzhen, which readily welcomes workers from all over China), and had to endure hard working conditions. Another factor is cost of living. Although returnees usually earn less than they did in the coastal region, the much lower cost of living in Chengdu, particularly the peri-urban area, partially compensates.

Case Study 1: Seeking a more suitable job in home province
The story of a female warehouse keeper in Yibailan Shoe Leather Company
in the Wuhou Shoe Cluster

I am twenty-three years old and from Zigong region, a place not so far from Chengdu. When I graduated from vocational school, there were not many job opportunities in my hometown, or even in a big city like Chengdu. So I went to Shenzhen with some friends and worked as a production worker in a factory. I had to work overtime day and night to hold the job. Even if I worked that hard, it was easy to lose my job at any time. Being a production worker, my education from the vocational school was also wasted. Promoted by the “Go West” policy, the development of Chengdu was sped up and job opportunities increased in recent years. So I returned to Chengdu trying to find a suitable job. Later, through the [public agency] employment market, I found a position in this company as a warehouse keeper. Although my pay here is similar to what I had in Shenzhen, my work burden is reduced a lot. More importantly, I feel I have roots here in my home province, where I am familiar with everything. My life has never been more secure. Now, I am living in my boyfriend’s home nearby.

Implications: As the lagging region in China, the West area used to be a place from which labor left to find better opportunities elsewhere. The “Go West” policy may change this situation, particularly in some metropolitan regions where dynamic economic development has attracted a number of *returned migrants* as well as *first-time local migrants*. Returned migrants have a stronger intention to work in the home province, where they plan to put roots, after being an “outsider” elsewhere. These returned workers can play an “ambassador” or linkage role between the Inner West and the Coastal East in terms of technology transfer, and market information sharing, based on their (former) personal networks in the coastal area.

Table 4. Origin Place of Workers, by Cluster
Unit: percentage of interviewed workers (%)

Cluster	Local (by <i>hukou</i>)		of which		
			From within municipality	From outside municipality, but inside Sichuan province	From outside Sichuan province
ETDZ	20.0%	80.0%	6.3%	68.7%	25.0%
Shoe	12.5%	75.5%	11.9%	59.5%	28.6%
Tourism	68.2%	31.8%	7.1%	14.3%	78.6%
Total	31.6%	68.4%	8.65%	57.7%	33.65%

Source: Based on Chengdu worker surveys conducted by authors, July 2002.

Case Study 2: Seeking better personal development opportunities
The story of a male researcher in *Yibailan Shoe Leather Company*
in the Wuhou shoe cluster

I am thirty years old and from Chongqing. Since I graduated from college, I have been working on R&D in the shoe industry. At the very beginning of my career, I got a really good salary in a shoe factory in Shenzhen. Later, I went to Wenzhou, one of the national shoe industry centers, and had even better pay than in Shenzhen. But as the central government decided to launch the west development campaign, I made up my mind to seek new opportunity back in Sichuan, the economic center of southwest China. I have been in this company no more than half a year and my monthly salary is up to 8,000 yuan, less than that of my previous job. I feel regret that what I have experienced here is far from what I expected. I am planning to move to Guangzhou or Moscow in the near future, because I cannot handle the personal relationships well in this company, and more important, my own capability is restricted in such a working environment.

Implications: Degree-holders often have higher employment and geographic mobility. They change jobs frequently in order to find better opportunities to exhibit their capabilities, advance their careers, and realize their ambitions. The West Development Strategy may attract some talented people to west China. However, if the local enterprises cannot change the traditional family-based enterprise management mode, it will be impossible for them to attract and retain talented people, who are scarce in West China. At present, most private enterprises in the region are still in their initial development stages and so are immature, not practicing modern management.

Some peri-urban firms make a distinction between workers from their immediate jurisdiction versus the municipality or province as a whole in their hiring policies. In particular SOEs (i.e., *Zigong Hard Alloy*, the *Dujiangyan Weir*, and the *Gold Leaf Hotel*), recruitment efforts are focused on employees from the immediate vicinity, and only skilled workers are hired from a larger radius.

As was the case in Hangzhou, the source of high-end labor is much more geographically diverse in origin than less skilled labor. For example, *Sichuan Jinghua* recruits specialized technical workers from Hunan as well as nearby Chongqing and Chengdu City proper. As noted, the master carvers in the *Dacheng Art Company* come from Fujian Province. In the case of *Yashi Food Manufacturing*, the vice general manager was recently recruited from Shenzhen. The deputy manager of the *Gold Leaf Hotel* was recruited from Tianjin. Many of these skilled recruits are inspired to migrate to Chengdu by the national government's "Go West" Policy and a sense of adventure, but are frequently disappointed by the working and living conditions in the area (see Case Studies 2 and 4). In order to retain these highly mobile, educated workers, firms in the Western Region need to provide stimulating career opportunities and flexible working conditions, and adopt modern management techniques. They cannot locate in places too inaccessible to the city proper, where the quality of living conditions, services, and shopping and entertainment is much higher than in more remote locations or often sterile new economic zones.

Attracting returned migrants and skilled workers from other parts of the country can play an important role in helping Inner West firms to enhance their competitiveness.

These workers are often valuable sources of technology and managerial know-how, market information, and contacts for business network building with the more economically developed parts of China. By tapping into these resources, firms in Chengdu can increase business linkages and knowledge exchanges with the coastal regions.

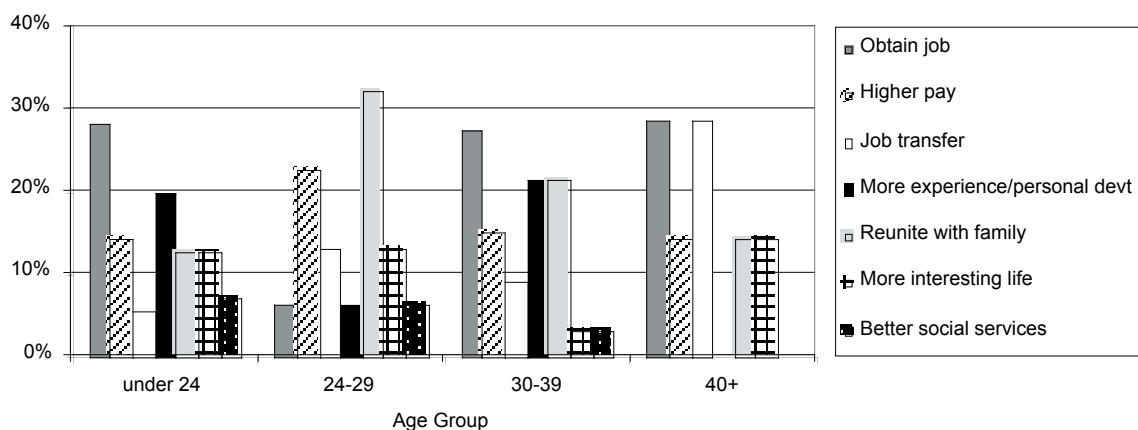
Laid-Off SOE Workers

A particularly important issue in Chengdu, given its economic history, is the downsizing of SOEs. This issue is much more important in the Inner West region than in the coastal areas, which have become much less dependent on these firms. Many firms expressed reluctance to hire laid-off SOE workers. For instance, the *Sichuan Jinghua* optic group indicated that they did not adjust well to more competitive workplaces. This may account for the official policy of the Municipal Employment Service Bureau to assist laid-off SOE workers to work in (or start up) businesses in the service sector, rather than working in peri-urban manufacturing firms. Similarly, *Sichuan Aerospace*, which has laid off hundreds of workers in the Chengdu National Level ETDZ, has provided kiosks suitable for retailing and service activities in the ETDZ for the laid-off workers.

Reasons for Migration

About half of migrants (51.4 percent) indicate social reasons for migration, higher than in the case of Hangzhou. However, the single most important reason for migrating is to obtain employment (23 percent), followed by reunion with family (19 percent). Reunion with family, in the Chengdu case, refers to returning Sichuanese, as noted above, and is therefore particularly prevalent among 24–39 year olds (see Figure 9, and Case Study 3). This is a different dynamic than in the Hangzhou case, where being reunited with family often pertained to second-generation migrants who had been schooled in their parents' hometown and were rejoining their parents in the Hangzhou Region. Thus, workers moving to Chengdu to be with family are *returning* to their home province, whereas workers moving to Hangzhou to be with family often are *leaving* their home province.

Figure 9. Reasons for Migrating, by Age



Source: Based on Chengdu worker surveys conducted by authors, July 2002.

Job-Seeking Behaviors

The most important mode to obtain employment is through official channels (43.4 percent), primarily through school placement, but also through government labor market exchange services (see Table 5). In all three clusters, one-third or more of new employees are placed by schools, either directly or through the local public security bureau. This is particularly true in the ETDZ. Many of the local schools teach specific skills to meet local demand; the tourism curriculum in the middle school in Dujiangyan is an example of this practice. Some firms rely more heavily on local government placement services, such as the Municipal Employment Service Administrative Bureau (MESAB), and lower level county equivalents. For example, *Yibailan* indicates that 70 percent of its workers are placed through government channels, particularly the MESAB. *Aiminer Leather Products* indicated that employment bureaus in a number of counties are important in obtaining labor.

Table 5. Means of Finding Current Job, by Cluster

Unit: Percentage of workers within cluster (%)

Cluster	Friends	School Placement	Labor Market Exchange	Newspaper Want Ads	Signs & Walk-ins
Longquanyi ETDZ	43.3	43.3	3.3	8.3	1.7
Wuhou Shoe	43.8	31.3	4.2	4.2	16.7
Dujiangyan Tourism	29.5	34.1	13.6	4.5	18.2
TOTAL	39.5	36.8	6.6	5.9	11.2

Source: Based on Chengdu worker surveys conducted by the authors, July 2002.

Virtually all firms indicated they preferred new graduates to laid-off SOE workers, who may have learned inappropriate work habits. Some employers, such as *Sichuan Jinghua* Group (optical products) prefer to recruit from several schools, as a mixed labor force was easier to manage and motivate (fewer cliques) and offered some diversity in terms of skill sets based on past training. Interestingly, former Chengdu craftsmen (cobblers) are not welcomed by shoe firms in the Wuhou cluster, because modern shoe production processes require a different set of skills. Although it varies from industry to industry, most production and tourist workers have at least middle school education. For example, one firm in the shoe cluster estimated that 40 percent of employees have completed middle school, 40 percent high school, and 10 percent of workers have some post-secondary education.

The second most important channel to find a job is through friends, and 39.5 percent of employees find work this way. This mode of job-finding is most prevalent in the ETDZ and shoe cluster. This channel is important to both local workers (37.5 percent) and nonlocal workers (40.3 percent). Among nonlocals, 24 percent found their job through hometown friends working in the host town, suggesting a strong chain migration pattern.⁴⁵

The more educated the employee, the more likely that s/he used school placement and official channels, and the less likely that s/he used friends to obtain a job.

