



Economic transition, industrial location and corporate networks: Remaking the Sunan Model in Wuxi City, China



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A B S T R A C T

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This research investigates the transition of the Sunan model, which was centered on local-state directed township and village enterprises (TVEs), through a case study of Wuxi City. Based on questionnaire surveys and firm/government interviews, we have found that Wuxi has been undergoing a series of institutional changes, economic transition and spatial restructuring. TVEs have been replaced by domestic private enterprises and to a lesser extent, foreign-invested enterprises (FIEs). However, in comparison with Suzhou, a leading city in Sunan (southern Jiangsu) where FIEs are a major driving force of economic restructuring, domestic capital and private firms have played a more important role in Wuxi. It is found that domestic firms in Wuxi have their own local production networks, rather than forming networks with FIEs. Moreover, local governments remain a key agent of economic transition and firm (re) location. The case of Wuxi highlights the multiple trajectories of remaking the Sunan model, the strong hand of local states, and the uneven process of economic development.

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Introduction

China's economic development is spatially uneven, largely driven by coastal city regions and the interplay of state, global capital and local agents (Wei, 2002a). Sunan, the Pearl River Delta (PRD) and Wenzhou models represent regional development trajectories in China during the early stages of reform in the 1980s (e.g., Fan, 1995; Liu, 1992; Ma & Cui, 2002; Oi, 1995). The Sunan model attributes the development of Sunan (Southern Jiangsu) to the local-state directed township and village enterprises (TVEs). Its success is credited to local-state corporatism and development/urbanization from below (Ma & Fan, 1994; Oi, 1995; Wei, 2002b), echoing the orthodox industrial districts and emphasizing local assets and institutions (Scott, 1988).

However since the early 1990s, with deepening reforms Sunan has moved "beyond the Sunan model" through privatization and the infusion of global capital. Scholars have challenged the orthodox notions of development models in China (Lu & Wei, 2007; Wei, 2002b; Ye & Wei, 2005), and have proposed alternative models of

development incorporating global and local forces (Wei, Liefner, & Miao, 2011). These studies echo the recent literature that questioned the relevance of orthodox models of industrial districts and regional development (Hadjimichalis, 2006; Whitford, 2001), and called for "globalizing" and "scaling up" regional development (Coe, Hess, Yeung, Dicken, & Henderson, 2004; Lin, 2009; Wei, Li, & Wang, 2007; Yeung, 2009).

While these researches have advanced our understanding of the restructuring of the Sunan model, studies are mainly based on the experiences of Suzhou whose restructuring process is heavily driven by globalization and the influx of FDI (Chien, 2007; Wang & Lee, 2007; Wei, 2002b; Wei et al., 2011, 2013). With few exceptions (e.g., Chou, Ching, Fan, & Chang, 2011; Wei & Gu, 2010), little attention has been paid to the role of domestic firms and local capital in the restructuring of the Sunan model. Although FDI has become a decisive dynamic of economic restructuring in Sunan, studies might have overemphasized exogenous factors and the notion of strategic coupling in regional development (Wei & Liao, 2013).

In this regard, a middle ground approach that incorporates a triple process of China's economic transition, namely globalization, marketization and decentralization, can help to gain a better sense of development dynamics in China and the restructuring of the Sunan model in particular. Moreover, the literature has also paid little attention to the spatial process of the restructuring of the

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Sunan model due to the limitations of data. Recent research has recognized the need for such studies, and has paid more attention to industrial locations at the intra-urban level (e.g., Yang & Liao, 2010).

This study draws upon the case of Wuxi City, a historical core of the Shanghai-centered Yangtze River Delta (YRD) and a prototype of the Sunan model. This paper investigates economic restructuring and industrial development in Wuxi. It aims to better understand variegated pathways to remaking the Sunan model that may not be driven mainly by FDI. Wuxi was also selected because since the 1980s, Wuxi has become a leading economic center in the YRD, which is probably the largest global city region in the world. In addition, while Sunan typically includes Suzhou, Wuxi, and Changzhou municipalities, the development of Wuxi has largely escaped scholarly investigation.

This study is mainly based on firm level data, a questionnaire survey in 2009 and dozens of interviews undertaken in Wuxi in 2008–2011. The firm level data were compiled from the Second Industry Census (1985), and the First (2004) and Second Economic Census (2008) conducted by the National Bureau of Statistics of China. We geo-coded the firms and then conducted spatial analysis to explore location and relocation of industrial enterprises, taking the Nanchang District, a central urban district in Wuxi, as a specific case. Between 2008 and 2011, we interviewed dozens of government officials and senior managers in manufacturing firms. We first interviewed officials and managers at the municipal, district, and development zone levels. Then we selected about a dozen of the firms for in-depth interviews, with an emphasis on location strategy, R&D activities, and network relations.

Based on the first round of interviews in 2008, we conducted a questionnaire survey in the Nanchang District in 2009. Our sample size was 276 firms, which were pre-determined from the business directory provided by the local government. We delivered a cover letter and a survey questionnaire to a senior manager of each firm, and the survey generated a total of 60 usable returns (68 returned). Blending evidence from both quantitative analysis and firm interviews has allowed a comprehensive understanding of the remaking of the Sunan model in Wuxi.

Research background and conceptual framework

Trajectories and mechanisms of regional development in the context of globalization have generated considerable scholarly discussion (Coe et al., 2004; Lin, 2009; Pike, Rodríguez-Pose, & Tomaney, 2006; Wei, 2002b; Yang, 2009). Scholars have questioned the literature on industrial districts for its narrow focus on local institutions and networks, as well as the neglect of globalization and the role of large firms (Hadjimichalis, 2006; Wei et al., 2007; Whitford, 2001). Amin and Thrift (1992) proposed the notion of a “neo-Marshallian industrial district”, which highlighted the impact of global corporate networks on industrial districts. Markusen (1996) classified four types of industrial districts: Marshallian, hub-and-spoke, satellite, and state-anchored districts. The “high road” strategy centered on globalization and innovation is central to the restructuring and upgrading of industrial districts (Eraydin, 2001; Martin & Sunley, 2006).

In recent years, scholars have called for a global production network (GPN) perspective that focuses on the dynamic strategic coupling of global production networks and regional assets (Coe et al., 2004). The GPN perspective or approach has enhanced our understanding of the dynamics of firm networks and global–local relations, and provides a powerful interpretation of the rise of industrial production in East Asia (Yeung, 2009). However, the GPN approach also has limitations for overemphasizing global or extraregional processes and leaving specific geographical contexts

in a vacuum. China’s development trajectories do not totally follow Western experiences because of the transitional economy and rapid urbanization, as well as the huge domestic market (Wei et al., 2011; Zhou, Sun, Wei, & Lin, 2011).

Firm location exerts profound impact on the geographical distribution of economic activities, and scholars argue for studying regions by studying firms (Markusen, 1994). From the perspective of classical and neo-classical location theories, firm location is determined exogenously, and is deemed to have “location functions” to choose the optimal place where production will yield maximum profits. Factors such as land availability, tax and tariff, market size, etc. are typically considered in location analysis. In recent years, globalization and the development of technology have prompted scholars to develop institutional and evolutionary perspectives, with concepts such as “embeddedness”, “institutional thickness”, “relationship assets”, “untraded interdependence” and “firm–region nexus” to understand industrial location and social–spatial relations (Amin & Thrift, 1994; Asheim, 2000; Dicken & Malmberg, 2001; MacKinnon, 2012; Storper, 1995).

In this study, we emphasize the role of the institutional change in urban and regional development and argue for a triple-process (namely, decentralization, globalization and marketization) approach, which captures the essential process of China’s reforms, to study firm location and the restructuring of urban and regional economies in China (He, Wei, & Xie, 2008; Wei, 2002a; Wei, Yuan, & Liao, 2013). It has been found that development zones, agglomeration economies, land availability, and urban structure have significant influences on firm location and urban development (Wei et al., 2013).

First, China’s reform initially emphasized the decentralization process, which refers to the shift of power from the central to local governments. Decentralization is a global phenomenon and is pervasive and still in full swing (Rodríguez-Pose & Sandall, 2008). In socialist countries, decentralization is a response to over centralization of socialism. It endows local governments with more autonomy and more responsibility to develop local economies, and encourage local governments to actively promote economic growth, especially in China (Walder, 1995). Local governments influence firms’ location decisions through the vehicles of financial incentives, industrial infrastructures, and open door policies, largely through the establishment of development zones (Wei et al., 2007; Yang & Wang, 2008). Meanwhile, as the conflict between resource utilization and environment protection intensifies, local governments are usually forced to adjust industrial distribution. However, decentralization does not radically change state-market and domestic–international relations and local contexts of development (Thun, 2004).