Walk-ins are not a major means of job placement—even less so than in Hangzhou. Walk-ins account for about 19 percent of locals hired and only 8 percent of migrants.

Case Study 3: Seeking employment closer to family
The story of a male workshop manager in *Aiminer Shoe Leather Company*
in the Wuhou Shoe Cluster

I am thirty-one years old and from Jiujiang region of Jiangxi Province in central China. After graduation from high school, following the dramatics of job-hunting in the Pearl River Delta area, I went to Shenzhen, where I met my current wife. Later, I also worked in other places like Panyu and Dongguan. Through my hard work, I was promoted from an ordinary production worker to a workshop manager. However, when my wife returned to Chongqing, her hometown, taking a new job and taking our kid, I decided to get together with them. Now it seems no problem for me to find a job elsewhere, based on my work experience. Anyway, I would like to choose a work place either in Chengdu or Chongqing, so that I can get closer to my family.

Implications: Those who are married, especially those with children, will place family interests as their first priority in job-hunting. Quite often they will take a job close to their family, even if it involves a pay cut or loss of other benefits. Therefore, local governments can effectively attract and retain talented people who need to work in the area for family reasons by providing good living environments, particularly in terms of facilities for children, such as good schools.

However, some firms, such as *Aiminer Leather*, regularly post boards at the factory gate indicating positions available.

Salaries and Training

Salaries in Chengdu are lower than for coastal firms, based on our Hangzhou comparative study, reflecting the lower cost of living in the west, and the abundance of unskilled labor. These gaps are highest for technicians and white collar workers, but are also significant for production workers. For example, in Chengdu, 78 percent of production workers interviewed earn less than 700 yuan per month while in Hangzhou, 85 percent make more than 700 yuan. Only 18 percent of technical workers earn over 1,500 yuan in Chengdu whereas 53 percent do in Hangzhou. The majority of technicians in the Chengdu case firms (70 percent) make between 700 and 1,000 yuan per month. It is only support staff (e.g., janitors, drivers) who do not enjoy a significant salary premium in Hangzhou. So, for those who have very little education, long distance migration may be less rational.

Salaries vary from firm to firm, but production worker salaries fall within a fairly narrow band with most workers being paid between 300 and 700 yuan per month (see Table 6). Salary differentials are greatest among technicians and managers, reflecting both individual qualifications and the technological sophistication of the industry. For example, salaries of technical staff can exceed 5,000 yuan per month in the optics industry, but are more in the range of 1,500 to 3,000 in the shoe industry.

Table 6. Average Staff Salaries, by Interviewed Enterprise
Unit: yuan per month

Cluster	Firm	Average monthly salary	Average salary for production workers	Average salary of technicians and junior office workers	Average salary of management and professional
Dujiangyan	DaCheng	800			
	Guyan	902	896	896	1150
	Jinye Hotel	819	611	725	3700
Longquanyi ETDZ	Dongtai	750	600	800	2500
	Jinhua	910	880	2000	4000
	Yashi	1000	600	1200	4000
	Zigong	1300	1100	1400	2000
Wuhou	Aiminer	800	800	800	
	Wujun	600	450	500	800
	Yibailan	850	800		1500

Source: Firm questionnaires administered by authors, July 2002.

There is much more variation in remuneration by gender than was observed in Hangzhou, where gender differences in pay were minor. In Chengdu, only 7 percent of male workers earn less than 500 yuan per month, compared to 22 percent of females (see Table 7). At the other end of the scale, 21 percent of males earn over 1,500 yuan per month, but only 3 percent of women. These gender-based salary disparities hold across the spectrum of job positions. For example, in white collar positions, 47 percent of males command a monthly salary exceeding 1,500 yuan, compared to 27 percent of females. Thirty percent of female technicians earned less than 700 yuan per month, compared to only three percent of males, and while no female technicians made over 1,500 yuan, 27 percent of the male technicians did. Similarly among production workers, women dominated the bottom of the salary range, and men the top. The only exception was in the support staff category, where men were worse off. Explaining these gender differentials is difficult, given that the labor market is less tight than in coastal areas, females may have less bargaining power. These disparities are not uncommon in lower end production complexes, such as are found in the Chengdu peri-urban area, and urban western China in general.

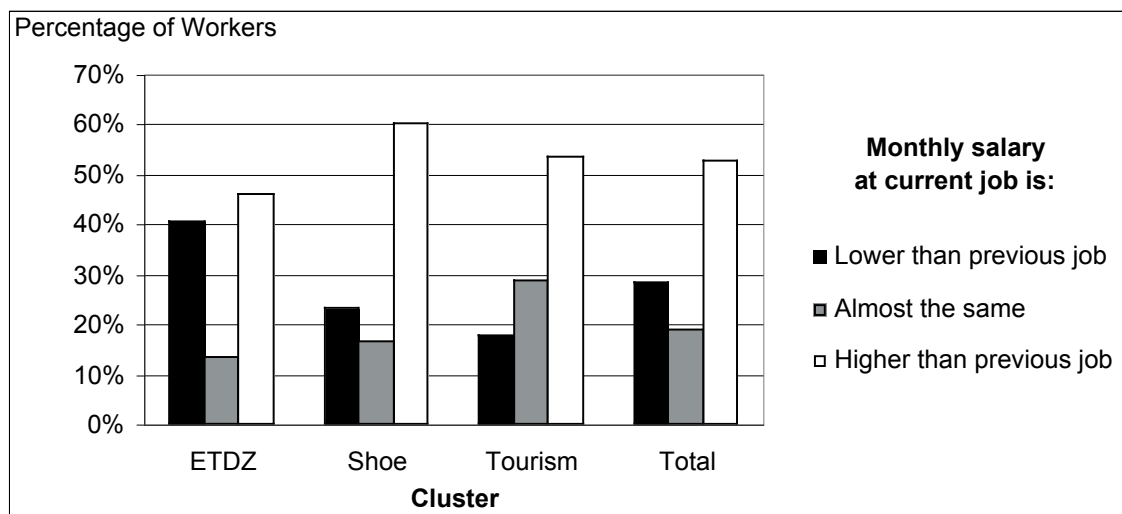
Table 7. Monthly Wages, by Position and Gender
Unit: Percentage of workers by position and gender

Position in Enterprise	Less than 500 Yuan	501–700 Yuan	701–1,000 Yuan	1,000–1,500 Yuan	Over 1,500 Yuan	Total
White Collar						
Male	0	14	9	32	46	100
Female	7	20	33	7	7	100
Technician						
Male	0	4	35	35	27	100
Female	8	23	23	46	0	100
Production Worker						
Male	15	54	27	4	0	100
Female	46	42	8	0	4	100
Support Staff						
Male	14	43	29	14	0	100
Female	7	40	40	13	0	100
TOTAL						
Male	7	26	24	22	21	100
Female	22	32	24	19	3	100

Source: Based on Chengdu worker surveys conducted by the authors, July 2002.

A surprising finding is that about half the workers have experienced a salary cut or no increase when changing jobs (see Figure 10). Twenty-nine percent experienced a salary cut; 19 percent did not receive a raise. This is especially true in the Longquanyi ETDZ cluster. This may be related to the relatively slow growth and low technology mix of firms there, plus the fact that the ETDZ attracts return migrants from the coast. As noted earlier, returnees are often willing to accept lower salaries in the Chengdu EUR to be nearer family and friends and to experience a lower cost of living. One-third of migrants to sampled firms in Chengdu took a pay cut, compared to less than one-fifth shifting jobs locally. By contrast, in Hangzhou, only one-fifth of migrants took a pay cut.

Figure 10. Comparison of Wages at Current Job and Previous Job



Source: Based on Chengdu worker surveys conducted by the authors, July 2002.

The highest level of income improvement occurred among persons taking jobs in the shoe cluster—60 percent experienced income increases (but 23 percent experienced a salary drop). Those accepting tourism sector jobs had the least downward pressure on salaries, with 82 percent of employees receiving the same or better wages than at their previous job. The opportunities for substantial increase in income offered by the shoe cluster appear related to the fact that many of the employees come directly from rural or small-town environments where incomes are generally low. On the other hand, the tourist firms sampled were more traditional SOEs, where reasonable salaries prevail, protecting against salary decreases for most job-takers.⁴⁶

What is striking is the high level of training delivered by firms, even for production workers. Over 55 percent of workers interviewed had received structured training. Virtually all firms conduct in-house training for all staff, including production operators, often involving a week or two of new employees' time. Training is most important in the ETDZ, and least in the shoe cluster. But even in the shoe cluster, 42 percent of the employees receive some form of organized training. High-level employees are often sent outside the region, or even to international destinations to receive specialized training. For example, optical producer *Sichuan Jinghua*, sends staff abroad for advanced training.

Based on our case study clusters, training rates are higher in Chengdu than in Hangzhou, where only 34 percent of workers received structured training. This may reflect the fact the Hangzhou firms hire a higher percentage of more experienced workers, whereas new employees in Chengdu, which is at an earlier stage of industrialization, have less previous work and technical experience, and tend to be younger, thus requiring more training.

Hukou and Social Services

Generally, firms register migrant workers with the local government. In turn, the workers receive a temporary *hukou* and are registered for basic health services. However, in the

Case Study 4: Seeking a more interesting life
The story of a male woodcarver in *Dacheng Art Company*
in the Dujiangyan Tourism cluster

I am twenty-three years old and from Fujian Province. My hometown is famous for root-carving and there are many household-based workshops. Immediately after I graduated from middle school, I began studying this skill by myself at home. When I was nineteen years old, I was recruited by a root-carving factory in Guilin, Guangxi Province. Just half a year ago, the factory assigned some workers to this art company around Qingcheng Mountain. Many workers were unwilling to take on this task at that time. I was curious about Qingcheng Mountain, the World Cultural Heritage site, and confident in my skill as well, so I agreed to come here. However, I feel really disappointed when I find no fun here. There are almost no entertainment places, since it is far from the center of Dujiangyan City. I cannot bear the bad sanitary conditions on the public bus, either. I prefer going back to Guilin to staying here.

Implications: To migrants who have lived in or been to the coastal area, inland regions are still less attractive, in terms of living conditions and lifestyle diversity, especially where their working places are far from the downtown area. This complaint is especially common among the young skilled workers. Locating enterprises near to the city therefore becomes an important factor in attracting skilled labor, especially the young, to the Western Region in general. This is likely to become an even more important factor over the next decade.

case of some footwear firms, such formalities may be ignored. In these cases, employees, sometimes with the help of their employer, need to obtain services through adaptive mechanisms, such as going to pharmacies for medical advice and giving gifts to schools to accept children. In the case of the ETDZ, the local government provides a local District *hukou* (not Chengdu City proper) to workers after one year (previously three years) if they want one. As is the trend throughout much of China, nonurban District *hukous* are readily obtainable by persons with a local job and a permanent place of residence.⁴⁷ In the ETDZ, most migrants applying for the District *hukou* are from within the province.

Hukou status has become less of an issue, however, as constraints associated with non-*hukou* status have diminished over time. It is no longer required to officially purchase basic needs such as food and housing. Many firms and workers indicated that *hukou* status meant little to young workers without children; their main concern was the level of salaries. This may change, and become more of an issue, as migrants become older and start families. Having a local *hukou* is still necessary to obtain a mortgage enabling purchase of a home, and for migrants to officially gain access to public education for their children.

Without a local *hukou*, most migrants must pay an extra fee to send children to local public schools. Many parents adapt by leaving their children with spouses or grandparents in rural towns. In some cases, the firms make agreements with local schools to take migrant worker children. Some firms, such as *Zigong Hard Alloy* and *Aiminer*, provide modest monetary gifts to local schools so that they will accept workers' children, at least to the middle school level (grade 9). One firm interviewed in the ETDZ expressed strong concerns about the quality of local district schooling, indicating it was a disincentive for workers with children to stay in the area. This is particularly an issue in attracting high-end workers.

Benefits provided by firms vary widely, both within and among industries, so that wages are not always a good guide to the worth of the compensation package. Traditional SOEs, such as *Zigong Hard Alloy* and *Dujiangyan Weir* (heritage attraction), offer the full range of official government programs and workplace benefits. Former SOEs, such as the *Gold Leaf Hotel*, are similar. However, benefits vary widely in the private sector. Most firms make an effort to keep staff happy, and so organize sports events (e.g., basketball), entertainment (e.g., karaoke), as well as outings to nearby scenic spots. Some firms even have workers' libraries, and many dormitories feature television sets and newspapers.

There is considerable variance in provision of health care, health insurance, unemployment, pension, and other social safety net provisions. Access to social services also depends on access to local *hukou*, which may be related to a firm's policies. As noted, some firms ignore local registration requirements while others make an effort to assist staff in registering. Nonlocals are much more likely to not have health insurance coverage (59 percent versus 40 percent for locals), but locals and migrants exhibit similar patterns/behaviors in seeking medical services, such as relying on pharmacies, enterprise clinics (where they exist), and small private clinics.

Only one-fifth of the municipality's labor force is covered by the official unemployment-pension plan social security scheme (which varies by municipality throughout China). Primarily it is those who work for SOEs and for large firms in the city proper that are covered.⁴⁸ This means that most workers in firms in the sample (outside of the SOEs) have no safety net in terms of pensions or unemployment insurance. Lack of pensions is not an immediate concern of the young workforce—people tend to have a low discount rate in assessing the value of benefits disbursed in the distant future—but will become increasingly so as the workforce ages.

In the study area, there is a virtually limitless supply of young production workers. On the other hand, the situation in terms of skilled workers is the opposite; they are in short supply. Often the extent to which skilled workers can be attracted and retained literally constrains the rate at which firms in peri-urban Chengdu can grow. Yet surprisingly, technical staff do not appear to have better social services coverage than production workers (e.g., health insurance coverage is 41 percent for both groups). The exception is white collar workers, which includes managerial staff. They enjoy the best coverage— 65 percent of those interviewed have health insurance.

Housing and Transportation

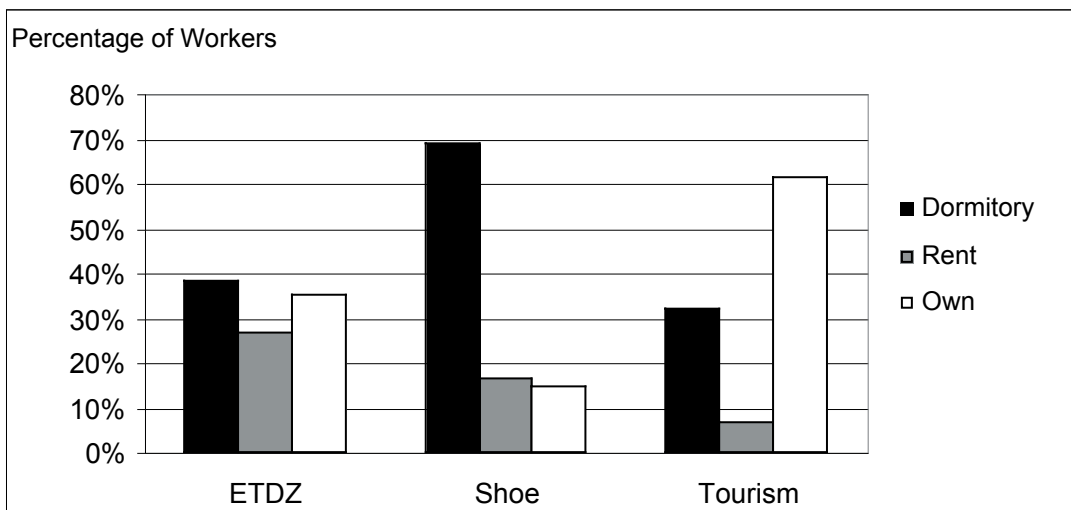
Generally locals own their own homes (75 percent) or live with family members. However, dormitories still play an important role for migrant workers in Chengdu (62 percent). Thirty-nine percent of college-educated workers use the dormitories. Because most migrants are locating in core and inner peri-urban areas, the importance of dormitory housing is greatest in these areas. Dormitory living is highest in the shoe cluster, where 69 percent of all workers live in dormitories. But even in the shoe cluster there are exceptions. For example, almost all workers at *Aiminer Leather Products* rent housing (rooms) locally. Having the lowest level of migrant workers, Dujiangyan has the lowest level of dormitory use—32 percent of all workers—but it is still significant (see Figure 11).

Case Study 5: Satisfied with a better living environment
The story of a female driver in *Hard Alloy Company* in the
Longquanyi Economic Development Zone

I am a driver, thirty-three now. I grew up in Zigong region, a remote, medium-sized city in the mountainous area, where I found my job in the same enterprise as my parents did. As the two hard alloy enterprises in Chengdu and Zigong were consolidated a few years ago, all of the employees in Zigong, along with the enterprise, moved here. The majority of employees are satisfied with the new living environment, which is better than that of my hometown. Specifically, it is convenient to do shopping. We don't need to travel to the city core for daily consumption, though it is not that far. And the condition of roads has been improved a lot, which makes me more comfortable while I am driving.

Implications: The relocation of SOEs to a better location in terms of quality of life is effective in increasing the morale of employees and thereby enhancing productivity. This is particularly true for the former “Third Line” enterprises, although further and deeper enterprise reforms are still needed in the new place, to increase returns from the change in location.

Figure 11. Type of Residence, by Cluster



Source: Based on Chengdu worker surveys conducted by the authors, July 2002.

Dormitories are sometimes on site, and occasionally, as in the case of *Yashi Food*, in the factory building. In other cases they are nearby, sometimes owned/operated by a third party. The quality of dormitories varies from adequate to excellent. Sometimes workers pay a nominal fee for dormitories, such as 150 yuan per month at *Sichuan Dongtai*; sometimes they are provided free. Some firms, especially those with no dormitories, provide a housing subsidy, often to married couples who do not want to live in the dormitory. Others provide no housing benefits. Housing costs are relatively low (few workers pay over 250 yuan per month for housing) but either way, it is still a substantial benefit.

The prevalence of dormitory living in Chengdu contrasts sharply to Hangzhou, where dormitories are increasingly rare and have been replaced by markets offering housing for sale and rent. Enterprise-supplied housing is associated with earlier stages of industrialization—later in the peri-urban trajectory it becomes less important. As firms move up the value chain, and employees are paid more, they tend to purchase their own housing. It also reflects the younger age of migrants in Chengdu, who are more likely to prefer dorm living—67 percent of all dorm residents in the Chengdu clusters are under twenty-four years of age. Notwithstanding the above, enterprise dormitories remain one of the most effective solutions for accommodating large-scale migration of unskilled young workers, and avoiding the emergence of slums. They are still used extensively in the Pearl River Delta region. Hangzhou, by contrast, which relied more on in-situ labor and high-end migration, experienced lower worker rental housing demand during the peak of the peri-urbanization process there, which could be readily handled by local rental markets. Thus, dormitories are likely to remain an important housing feature in Chengdu for some time to come, as the core and inner peri-urban areas continue to absorb large influx of migrants from the surrounding rural area.

In terms of transportation, few workers (only 6.6 percent) use private cars or motorcycles to go to work; 84.2 percent walk or cycle to work. Perhaps because of its relatively isolated location, Dujiangyan, has the highest reliance on motorized transportation, including public transportation. The high reliance on walking to work suggests that the workplace and residence are very close—unlike Hangzhou where workplace and living place are becoming increasingly separated. Interestingly, the majority (67 percent) of locals walk to work even though most own their own home rather than live in dormitories, which tend to be located very near to the workplace. This contrasts sharply with Hangzhou where 64 percent of locals used a private vehicle to go to work (primarily motorcycles). If coastal trajectories are mimicked in the west, this distinct differential may change in the future.

Work-living communities tend to be highly localized, with minimal travel to the core city. Surprisingly, the likelihood of workers traveling to the core is not correlated with distance. Although Dujiangyan, the most distant of the clusters (40 kilometers from the core) has a slightly higher percentage of workers who rarely or never go to the core city, it also has the highest percentage of workers (21 percent) who frequently go to the core, one to two times per week. This may be correlated with the relative lack of big city amenities in Dujiangyan.