Second, globalization highlights China’s open door policy and its integration into the global economy. Attracting foreign investment has become a major policy objective in Chinese cities since the opening up of four special economic zones and 14 coastal cities in the early 1980s. China has become the largest recipient of FDI in the developing world, facilitated by global relocation of manufacturing to developing countries. However, evidences are overwhelming that FDI is spatially uneven and tends to be concentrated in most globalized core city regions of developing countries (Dicken, 2011). FDI in China is unevenly distributed and heavily concentrated in coastal cities (Huang & Wei, 2011). Their location decisions may differ from those of domestic firms, which lead to weak embeddedness and spatial mismatch pattern between foreign and domestic firms (Wei et al., 2013). This phenomenon limits spillovers from foreign firms to local economies (Wei & Liao, 2013). Given the relatively interior location of Wuxi in the YRD, we expect less influence of foreign-invested enterprises (FIEs) in economic development and weak linkages between foreign and domestic firms.

Third, marketization has introduced market forces in location decisions of firms, especially since the early 1990s when China deepened market reforms. Although officially a socialist market economy, China's economy has become predominantly market oriented (Naughton, 2011). The market force is increasingly influencing firm behaviors, especially in more open coastal economies like Sunan. As a market player, the firm must take costs and profits into account when making locational decisions. Costs of labor and transportation are considered the most important factors, which can be traced back to Weber's industrial location theory. Hence, such factors as distance to city center, accessibility, land price, labor cost, and infrastructure exert an important influence on locational choice of firms (He et al., 2008; Wei et al., 2013).

Last, this triple transition is closely interconnected and is sensitive to local conditions as well. Local governments' policy objectives toward upgrading may prompt relocation of industrial firms, in order to reduce the pollution in city core areas and support the development of tertiary industries. This process is increasingly prevalent in the largest Chinese cities and also pushes firms toward technological innovation and structure adjustment (Hu, Zhou, & Gu, 2000). Moreover, with a huge domestic market and further marketization, going regional and national (not solely global) is an important strategy for firm growth in China (Wei et al., 2007). For instance, while many firms in the YRD are FIEs producing for other FIEs, especially in Suzhou (Wei et al., 2011), the YRD and China's domestic market do provide opportunities for local firms in less globalized cities like Wuxi.

Development process and economic restructuring

The Sunan region is also coined as Su (Zhou)-(Wu) Xi-Chang (Zhou) region. Wuxi is located between Suzhou and Changzhou, north to the Taihu Lake. In 2009, the municipality had a population of 4.64 million and a land area of 4787 km², including 6 city districts (Nanchang, Chong'an, Beitang, Binhu, Xishan, and Huishan) and 2 county-level cities (Jiangyin and Yixing) (Fig. 1).

Wuxi is an ancient city and one of the earliest economic centers of China, which can be traced back to the Zhou Dynasty (1300 B.C.). With the construction of the Grand Canal in the Sui Dynasty (581–618 A.D.), Wuxi became a trade center for textiles, clothing and

agricultural products, especially rice. Late in the Qing dynasty (1644–1911), numerous Wuxi natives served as compradors at Shanghai, and attained considerable industrial, commercial and market relations experience. Some comprador-capitalists returned to Wuxi to set up modern factories, mainly in light industries such as textiles and food processing industries, which marked the beginning of the development of China's modern industries. For example, the Rong family in Wuxi was known for their yarn factories and flour processing. Prior to the Anti-Japanese War, industry in Wuxi reached its peak. Wuxi ranked as one of the 6 largest industrial cities in China, along with Shanghai, Tianjin, Wuhan, Guangzhou, and Qingdao. In 1937, the number of manufacturing workers in Wuxi was more than 60,000, second only to Shanghai; its total industrial output was 77,260,000 yuan, ranking it third in China (Editorial Committee, 2006). In fact, before 1949 several rounds of urban planning had been made for Wuxi, which gave considerable attention to industrial location; they were not implemented effectively mainly because of restrictions in financial resources and the interruption of wars.

After the founding of Socialism in 1949, Wuxi's status as a national industrial center began to decline, although under the ideology of a socialist planned economy, Wuxi was considered an industrial city. None of the 156 key projects financed by the Soviet Union during the first five-year plan period (1953–1957) was located in Wuxi. In the 1950s and 1960s, Wuxi mainly produced in the heavy industries including machinery, metallurgy, and chemical industries, which accounted for 41% of industrial output in Wuxi in 1976 (Editorial Committee, 1995).

From the late 1970s to the 1980s, while private firms were still prohibited, TVEs in Wuxi captured opportunities provided by economic reforms and became the dominant sector in rural economies. The 1982 plan proposed that Wuxi should form 5 integrated industrial zones (Nanmen, Dongmen, Xichenglu, Shanbei, and Dayunhe) to accelerate industrialization (Fig. 2). In 1984, Qianzhou Town in Wuxi County became the first town in China with an industrial output of 100 million yuan. Half of the 100 million-yuan-plus towns in Jiangsu Province were located in Wuxi, making Wuxi a prototype of the Sunan model. Consequently, TVEs produced about two-thirds of the industrial output in Wuxi in 1992 (Editorial Committee, 1995). The development of TVEs aimed at

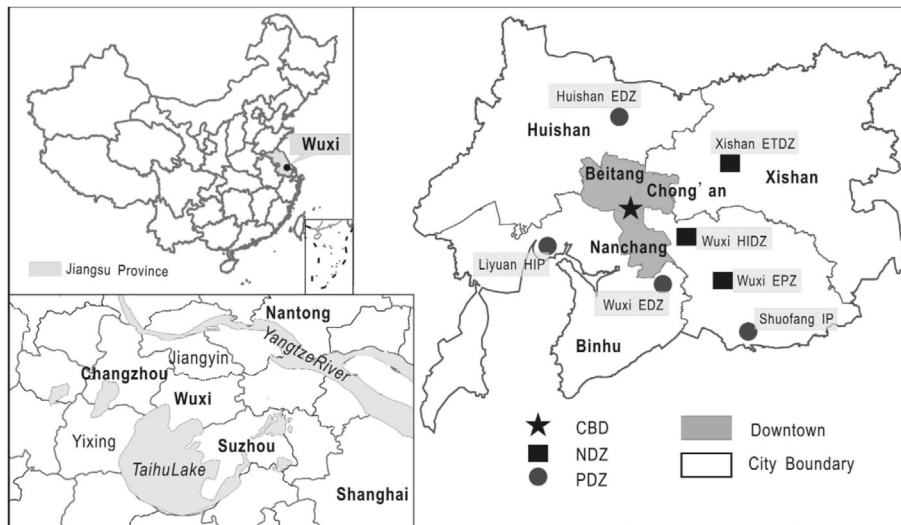


Fig. 1. The location of Wuxi and its Nanchang district. Note: CBD = central business district; NDZ = national level development zone; PDZ = provincial level development zone; Wuxi HIDZ = Wuxi High-tech Industrial Development Zone; Xishan ETDZ = Xishan Economic and Technological Development Zone; Wuxi EPZ = Wuxi Export Processing Zone; Liyuan HIP = Liyuan High-tech Industrial Park; Wuxi EDZ = Wuxi Economic Development Zone; Huishan EDZ = Huishan Economic Development Zone; Shuofang IP = Shuofang Industrial Park.