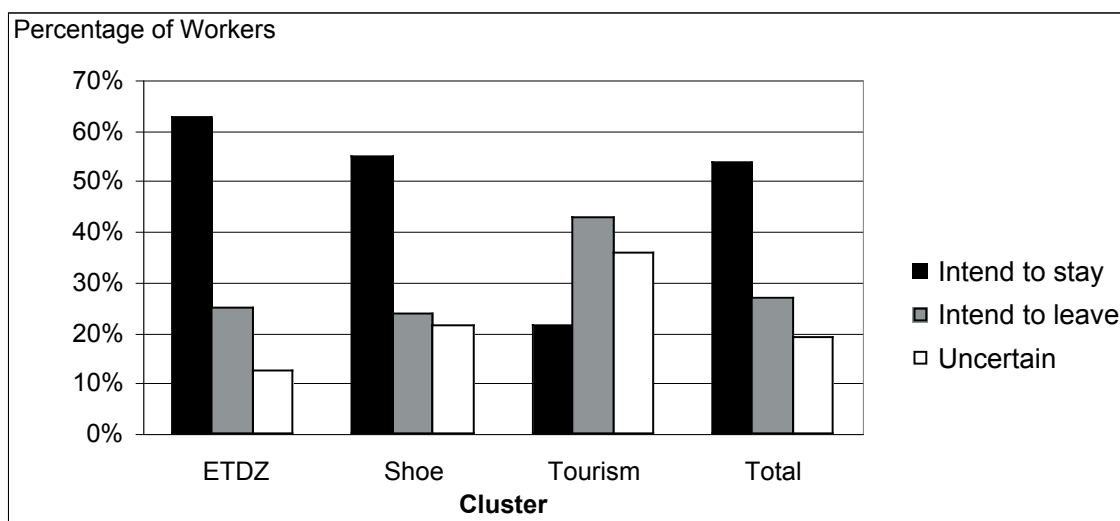
Future Expectations

One social concern among workers in the studied firms is lack of job and income security, much more so than in Hangzhou. Part of the concern stems from the large number of SOEs, or ex-SOEs, in the Chengdu EUR, a number of which are struggling. For example, the economic future of the *Zigong Hard Alloy* SOE is uncertain, as are the workers' jobs. Many firms are in highly competitive markets and are dependent on low cost production, a difficult environment in which to sustain business. For example, *Yashi Food* workers are laid off (and re-hired) according to the level of production. By contrast, higher value added production, increasingly the norm in coastal areas, may be correlated with less magnified swings in employment levels.

As indicated by the worker survey results in Figure 12, many workers do not foresee themselves settling down in the Chengdu EUR. Just over half (54 percent) intend to stay on

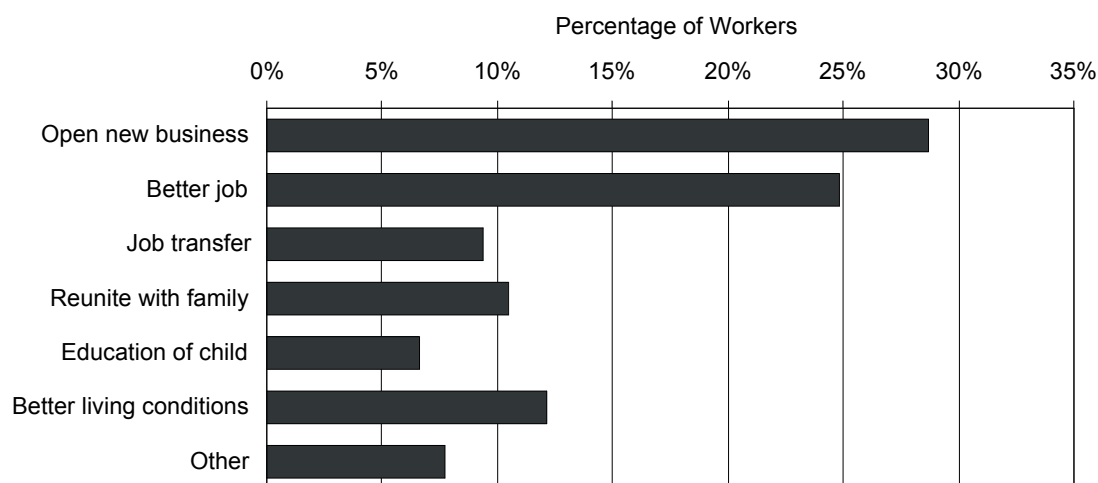
in the community where they are now living. This contrasts with the situation in coastal areas, for example, in Hangzhou, where 81 percent plan to settle down in the communities in which they are living. The ETDZ workers express the most interest in staying on (63 percent), while the tourist cluster has the least stable workforce (43 percent plan to leave and another 36 percent are considering it). The shoe cluster is an intermediary case—55 percent intend to stay; only 24 percent are certain they will move on. These differentials among Chengdu clusters may partly be explained by the fact that career paths within firms, and the cluster, are more developed and obvious, in the ETDZ case.

Figure 12. Future Intentions of Workers to Stay in Community, by Cluster



The lead reason why workers want to move on is to open their own business—peri-urban workers seem very entrepreneurial, even more so than in Hangzhou (see Figure 13). This is especially true of young high school or technical school graduates. The second reason is to move on to a better job. (Even though many workers earn the same or less at their new job, the cost of living differentials could mean they are financially ahead in terms of purchasing power.) Moreover, the longer workers stay at a job, the more likely they are to want to leave. This suggests a lack of rapid promotion opportunities. An exception is among 24–29 year olds, for whom moving out is often related to a job transfer within the firm.

Figure 13. Reasons for Moving Out



Source: Based on Chengdu worker surveys conducted by the authors, July 2002.

An important third reason workers plan to leave is dissatisfaction with current living conditions. Amenity and social facilities are less developed in peri-urban Chengdu than in many coastal EURs, thus there may be less incentive to settle down in what may appear to be sterile communities. In fact, the research indicates that many workers, especially more educated ones and migrants from more urbane locations, are bored living in peri-urban areas, even in areas as close to the city core as Longquanyi, the site of the ETDZ. This is exacerbated by lack of affordable frequent or comfortable transportation to the city core (see Case Study 4).

For migrants from rural areas, on the other hand, the move to peri-urban Chengdu is often associated with a better quality of life (see Case Study 5). However, rural people may not yet view settling down in a large urban area as an achievable aspiration, resulting in the lower levels of expressed intentions to settle in Chengdu communities, compared to the coastal areas which have more second-generation migrants, and where many more successful role model households exist.

6. Rapid Change and the Policy Environment

As backdrop to the next section on policy implications (Section 7), this section briefly describes the policy environment shaping peri-urbanization in Chengdu, both from a physical and employment perspective.

6.1 Peri-urban Form

As has been documented in a companion discussion paper,⁴⁹ Chengdu's physical and demographic growth has been to the west since 1990, in the inner peri-urban area toward and beyond: (i) the new airport in Shaungliu County, (ii) the fast-growing satellite town of Wenjiang, and (iii) the Chengdu National Hi-Tech West Zone park near Pixian, extending

on to the tourist center of Dujiangyan. This actual pattern of physical development contrasts sharply with a public policy emphasis on driving the EUR's development to the east and south, and particularly to the southeast (along the Chengdu–Chongqing corridor), as advocated in the five-year municipal physical plan for the EUR (urban planning region) released in 1997, and the subsequent five-year plan released in 2002.

Key to the land use development system in Chengdu (and across China) is the allocation of quotas for land conversion from rural to urban uses. This allocation process is based on a hierarchical process, whereby the national Ministry of Land and Resources provides the Land and Resources Bureau of Chengdu Municipality with an annual rural-urban land conversion quota (which does not specify specific sites), that is allocated downward to local counties and districts. The latter bodies, in turn, lease land to private companies through auctions, bidding, or negotiation, as well as allocate land for public uses. More detailed physical planning, indicating specific areas for development and infrastructure networks occurs for the urban planning area that constitutes 3360 km² of the municipality's 12,360 km². Relatively detailed five-year physical plans are prepared for this area.

Physical urbanization has occurred much faster than was anticipated in the 1997–2002 plan, which forecast 226 square kilometers would be built up by 2010—already over 220 square kilometers (2002) are physically urbanized. The land allocation system obviously interacts with infrastructure network development, with accessible land being more in demand for conversion, and therefore of higher market value. The recent development of outer ring roads (third and part of the fourth) is rapidly changing accessibility contours in the EUR. Previously, the EUR was dominantly shaped by radial corridors as documented in the companion discussion paper on Chengdu land conversion.⁵⁰

Ideally, there should be a close fit between land conversion allocation quotas and the urban physical plans. Over the last several years, local governments (counties, districts, county-level cities) have obtained more control over land development, resulting from decentralization policies. This has brought land development decisions closer to the people but has made it more difficult for the municipality to shape overall extended urban region form.

Six satellite towns (Wenjiang, Longquanyi, Jintang, Shuangliu, Pixian, Qingbaijiang) were planned in the late 1970s for Chengdu's peri-urban area and developed in the 1980s (see Map 2). Each is approximately 20 kilometers from the city center, and the six will soon be linked by the Fourth Ring Road. In the early 1980s, "Third Line" heavy and defense-related industries moving from remote areas in western China were encouraged to settle in these satellite cities. Some did, as has been described. For example, a major military aerospace company, *Sichuan Aerospace*, located in the Longquanyi ETDZ. Over time, however, these satellite towns have become the site of private enterprises, joint ventures, multinationals, and are beginning to develop as bedroom towns for workers commuting into core Chengdu's producer services-oriented economy.

New dynamic satellite cities have also emerged, such as Dujiangyan and Meishan to the south of Chengdu Municipality. For example, Motorola's operations for western China are based in Meishan. Wenjiang, directly to the west of Chengdu is one of the most successful of these satellite towns. It has attracted a large number of Taiwan joint venture firms, plus being the site of a food processing and herbal medicines cluster. It also is the most developed bedroom community in peri-urban Chengdu with large-scale middle and upper middle class suburban housing tracts proliferating. Ironically, Wenjiang, and other satellite towns do not welcome SOEs, despite their genesis, preferring private enterprises (both domestic and foreign) which offer greater economic and employment growth potential, and greater potential for local governments to generate fiscal revenues.

As noted, the National Hi-Tech Western Development Zone Park, promoted by the provincial government on the corridor to Dujiangyan, has been a prime driver of development to the northwest, while the new airport at Shuangliu has driven development to the southwest. Chengdu is the leading aviation center of western China, having recently overtaken Kunming; it is significantly more important than Chongqing. Given this massive public investment, market dynamics, and the fact that aviation and hi-tech are fast-growing activities, compared with the relatively slow-growing industrial mix in the ETDZ at Longquanyi, it is not surprising that growth in the Chengdu EUR has been mainly to the west. Other factors are involved. One is the lower status of the east side of Chengdu because of its association with heavy industry and the fact that polluted air is blown eastward. Another is the fact that the west side is richer agriculturally, generating surplus capital that can be used to build villas. Further, educational and cultural facilities, of high status, are associated with the western and southern sides of Chengdu, with the notable exception of the prestigious Sichuan University, located in the southeastern section of the urban core (see Map 2).

Given that a variety of ostensibly strong urban form-shaping instruments are available to the municipal government, it is surprising that this outcome occurred when it is so at odds with the official plan. The reason may lie in the increasing decentralization of land planning and land allocation processes to lower level governments. The relatively loose alignment between the land allocation and physical planning functions may also be an explanatory factor, since different bureaus at the municipal level undertake these tasks.