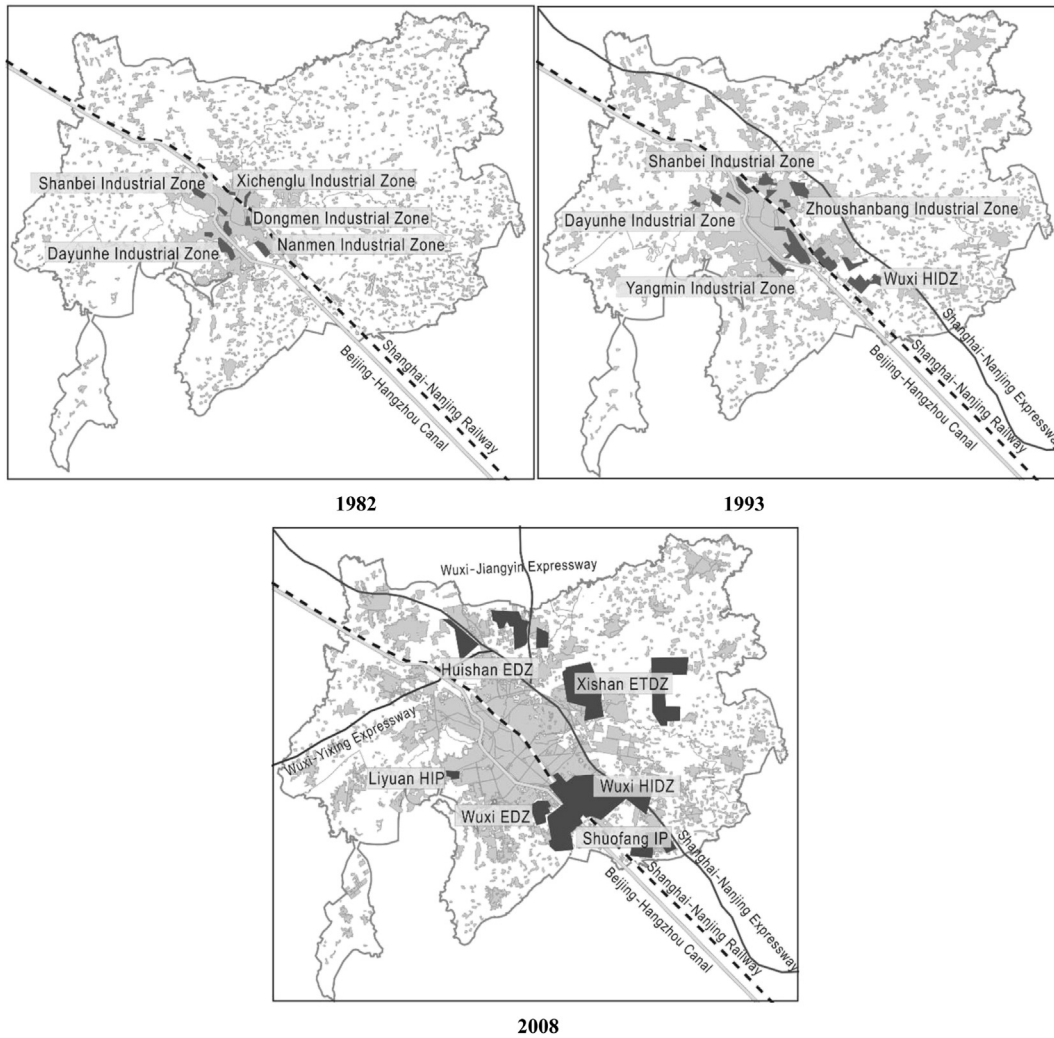


Fig. 2. Urban land expansion and industrial layout of Wuxi in 1982, 1993 and 2008.

meeting the demand of people's daily needs and state owned enterprises (SOEs). So the majority of TVEs was labor-intensive industries such as textiles and mechanics. In 1990 the industrial output of textiles, garment and mechanics accounted for 51% of Wuxi's total output; and the metallurgy industry 10% (Fig. 3).

The economy of Wuxi has since experienced dramatic restructuring, and the most rapid growth has taken place in private and foreign enterprises. With deepening market reforms in the early 1990s, TVEs' collective ownership resulted in corruption and deterioration in profitability, and failed to compete with foreign and private firms (Wei, 2004). By the late 1990s most TVEs had been shut down or transformed into private- or joint-ownership firms (Wei, 2002b). As shown in Table 1, the proportion of collective firms in total industrial output plummeted from 23.6% in 2000 to 10.7% in 2008, while that of foreign firms and private firms rose from 16.3% and 25.9% in 2000 to 39.1% and 32.7% in 2008 respectively (Table 1). The industrial structure has also shifted toward electronics and equipment manufacturing (Fig. 3).

Our fieldwork leads us to conclude that three major factors contributed to the failure of TVEs. First, numerous labor-intensive TVEs went bankrupt due to vague property rights, small size, backward technology, and poor productivity. By the late 1990s, nearly 40% of TVEs in Wuxi had gone bankrupt. Second, some TVEs were privatized and transformed to high-tech enterprises.

For example, Jiangsu Xinfang Group, a former village-owned chemical firm at Yangming Town, which was also the first enterprise with over 120 million-yuan output in suburban Wuxi, was transformed to produce new chemical fiber materials. Third, the municipal government began to strictly control enterprise entries, and target the development of high-tech industries. New industrial clusters emerged in the southeastern and eastern parts of Wuxi where three national level development zones including Wuxi High-tech Industrial Development Zone (Wuxi HIDZ), Xishan Economic and Technological Development Zone (Xishan ETDZ) and Wuxi Export Processing Zone (Wuxi EPZ) were located (Table 2). All of these zones aimed to attract high-tech enterprises rather than labor-intensive TVEs. In particular, since the early 2000s, Wuxi has adopted a more ambitious strategy to promote high-tech industrial development, centered on Wuxi HIDZ. Table 2 shows that between 2002 and 2006, three new development zones were built with a total land area of 12.71 km², which is equivalent to the total land area that was converted into development zones in Wuxi's history.

The evolving industrial layout suggests that development strategies of focusing on development zones and high-tech industries are similar to many other Chinese cities. Nevertheless, as one of the cradles of China's national industry and TVEs, the domestic sector has become more influential in Wuxi's economic transition. Table 3 shows that total exports from Wuxi was only one fifth of that in

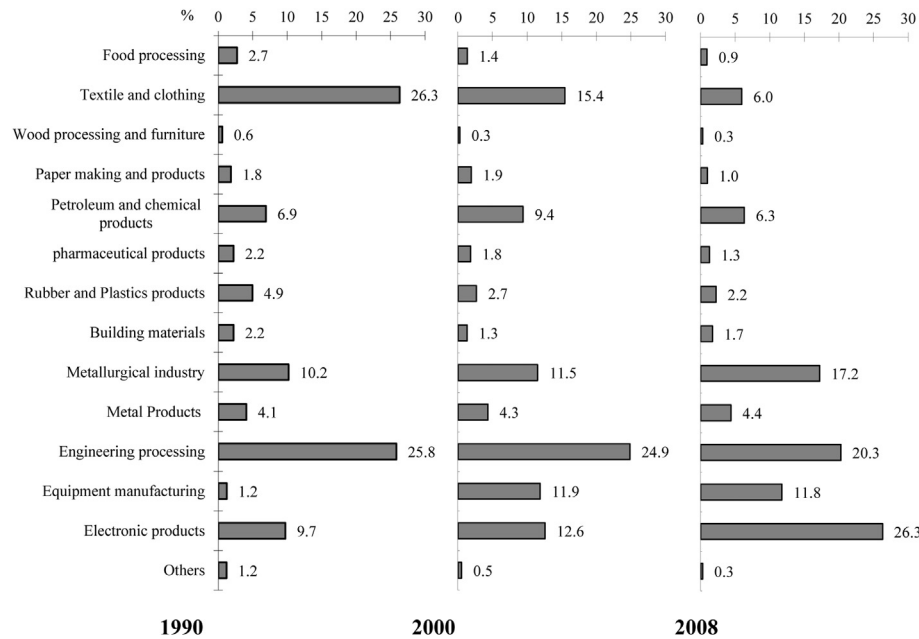


Fig. 3. Proportion of different industries in total industrial output in 1990, 2000 and 2008.

Source: Compiled from JBS (1991, 2001, 2009), WBS (1991, 2001, 2005, 2009) and YBS (1991, 2001, 2009).

Table 1

A comparison of Wuxi GOVI by ownership form in 2000, 2004 and 2008, in billion yuan.

Ownership form	2000		2004		2008	
	GOVI ^a	%	GOVI	%	GOVI	%
State-Owned Firm	23.08	8.09	33.97	5.97	34.03	3.31
Collective-Owned Firm	67.29	23.58	82.53	14.50	109.61	10.66
Share-Holding Cooperatives	40.74	14.28	41.62	7.31	13.85	1.35
Joint-ownership firm	—	—	—	—	0.22	0.02
Limited liability corporation	31.01	10.87	132.24	23.24	88.24	8.58
Share-Holding Firm	—	—	—	—	43.56	4.24
Private Firm	73.90	25.87	137.64	24.19	336.11	32.69
Foreign-invested firm	46.44	16.27	140.97	24.78	401.81	39.08
Other Firms	3.00	1.05	—	—	0.73	0.07
Total	285.35	100.00	568.97	100.00	1028.17	100.00

Notes: There were only combined data available for limited liability companies and share-holding firm, in 2000 and 2004; “—” means no data.

^a GOVI: Gross out value of industry.

Source: WBS (1991, 2001, 2005, 2009).

Shanghai. The ratio of exports to GDP was 0.55 in 2008, which was much lower than Suzhou (1.34), another leading city in Sunan. The total number of FIEs in Wuxi was one third that of Shanghai and its FDI per capita was only half of Suzhou. In short, economic transition

Table 2

Major development zones in Wuxi City, 2008.