In the future, there may be a trade-off between rapid contiguous development on the fringe of the built-up area, and development of the satellite cities. In the 1990s, development of the satellite cities occurred rapidly, but over the last five years there has been more emphasis on contiguous and in-fill development, especially to the west.⁵¹ Plans by the municipal government to increase the size of Longquanyi to 1.36 million,⁵² and to develop a new town in Shuangliu with a population of 700–900,000 (partially driven by shifting municipal offices to that location) could, if realized, reduce future growth of satellite towns significantly, as there is a limit to the number of additional urban residents who will settle in the EUR.⁵³ Further, the municipal government advocates in-fill development between the Longquanyi ETDZ and the contiguous Chengdu built-up areas, as has occurred through market forces in the Shuangliu area over the last five years.⁵⁴ Based on 4th and 5th Population Census data, the entire municipality gained 1,842,000 people between 1990 and 2000, close to the 1,780,000 population increment forecast for these two new towns. Assuming, on the high side, that Chengdu Municipality gains 4.5 million in population over the next twenty years (the vast majority of net population growth will be in the EUR), 40 percent of population growth would be in these two new towns, if they develop according to plan. This is not impossible, but may be unrealistic given competing development pressures to the west and northwest, plus urban redevelopment in the city core. However, CBD residential populations are unlikely to grow given the strong demand for producer services and retail space in the CBD.

In summary, no clear decision appears to have been made regarding the form that the extended urban region will take. But whether it be based on contiguous development utilizing “new towns in town” or focused around existing satellite towns, the main development thrusts will continue toward the west, focused on the inner peri-urban area. Either pattern, assuming effective transportation planning, development, and management, could be sustainable. The spatial pattern to be avoided in peri-urban Chengdu is dispersed leap-frogging development (scatter), especially in the outer peri-urban area.

6.2 The Employment and Social Delivery System

There are many pressures on Chengdu to absorb rural labor. The municipality is experiencing the peak of the rural-urban transition. From 1996 to 2000, over 1.5 million of the municipality's 3.98 million farmers (in 1996) shifted to nonfarming activities. In other words, over 38 percent of the farming population shifted out of the sector. Of these, half a million left Sichuan Province for work elsewhere, primarily to coastal China; the rest have been absorbed, formally or informally, into the municipality's nonfarm economy, or are unemployed. This means that each year about one-quarter million former farmers need to be absorbed into the EUR; 125,000 more out-migrate.

Adding to the challenges facing public officials attempting to understand and facilitate labor market dynamics in the municipality is the tremendous level of churn in the population. According to the Chengdu Employment Service Administrative Bureau, at least half a million people left the municipality between 1996 and 2000 (temporarily or permanently) to work in other parts of the country, such as Guangdong, Zhejiang, Beijing, and Jiangsu, while 1.5 million in-migrated during the same period, creating a net gain from migration processes of one million, or 250,000 per year.⁵⁵

Chengdu is primarily the high-end services center for western China (see Appendix 1) offering business, government, financial, aviation, and tourism services. Much of the employment created in these sectors, largely located in the city proper, is not suitable for recent rural migrants, although high-end producer and financial service activities do generate nearby low-end service jobs in catering, cleaning, and laundry. Chengdu's role as a leading producer and financial services center is reflected in the fact that it has the fourth highest income level of any city in China (excluding the four national cities) and has among the highest rates of private motorization in China. In this sense, it is an outlier in western China, contrasting, for example, with Chongqing. This prosperity is expected to continue. The municipality's official current five-year plan forecasts that by 2007, GDP per capita will exceed U.S. \$3,000 per capita. The disposable income is forecast to rise to U.S. \$1,572 per capita in urban areas, and U.S. \$605 in rural areas, resulting in an urban-to-rural income disparity ratio of 2.6. Most of this economic growth will be generated in the core. Thus, to a considerable extent, the main story in the Chengdu EUR is the role of the core. It is the core that is to a considerable extent unique, particularly in western China. As has been indicated, the role of industry in Chengdu EUR's economy is less than in Chongqing and virtually all coastal extended urban regions, as illustrated by the comparison with Hangzhou presented earlier.

Nevertheless, the peri-urban area, represented by the activities assessed in this discussion paper, has had to play a significant role in absorbing rural migrant labor. In a relative sense, however, this role has been smaller than in most other large Chinese EURs because of the dynamism of Chengdu's core economy. To a considerable extent, this has been recognized and made official. According to the Social Bureau Comprehensive Department, only 30 percent of those laid off from SOEs over the last five years have been re-employed in formal paying jobs. The importance of laid-off people starting their own businesses, especially in the personal services sector and in the core city, is obvious. Conversely, migrants to Chengdu EUR are encouraged to engage in construction and manufacturing, activities found primarily on the periphery of the core city or inner peri-urban areas. This channeling of locally laid-off workers versus migrant works into different activities (and by implication, into different geographic areas) may help reduce possible conflicts between these two groups in their potential competition for jobs.

Given this dynamic, high stress situation, what role can the public sector play in creating jobs for rural-urban migrants? How can public agencies facilitate industrial and employment structures that are stable, and offer opportunities for advancement up the economic ladder, both for the firms and their employees? Since the public sector in China is increasingly not involved in direct job creation, the role of the public sector (especially the municipality) is, and should be, one of employment placement, training, assisting business start-ups with credit and training, facilitating cluster dynamics, establishing basic social safety nets, and information provision.

The prime role of the Chengdu Employment Service Administration Bureau, a sub-bureau of the Municipal Government (the name of equivalent bureaus varies throughout China) is to match labor to jobs. Their task is an overwhelming one given the large numbers of rural-urban migrants (described above), laid-off workers, plus new graduates needing jobs. Although the official municipal unemployment rate (2002) is 3.6 percent, the actual number is much higher when persons leaving agriculture but staying in the municipality (250,000 per year), net migrants (250,000 per year), laid-off SOE workers receiving low stipends, and new school graduates are included in those seeking jobs.

In 2001, the Bureau was able to find jobs for 45,198 people, giving priority to Municipal residents (not migrants), and tending to focus on those with specific skills. It is apparent that most people who find jobs do so through other modes such as schools and friends, as previously described. In addition, the Bureau conducts research on labor markets and delivers short courses (1–3 months) to make job seekers more employable. Many of these courses (there are over fifty), which are free, are designed to re-equip laid-off SOE workers to make a living in the urban personal services sector, which includes hairdressing, retailing, driving, and cooking. The Bureau is encouraging all townships to develop employment bureaus to increase service coverage, and serve peri-urban areas better. At present, the main interface with the Bureau is through district and county offices.

Only about 20 percent of the labor force (1.1 million people in 2001) is enrolled in the municipality's official social security system. As the population ages, there will be more demand for social security, and the shortcomings in coverage, if not addressed, will become a more serious issue in large urban areas. It will be incumbent on urban governments, such as Chengdu, to expand these services to the urban population as a whole, making expansion of coverage a higher priority than raising the level of benefits. At present, there is much lower official social security coverage in the peri-urban areas than in the city core (city proper).

The above concern intersects with the *hukou* issue. Unless a person has a *hukou* s/he is not eligible for social security coverage in the urban jurisdiction in question. Since many peri-urban residents do not have *hukou*, this is a problem in itself. But even a *hukou* does not guarantee enrollment in the official municipal social security system. The system is biased toward SOEs, and formal corporate employers, forms of employment less prevalent in peri-urban areas.

7. Policy Implications

What are the policy implications in terms of improving the quality of peri-urbanization in Chengdu?

(i) Regional and urban planning processes and five-year physical plans need to be made more realistic by taking market forces into account. Real economic drivers, preferences of residents and investors, and major public investment decisions need to be fully factored into urban planning. To “rationally” plan in isolation from these factors, almost certainly will reduce the utility of the plan. Eventually, if plans continue to diverge substantially from what happens on the ground, they will lose most of their credibility, as has happened in many Southeast Asian countries.⁵⁶

(ii) Government employment placement services are performing well, given the magnitude of the challenge. However, there is need for closer cooperation between private and public employment bureaus, and other job matching processes, such as school placements. For example, venues (posterboards, internet sites) could be established to facilitate and leverage informal job information networks, already an important source of job placement. The current policy to develop public employment placement services at the micro scale (townships) is positive. At that level, less skilled positions can also be included in employment data banks—not just the more skilled positions that municipal, district, and county offices tend to focus on because of the enormity of the task they face. In peri-urban areas especially, migrants need to be treated equally with local residents by public employment services, given the developmental importance of migrants in peri-urban labor markets.

(iii) There is a need, over time, to increase official social safety net (unemployment insurance, pensions) coverage to include all urban workers, not just those working for governments, established SOEs, and corporate employers. Because of low levels of worker coverage in peri-urban areas, a reflection of the types of firms that locate there, the population there is especially vulnerable to risks.

(vi) Phasing out *hukou* restrictions will improve the lives of urban core and peri-urban residents, especially as they have children, and age. The main implications relate to access to schooling for children, but *hukou* status can also affect households in other ways—in access to mortgages, for instance.

(v) Our case studies indicate high levels of entrepreneurship among the young with high school and technical education. Entrepreneurship and business start-ups should be encouraged through small business and technical courses at convenient times for those working (e.g., at night), and access to small business start-up credit. This is a primary need in Chengdu because so many of the workers are from rural areas, or grew up in a region where entrepreneurship was less valued than in coastal areas.

(vi) As has been noted, communities in peri-urban Chengdu are still largely localized in terms of transportation-activity systems. There are some exceptions, such as increasing daily commuting to white collar jobs in Chengdu from bedroom

developments in satellite towns, especially Wenjiang. Maintaining such localized systems as long as possible is desirable, but there needs to be a recognition that workplace and residence will increasingly diverge, as has occurred in coastal cities such as Hangzhou, with substantial implications for land use and transportation planning. For example, as truly integrated extended urban region socioeconomic systems emerge, with considerable cross-commuting on a daily basis, regional transportation systems become more important. The transition should be managed to minimize negative environmental and energy impacts. Average trip length within the Chengdu EUR is likely to become longer, necessitating changes in transportation networks and modes. If noncontiguous (to the built-up core city) development in peri-urban areas continues on a substantial scale, it is vital that development be focused in, and directly adjacent to existing satellite cities already located along major transportation corridors. This will result in “necklace” urban form, regarded as highly efficient in economic, environmental, and energy terms.

(vii) Perhaps obvious, and discussed in companion discussion papers by APARC on East Asian peri-urbanization, there is a strong need to align local government capabilities, fiscal resources, and facility construction and staffing with the expected acceleration of peri-urban development in the Chengdu EUR. If current trends continue, reinforced by policy interventions, most employment and demographic growth will likely occur along a limited number of corridors, especially adjacent to the built-up area of the core city and established satellite towns, ETDZs, and hi-tech areas. Every effort should be made to ensure that environmental infrastructure (water supply, sanitation, regional landfills), social facilities (schools, health facilities), and monitoring/guidance systems for land use (particularly related to rural-urban land conversion) are in place before, or as major growth spurts occur.

(viii) Investment is likely to be highly localized within the inner and outer peri-urban areas, but this makes sense in that highly nucleated settlement patterns are more efficient (in economic, energy, and fiscal terms), conserve land, and provide better lifestyle opportunities. Public investment, not just for mega-projects such as airports and hi-tech zones, but also for civil infrastructure, can lead and guide peri-urban development, rather than just responding to it, encouraging development of relatively high density nodes.

8. Conclusions: Extended Urbanization in Chengdu

The Chengdu extended urban region plays a dual role. It is the major high-end service provider and R&D center for western China, a function spatially concentrated in the Central Business District, the Shuangliu international airport node, and in hi-tech zones on the edge of the urban core. But at the same time, the EUR is expected to absorb about 500,000 rural-to-urban migrants and persons leaving farming within the municipality annually—a flow that is likely to continue unabated for the next decade.

It is the inner peri-urban area, particularly at the fringe of the core urban districts and along key corridors into neighboring counties, which plays and must continue to play a

major role in absorbing those directly experiencing the rural-urban transition in their lives, as described in the workers' stories. New jobs in manufacturing, tourism, and construction represent hope for better lives for these urban pioneers. This is the case despite the unusually dominant role of Chengdu's core in employment creation and economic growth—as contrasted with most coastal extended urban regions, and its main urban competitor in the west, Chongqing. Perhaps Chengdu's closest parallel is with Beijing, where the core and the service sector also play dominant roles in the EUR's development.

Continued redevelopment of the core is pushing manufacturing and institutional functions (e.g., municipal governance) outwards along key corridors, and strong drivers are encouraging growth of manufacturing in western China's EURs. Given these factors, peri-urbanization will likely accelerate in the Chengdu EUR, as a complement to, rather than at the expense of core development.

Local governments face major challenges in Chengdu's peri-urban areas. These relate to urban form (which in turn affects environmental quality and energy efficiency), facilitating rapid employment creation, expanding social security coverage and access to social services for residents, and enhancing future competitiveness. Rapid economic growth and employment creation is obviously a must, given the Chengdu EUR's situation.

In the longer run, peri-urbanization in Chengdu will likely increasingly resemble that on the coast, as we have argued throughout this paper in references to trajectory dynamics. For the next decade or so, however, the Chengdu EUR will probably exhibit a significant number of unique characteristics, calling for customized policy responses in peri-urban areas. Economic dynamics in the region appear to be about ten to fifteen years behind coastal China, but this gap may narrow over time.

The Chengdu peri-urban area, unlike coastal urban regions, is unlikely to run out of regional inexpensive labor (within 200 kilometers) over the next ten to fifteen years. Second, it would appear that investment will continue to show a significantly lower proportion of FDI than in the coastal areas. This is partly because Chengdu's high level of service activity which utilizes lower levels of FDI (even in multinational service corporations), and partially because the inland location is less attractive to firms exporting bulky goods. Third, manufacturing will continue to account for a smaller proportion of GDP and employment in Chengdu than in major coastal extended urban regions, and the neighboring Chongqing EUR. In the latter, the economic geography for manufacturing is improving as a result of improved navigation, resulting from the Three Gorges Project and Chongqing's site as the hub of an ever-expanding western China rail network. Fourth, peri-urbanization will probably be less dispersed and scattered in Chengdu than in most other large Chinese EURs. The historical legacy of satellite towns, planned and market-driven development contiguous to the built-up core (aided by in-filling), and the lack of large competing urban centers within Chengdu's EUR contrast with the constellation-like peri-urbanization in coastal areas, characterized by innumerable sizable settlements, including several very large ones, and complex cross-flows between these nodes. The core city, in relative terms, will remain more important in the Chengdu case than in coastal EURs such as the Pearl River Delta (PRD) and Yangtze River Delta (YRD) where several cities with multimillion populations compete within the EUR, and the propulsive role of manufacturing generates extremely strong centrifugal forces. In the PRD, for example, Guangzhou and Hong Kong are about equal in population size. In the YRD, Nanjing, Hangzhou, and Ningbo are multimillion-sized competitor poles to Shanghai.

Chengdu's context implies that the major challenges related to peri-urbanization are likely to be in the areas of migrant absorption, employment creation, and improving the quality of life for peri-urban residents, and somewhat less in terms of regional form. The fact that most migrants are, and will continue to be, from relatively nearby locations should minimize cultural sources of conflict and enable more rapid creation of real communities in peri-urban areas.

We see the Chengdu EUR's future as schizophrenic. On one hand, it will need to continue to maintain its competitive advantage as the high-end service center for western China, or lose the role to Chongqing. If successful, this will continue to drive development of the core (CBD) and amenity development, including well designed housing, recreation and park areas, specialized retailing, and entertainment zones. On the other hand, Chengdu will continue to confront the challenge of absorbing in excess of 500,000 people annually, stemming from the rural-urban transition process underway in the region and its immediate hinterland. Chengdu will be unable to ignore this challenge. Indeed, it is this latter dynamic, based on large cohorts of low-cost labor, that will drive much of the EUR's peri-urbanization, attracting manufacturing enterprises, and growing SMEs within cluster environments, many of them building on historical traditions. Tourism will continue to play a major role in the peri-urban region's development, especially to the northwest. On the edge of the core city, R&D and educational functions will continue to mature, many of them legacies of the "Third Line" period.

In summary, this research on peri-urbanization in Chengdu reinforces our position that Chinese urban regions, to some extent, follow predictable trajectories in their development, with lag times varying across China. At the same time, the Chengdu case is sufficiently unique to suggest caution in overgeneralization concerning peri-urban trajectories in China. Chengdu appears to be an EUR where development is driven largely from the inside out, rather than from the outside in, as in the PRD. The extent to which Chengdu will remain a somewhat unique case remains to be seen.

Appendix 1: Thematic Comparison between Chengdu and Chongqing for Some Critical Indicators in Terms of Overall Performance

Indicators/Cities	Chengdu	Chongqing	Remark
General Survey			
Population	Less	More	Chengdu: 10.199; Chongqing: 30.979 (million persons)
Percentage of Urban Population to the city's whole population	Higher	Lower	Chengdu: 36%; Chongqing: 22.26%
GDP (2001)	Lower	Higher	Chengdu: 149.2; Chongqing: 175.0 (billion yuan)
GDP growth	Higher	Lower	Growth rate: Chengdu 13%; Chongqing 10.4% (2002)
Income level (2001)	Higher	Lower	Chengdu: 12,493; Chongqing: 9,523 (yuan/year)
Investment in Fixed Assets (2001)	Lower	Higher	Chengdu: 58.2; Chongqing: 80.2 (billion yuan)
Immediate Hinterland	Bigger	Smaller	Population: Chengdu: 83.29; Chongqing 67.09 (million persons)
Service Sector	Better in level	Larger in scale	
Administrative Level	Lower	Higher	Chengdu is a sub-provincial municipality; Chongqing is a provincial level municipality
Civil Aviation	Advanced	Less advanced	Chengdu: 6.25; Chongqing: 1.23 (million passengers) in 2001
Urban Infrastructure and Housing			
Real Estate Development	More developed	Less developed	Chengdu: 2000-3000; Chongqing: 1500-2000 (yuan/sq.m)
Growth Rate of Urbanization	Lower	Higher	
Industry			
Foreign Direct Investment (2001)	Lower	Higher	Chengdu 220.62; Chongqing 244.36 (million USD)

Number of MNCs	Fewer	More	Chengdu: 98; Chongqing: 122
Manufacture	Growing	Competitive Advantage	GOVI: Chengdu: 707.7; Chongqing: 1072 (million yuan)
Hi-Tech	Comparatively Strong	Weak	Chengdu has the regional headquarters of Microsoft and Motorola
Number of State-Owned Enterprises (2001)	Fewer	More	Chengdu: 1318; Chongqing: 2054
Deposit and Loan Balances of RMB of Financial Institutions	Almost the same	Almost the same	Total Deposit Balance of Chengdu: 225.7, Chongqing: 229.4; Total Loan Balance of Chengdu: 176.2, Chongqing: 187.2 (billion yuan)
Financial Center	Strong	Weak	The southwest headquarters of Bank of China is in Chengdu
Number of Foreign Consulates	Fewer	More	Chengdu: United States; Chongqing: Japan, Britain, Canada
Foreign Trade	Less	More	
Science, Education, and Culture			
Number of Universities	Fewer but better	More	Chengdu: 22, Chongqing: 29; But Chengdu has the more prestigious universities.
Student Enrollment Levels (2001)	Higher	Lower	Undergraduates: Chengdu: 188,394; Chongqing: 170,006 Graduates: Chengdu 17,422; Chongqing: 8,358
Number of Academicians	Many more	Fewer	Chengdu: over 30 (all are local residents); Chongqing: 3 (all are nonresidents)
Education Level overall	Higher	Lower	
Quality of Human Resources	High	Lower	
Urban Amenity			
Higher Class Residences	More	Fewer	
Internationalization Level	Higher	Lower	

Air Pollution	Relatively Better	Worse	Total volume of industrial waste gas discharged (100 million cu.m): Chengdu: 873; Chongqing 1856
Waste Water Treatment	Relatively Better	Worse	Discharged volume of industrial wastewater (million tons): Chengdu: 343.65; Chongqing: 812.14

Source: Jianming Cai, Beijing Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences.

Appendix 2. Firm Management Interview Check List

1. How did your firm get started making products in this line of business?
2. How do you intend to add value to your products (move up the value chain)?
3. What are the major problems faced by your firm in improving your business?
4. What are the advantages/disadvantages to being located in this cluster?
5. What, if any, significant links do you have with other firms nearby?
6. What, if any, links do you have with other support organizations nearby, e.g., technical schools, government organizations, industrial associations?
7. Does your firm offer opportunities for staff to upgrade their skills? If so, how?
8. Do your staff take training courses on their own? If so, what types of courses?
9. Are your employees registered with the local government? If so, who registers them? Does the firm do it, or do the employees do it themselves?
10. What are the major problems faced by your employees? (Local residents / Migrants)
11. Are you satisfied with government (all levels of government) support to your firm and industry?

Appendix 3. Employee Interview Questionnaire

Date: _____

Cluster: _____

Enterprise: _____

1.1 Did you grow up in this area (within 25 km)?

☐ (1) yes ☐ (2) no

1.2 If no, where?

☐ (1) within municipality ☐ (2) outside municipality, inside province
☐ (3) outside province (specify:_____)

2. How did you find this job?

☐ (1) friends in host town ☐ (2) friends in hometown (migrants only)
☐ (3) local people ☐ (4) government ☐ (5) newspaper (media)
☐ (6) sign ☐ (7) walk-in ☐ (8) placed by school after graduation
☐ (9) transfer between enterprises ☐ (10) other (specify:_____)

3. Personal Data

3.1 Sex: ☐ (1) male ☐ (2) female

3.2 Age Category:

☐ (1) 18 or younger ☐ (2) 19–23 ☐ (3) 24–29 ☐ (4) 30–39 ☐ (5) 40+

3.3 Education:

☐ (1) postgraduate ☐ (2) college ☐ (3) technical and vocational school
☐ (4) high school ☐ (5) middle school ☐ (6) primary school
☐ (7) not finished primary

3.4 Are you married? ☐ (1) yes ☐ (2) no

4.1 Your position in this enterprise

☐ (1) clerical ☐ (2) technician ☐ (3) production worker
☐ (4) support staff ☐ (5) short term contractor ☐ (6) salesperson

4.2 How long have you worked at this job?

☐ (1) ≤6 months ☐ (2) 7–12 months ☐ (3) 1–3 years ☐ (4) >3 years

5. Immediate Previous Job

5.1 How long did you work at your previous job?

☐ (1) unemployed ☐ (2) ≤6 months ☐ (3) 7–12 months
☐ (4) 1–3 years ☐ (5) >3 years

5.2 Where was your previous job located?

☐ (1) within 25 km ☐ (2) outside locality, inside municipality
☐ (3) outside municipality, inside province (4) in another province (specify:_____)

5.3 Type of work:

☐ (1) support staff ☐ (2) production worker ☐ (3) technician
☐ (4) clerical (white collar workers) ☐ (5) farmer ☐ (6) soldier
☐ (7) businessperson

5.4 Salary per month

☐ (1) higher than current job ☐ (2) lower than current job ☐ (3) almost the same

6. Job Before Previous Job

6.1 How long did you work at your previous job?

- ☐ (1) unemployed ☐ (2) ≤6 months ☐ (3) 7–12 months
☐ (4) 1–3 years ☐ (5) >3 years

6.2 Where was your previous job located?

- ☐ (1) within 25 km ☐ (2) outside locality, inside municipality
☐ (3) outside municipality, inside province
☐ (4) in another province (specify:_____)

6.3 Type of work

- ☐ (1) support staff ☐ (2) production worker ☐ (3) technician
☐ (4) white collar worker ☐ (5) farmer ☐ (6) soldier
☐ (7) business person

6.4 Salary per month

- ☐ (1) higher than current job ☐ (2) lower than current job ☐ (3) almost the same

7. Hukou status

- ☐ (1) unregistered ☐ (2) registered (temporary) ☐ (3) local urban *hukou*
☐ (4) local rural *hukou* ☐ (5) hometown urban *hukou* ☐ (6) hometown rural *hukou*

8. Health Services

8.1 When you are sick, where do you *normally* obtain medical services?

- ☐ (1) pharmacy ☐ (2) clinic within enterprise ☐ (3) hospital (township)
☐ (4) private clinic ☐ (5) municipal hospital ☐ (6) don't use any services
☐ (7) other

8.2 Do you have health insurance? ☐ (1) yes ☐ (2) no

8.3 If yes, who provides it?

- ☐ (1) enterprise ☐ (2) host local government ☐ (3) home local government
☐ (4) personal insurance ☐ (5) social groups/organizations (e.g., labor bureau)

9.1 Are you taking part in any training program?* ☐ (1) yes ☐ (2) no

9.2 If yes, who delivers the training?

- ☐ (1) enterprise ☐ (2) local government ☐ (3) private institution/other
* e.g., informal distance learning, continuing education, adult education

10. What other local government services do you use? List (e.g., temporary residency center, travel center, labor bureau).

11. What other local government services would you like to receive? List.

12.1 In what type of housing do you live?

- ☐ (1) enterprise dormitory ☐ (2) dormitory provided by local government
☐ (3) board ☐ (4) rent housing unit
☐ (5) buy housing unit ☐ (6) free (with relatives, friends)
☐ (7) substandard structure ☐ (8) other

12.2 How much do you pay for housing per month? _____Yuan per month

13. How do you normally travel to work?
☐ (1) walk ☐ (2) bicycle ☐ (3) motorbike ☐ (4) enterprise bus
☐ (5) public bus ☐ (6) taxi ☐ (7) private vehicle ☐ (8) enterprise car

14. Travel to the City Center

14.1 How often do you travel to the city center for business? _____times per month

14.2 For personal reasons? _____times per month

14.3 How do you travel to the city center (mode used most often)?

- ☐ (1) walk ☐ (2) bicycle ☐ (3) motorbike ☐ (4) enterprise bus
☐ (5) public bus ☐ (6) taxi ☐ (7) private vehicle ☐ (8) enterprise car

15. What is your plan for the future?

15.1 Do you plan to stay living in this community?

- ☐ (1) yes ☐ (2) no ☐ (3) uncertain

15.2 If no, where do you intend to move?

- ☐ (1) return to your hometown ☐ (2) move to another community (specify: _____)

15.3 If you want to move, what is your reason?

- ☐ (1) children's education ☐ (2) better job
☐ (3) reunite with family ☐ (4) better living conditions
☐ (5) job transfer ☐ (6) start own business
☐ (7) unfriendly local people ☐ (8) other (specify: _____)

16. What is your current salary? _____ Yuan per month

FOR MIGRANTS ONLY

(Hometown located 25 km or more away)

17. Why did you migrate to this location?

- ☐ (1) obtain job ☐ (2) higher pay ☐ (3) more interesting life
☐ (4) better social service ☐ (5) reunite with family ☐ (6) other (specify:_____)

18. If married, where did you meet your spouse?

- ☐ (1) here ☐ (2) hometown ☐ (3) other

19.1 Do you have children of school age? ☐ (1) yes ☐ (2) no

19.2 If yes, where does s/he study?

- ☐ (1) in hometown ☐ (2) in private school in host town
☐ (3) in public school in host town

19.3 If your children attend public school in the host town, do you pay an extra fee?

- ☐ (1) yes, specify amount: _____ Yuan ☐ (2) no

20. What is the amount of your remittance? _____ Yuan per year

Appendix 4: Firm Operations Questionnaire

Date: _____

Cluster: _____

Enterprise: _____

1. Location

1.1 Has your enterprise moved? ☐ (1) yes ☐ (2) no

1.2 If yes, where was original location?

☐ (1) within the same cluster ☐ (2) outside cluster, inside town

☐ (3) outside town, inside county ☐ (4) outside county

1.3 If within the same cluster, what was the reason for relocating?

☐ (1) required by government ☐ (2) only way to obtain land

☐ (3) access to good infrastructure ☐ (4) nearby related firms

☐ (5) preferential policies ☐ (6) other (specify: _____)

2. Type of ownership:

☐ (1) township enterprise ☐ (2) village enterprise ☐ (3) shareholding

☐ (4) joint venture ☐ (5) private ☐ (6) HK and Macao investments

☐ (7) other FDI ☐ (8) other type (specify: _____)

3. When did your enterprise start operating? Year: _____, Month: _____

4. Accumulated fixed assets as of December 2001: _____ 10,000 Yuan

Net fixed assets as of December 2001: _____ 10,000 Yuan

5. Total profits in 2001: _____ 10,000 Yuan

Taxes paid (local and national) in 2001: _____ 10,000 Yuan

6. Total number of staff by end of year 2001: _____. Of this total, how many:

(1) finished primary school: _____

(2) finished junior middle school: _____

(3) finished high school: _____

(4) finished technical or vocational schools: _____

(5) finished college: _____

(6) are technicians or engineers: _____

(7) are male: _____

(8) are younger than 20 years old: _____

(9) are 20–35 years old: _____

(10) are 36–55 years old: _____

7. Source of staff: number of staff that originates from:

(1) within a 25 km radius of the work site: _____

(2) outside 25 km radius, but within municipality: _____

(3) outside municipality but within province: _____

(4) outside province: _____

8. Do you provide a dormitory for staff? ☐ (1) yes ☐ (2) no
- 8.1 If yes, how many staff reside in the dormitory? _____. What percentage? _____%
- 8.2 Is the dormitory on factory property? ☐ (1) yes ☐ (2) no
9. The average salary is _____ Yuan per month, of which
- (1) Average salary for production workers is _____ Yuan per month
- (2) Average salary of technicians and junior office workers is _____ Yuan per month
- (3) Average salary of management and professionals is _____ Yuan per month
10. List the main products of the enterprise: _____
- _____
11. The major markets for your products (by value) are:
- ☐ (1) within municipality ☐ (2) outside municipality, inside province
- ☐ (3) outside province ☐ (4) outside China
- If (4), what percentage of products (by value) is exported _____ %
- List the major countries: _____
12. **Employment Benefits**
- 12.1 Which year did your enterprise start paying pensions? _____
- Cost of pension: _____
- 12.2 Which year did your enterprise start paying unemployment insurance? _____
- Cost of unemployment insurance: _____
- 12.3 Which year did your enterprise start providing health care insurance? _____
- Cost of health insurance: _____
13. Percentage of waste water generated that is treated: _____
14. From where does your enterprise obtain skills and technology?
- ☐ (1) other firms inside cluster ☐ (2) learning by doing
- ☐ (3) internal R&D ☐ (4) buy information from intermediary firms
- ☐ (5) government ☐ (6) educational institutions
- ☐ (7) business partners* ☐ (8) industry associations
- (*e.g., investor, client, partner)
15. Major difficulties experienced: _____
- _____
- _____
16. Desired policies, programs, or services from local government: _____
- _____
- _____

17. Development history of enterprise

Year	Staff (persons)	Output value (10,000 Yuan)	Investment (10,000 Yuan)	FDI (% of investment)	Land area (μu)
1990					
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					
2000					

Notes

¹ For an overview of China's western development policies, see Lai, H.H., "China's Western Development Program: Its Rationale, Implementation, and Prospects", *Modern China* 28:4, October, pp. 432–66. See also Lui, W. and J. Cai, *Urban Development in Lagging Regions in China*, Washington: EASUR, World Bank, 2001.

² That is, facilitating the transformation of local (in this case, within the municipality) surplus agricultural labor into productive urban workers.

³ For a definition of peri-urbanization, see Webster, D., *On the Edge: Shaping the Future of Peri-Urban East Asia*, Discussion Paper, Stanford: Asia-Pacific Research Center, Stanford University, 2002.

⁴ Webster, D., J. Cai, L. Muller, and B. Luo, *Emerging Third Stage Peri-Urbanization: Functional Specialization in the Hangzhou Peri-Urban Region*, Discussion Paper, Stanford: Asia-Pacific Research Center, Stanford University, 2003.

⁵ For a discussion of "Third Line" policy see Kirkby, R., and T. Cannon, "Introduction" in Goodman, D.S., *China's Regional Development*, London: Routledge, 1989, pp. 7–10.

⁶ Wuhou District, on the southwest edge of Chengdu (now part of the city proper) had more TVEs than any other jurisdiction in western China, and ranked in the top one hundred in China as a whole by the late 1980s.

⁷ Findings from the Hangzhou research are summarized in Webster, Cai, Muller, and Luo (2003).

⁸ For an overview of current development in the Chongqing EUR, see Dolven, B., "Developing The West: Building It—But Will They Come?" *Far Eastern Economic Review*, September 4, 2003, pp. 28–30.

⁹ There are exceptions. For example, leather materials for shoe production are purchased from the coast, because leather tanning is banned for environmental reasons in the Chengdu EUR.

¹⁰ *Hukou* refers to China's domestic residential registration system. Local *hukou* status entitles the holder to a range of public—and particularly social—services, such as access to children's schooling, health care, and pension plans (where they exist) in the locality.

¹¹ Schneider, A., K. Seto, D. Webster, J. Cai, and B. Luo, *Spatial and Temporal Patterns of Urban Dynamics in Chengdu, 1975–2002*, Discussion Paper, Stanford: Asia-Pacific Research Center, Stanford University, 2003.

¹² Recent rapid economic and investment development in Chengdu is described in Zhiling, H. and Z. Yuze, "Golden Ox No. 1 in the West", *China Daily*, September 26, 2003, p. 7.

¹³ Wuhou District and Shangliu County lost total land area between 1995 and 2000 when another hi-tech district was created in the southwest quadrant of the city. No other districts or counties lost or gained any area, and the municipal total remained unchanged. For the sake of simplicity, most of the excluded data was included in the urban core totals, as the southwest hi-tech district, Gaoxin District, is located in Wuhou.

¹⁴ The terminology used in China for submunicipal administrative areas can create confusion when distinguishing between urban and nonurban areas. Counties that surpass certain population density and economic levels are administratively upgraded to a “county-level city” designation. Although the entire administrative area that was formerly a county is now termed a “city”, it is still comprised of urban and nonurban districts, including a dominant urban area where the county seat is located, and which shares the same name as the larger administrative area, a number of smaller townships, and rural districts.

¹⁵ The urban core corresponds to the old city proper, before a major amalgamation occurred in 2001. The five urban districts are Jinjiang, Qingyang, Jinniu, Wuhou, and Chenghua. The Inner Peri-urban area consists of the two newly annexed semi-autonomous districts, Longquanyi to the southeast, and Qingbaijiang to the northeast, and four counties. These are Shuangliu (where the airport is located), Wenjiang, Pixian, and Xindu; combined, they form a complete ring around the core. The Outer Peri-urban is a western band comprising two county-level cities, Dujiangyan and Chongzhou, plus Xinjin County. The rural area comprises Pengzhou City, Qonglai City, Jintang County, Dayi County, and Pujiang County.

¹⁶ For detailed information on Jinniu District, see Xuwen, Z. and Z. Siyuan, “District Sees Rosy Economic Prospects: Jinniu Boasts Cultural Heritage, Ever-Improving Business Climate”, *China Daily*, September 26, 2003, pp. 6–7 (Special Supplement on Jinniu District).

¹⁷ The 4th census was not based on the principle of counting people where they actually live.

¹⁸ In the census, migrants are defined as those who have arrived over the last five years.

¹⁹ Webster, Cai, Muller, and Luo (2003).

²⁰ For a more detailed discussion of peri-urbanization stages, see Webster, Cai, Muller, and Luo (2003).

²¹ The hi-tech district, Gaoxin District, is not included in the submunicipal statistical data, but can be calculated by subtracting the sum total of all the districts and counties and subtracting it from the municipal total. This figure has been included in the urban core total, as most of Gaoxin district is comprised of areas previously included in the urban core district of Wuhou.

²² Calculation based on 2000 census population figures.

²³ Based on disposable income of urban residents and net income of rural residents. For time series data and analysis, see “Rich Man, Poor Man”, *The Economist*, September 27, 2003, pp. 25–6.

²⁴ The primary sector employment share seems suspiciously high given the economic structure of the municipality and the data of labor oriented bureaus, presented in Section 6.2. Chinese academics have debated whether primary sector employees were over-represented in the census survey of employment, or the possibility that migrants responded incorrectly. The 1998 official employment figures, based on *hukou* population, indicate that primary employment shares ranged from 54 percent in the inner peri-urban area to 59 percent in the rural area. Secondary employment figures ranged from 23 percent in the inner peri-urban area to 19 percent in the rural. Because migrants would tend to work in the secondary or tertiary sector, their inclusion in the census employment survey should have produced lower primary sector shares, not higher. Nonetheless, the *hukou* employment data exhibit the same distinctions between the four settlement areas in terms of declining levels of primary and secondary employment from core to rural areas. The sole exception is that, in the *hukou* employment statistics, the outer peri-urban area has a higher share of tertiary employment (24 percent) than the rural (21 percent) or inner peri-urban (22 percent) areas. The 1990–98 employment trends also move in the same direction as the 1990–2000 census employment survey.

²⁵ Calculations are based on the 4th and 5th census employment surveys.

²⁶ This is the sum of the four settlement areas. Although municipal figures are available, they are highly suspect. According to the *Chengdu Statistical Yearbook*, the municipality lost 100,000 ha of cultivated land between 1990–95, only to gain over half back again between 1995 and 2000. There is a large discrepancy (84,000 ha) between the sum of cultivated land in the four settlement areas and the municipal total, and it is unlikely that the loss of cultivated land to hi-tech parks can account for this. At any rate, they would not remain cultivated lands for long.

²⁷ Over 40,000 work in the shoe manufacturing plants. Another 40,000 work in directly linked activities, such as packaging, shipping, and marketing, but not including retailing.

²⁸ According to official data, the tourism sector in Dujiangyan (defined as restaurants, hotels, attractions staff, and taxis) employed 78,000 people in 1998. Current employment in the cluster is estimated to be at least 85,000.

²⁹ Poorly fitting shoes are the prime cause of leg infections and amputations among diabetics.

³⁰ Firm owners claim that they established the association because the local government was not listening to them enough. The district government claims that they encouraged the formation of the association to reduce conflict and encourage cooperation among firms within the cluster.

³¹ Most of shoe firms were started by local entrepreneurs, and they consequently have strong personal ties to the area, similar to the Hangzhou down cluster case.

³² This corresponds to a similar situation in Ayutthaya world heritage area in Bangkok's northern peri-urban area (the closest analogous case), where most workers in the tourism

cluster are locals, but the nearby industrial estate (Rojana) attracts large numbers of migrants.

³³ Schneider, Seto, Webster, Cai, and Luo (2003).

³⁴ There is a need to upgrade housing conditions in inner Chengdu, and a large-scale housing redevelopment program is well under way. Four million square meters of housing within the first ring road are deemed below standard; much of this substandard housing is located in the northeast quadrant.

³⁵ To attract this hi-tech firm, special incentives were offered, namely free land for three years.

³⁶ See the companion discussion paper on Hangzhou (Webster, Cai, Muller, and Luo (2003)) for further detail on the important role that this university plays in supporting technical innovation in China.

³⁷ Based on 5th Population Census China, 2000. The census also puts the urban population in the District at 343,124, the vast majority of which is located in the district center adjacent to the ETDZ.

³⁸ Chongqing is the river/sea navigation and railroad center for the Inner West Region. For details on Chongqing's dominant role in navigation, see Dolven, B., "Yangtze River Rebound", *Far Eastern Economic Review*, September 11, 2003, pp. 32–3.

³⁹ Schneider, Seto, Webster, Cai, and Luo (2003).

⁴⁰ Interview, Land and Resources Bureau, Chengdu Municipality, July 2002.

⁴¹ The effect of hub airports on urban form in East Asia is substantial. For example, major airports generate forces that can rival central business districts in economic and demographic impacts. It is estimated that Jakarta's new airport resulted in a net shift of one million people to its southwest location. In Thailand, impact studies for the new Bangkok International Airport indicate that it will create a net shift of 600,000 people from the northern corridor to the eastern corridor over a period of twenty years.

⁴² For more details, see Chengdu National Hi-Tech West Zone District, *Chengdu National Hi-Tech West Zone*, undated.

⁴³ Information source (this paragraph): Presentation by Chengdu Municipal Planning Commission to CDS (City Development Strategy Workshop), Chengdu, March 5, 2003.

⁴⁴ A total of 152 employee interviews were conducted: 60 in the ETDZ, 48 in the shoe cluster, and 44 in the tourism cluster.

⁴⁵ Chain migration refers to the follow-on migration of residents of the same hometown who learn of job opportunities in the destination city (often in the same firm) from friends and relatives who have migrated ahead of them.

⁴⁶ Most SOE workers have held their present position longer than those in the private sector, which affects the comparability of the data.

⁴⁷ There is a spatial differentiation in *hukou* criteria—it is much more difficult to obtain an urban *hukou* than a rural one. Within the urban category, it is more difficult to obtain a *hukou* for the municipal city proper than for a district or county-level city. Further, regulations are more strict in coastal areas, such as Hangzhou, than in western areas, such as Chengdu.

⁴⁸ Data Source: Interview, Social Bureau Comprehensive Department, Municipality of Chengdu, July 2002.

⁴⁹ Schneider, Seto, Webster, Cai, and Luo (2003).

⁵⁰ Schneider, Seto, Webster, Cai, and Luo (2003).

⁵¹ Schneider, Seto, Webster, Cai, and Luo (2003).

⁵² An increase of 880,000 over the current population.

⁵³ Based on Powerpoint presentation at Chengdu Municipality City Development Strategy Workshop by Chengdu Municipal Planning Bureau, March 5, 2003. (Sponsored by Chengdu Municipality and the World Bank.)

⁵⁴ Schneider, Seto, Webster, Cai, and Luo (2003).

⁵⁵ This data is of the same order of magnitude as data presented in Section 3.3, but differs somewhat (not unexpectedly), given that it comes from different data sets (Municipal Labor and Social Security Bureau and Municipal Employment Service Administrative Bureau.)

⁵⁶ Interestingly, the Chongqing EUR, at the other end of the Chengdu–Chongqing cluster, is also growing mainly to the west. There, however, official plans are aligned with this dynamic. A Western Development Corridor has been designated, and it is receiving special support, through World Bank programs, in the western peri-urban area of Chongqing.

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