Level	National		Provincial			
	Wuxi HIDZ (including Wuxi EPZ)	Xishan ETDZ	Liyuan HIP	Huishan EDZ	Shuofang IP	Wuxi EDZ
Year opened	1992	1993	1993	2002	2006	2006
Jurisdiction area (km ²)	5.45	9.2	2.5	5.337	4.53	2.84
GDP (billion Yuan)	70.80	16.00	5.70	3.31	5.89	4.40
General financial revenue (billion Yuan)	14.41	3.05	0.77	0.84	0.72	0.71
Local taxation (billion Yuan)	6.10	1.14	0.40	0.54	0.31	0.28
Total volume of foreign trade (billion dollar)	30.85	2.00	0.39	0.30	0.13	0.28
Accumulated realized FDI (billion dollar)	10.00	2.36	0.40	0.28	0.17	0.12
Number of foreign-invested firms	711	621	171	151	102	55

Notes: Wuxi HIDZ = Wuxi High-tech Industrial Development Zone; Wuxi EPZ = Wuxi Export Processing Zone; Xishan ETDZ = Xishan Economic and Technological Development Zone; Liyuan HIP = Liyuan High-tech Industrial Park; Huishan EDZ = Huishan Economic Development Zone; Shuofang IP = Shuofang Industrial Park; Wuxi EDZ = Wuxi Economic Development Zone.

Source: Compiled according to Wuxi interviews.

in Wuxi is less influenced by FDI; domestic firms and capital have played a more important role in Wuxi's development, which is also highlighted by local government officials we interviewed.

Influenced by the global financial crisis, the export growth of Wuxi gradually slowed down and even decreased. The total export increased by 35.5% in 2007 but declined by 26.9% in 2009. The municipal government initiated a series of policies to cope with the crisis, including supporting for export, stimulating domestic market especially by investing in infrastructure, and enhancing innovation.

Profile of surveyed firms

To better understand the process of remaking the Sunan model, we conducted a survey of industrial enterprises in the Nanchang District in Wuxi. The surveyed firms were mostly established after 1997 (80.0%) and only four firms can be traced back to 1992 (Table 4), which reminded us that during economic transition most TVEs in the Nanchang District went bankrupt and current manufacturing firms were mainly established after the TVE property rights reform in 1997.

The surveyed firms were generally small in size. Only 27.7% of firms had an investment of over 25 million yuan, and a substantial proportion of firms had investments of 1–25 million yuan. In terms

Table 3
Profiles of Shanghai, Nanjing, Hangzhou, Suzhou, Wuxi and Changzhou in 2008.

Municipality	Shanghai	Nanjing	Hangzhou	Suzhou	Wuxi	Changzhou
Administrative area (km ²)	6340	6582	16,596	8488	4787	4375
Population (million)	18.88	7.58	7.97	9.13	6.11	4.41
GDP (billion Yuan)	1370	378	478	670	442	220
GDP per capital (Yuan)	72,564	49,868	59,975	73,384	72,340	49,887
Exports (billion dollar)	169.3	23.6	33.6	131.7	35.8	13.2
Exports per capital (dollar)	8967	3113	4216	14,425	5859	2993
FDI (billion dollar)	10.1	2.3	6.23	8.1	3.2	2.0
FDI per capital (dollar)	535	303	782	887	524	454

Source: RCCJD (2009).

of employment, total employees of surveyed firms were quite even, and the majority of firms had less than 100 employees. However, the revenue of surveyed firms was up to 3.76 million yuan per acre, higher than the average in Wuxi. This indicates that the Nanchang District, as a central city district of Wuxi, has limited land to develop and is restricted by higher land redevelopment costs. It was unable to provide sufficient land to large firms at low prices. Therefore, manufacturing firms developed in the Nanchang District are those with high land use efficiency.

In terms of ownership, although it has diversity in ownership structure, Nanchang is different from Suzhou, which is known for FDI-driven development (Wei, 2002b; Wei et al., 2011). Firms in Nanchang are mainly local, and 79.3% of surveyed firms locate their headquarters in Wuxi and only a few in Japan, Hong Kong, Beijing or Shenzhen. Official statistics also show that in 1985, 63% of manufacturing firms in Nanchang were collectively owned. Since 1997 Nanchang has promoted joint-venture partnerships, property leasing and privatization. As a result, ownership became more diversified. The survey captured this change in detail: 68.3% of the surveyed firms were private-owned, followed by share-holding firms (11.7%) and Sino-foreign joint ventures (11.7%). None of the surveyed firms was state-owned and only one was collectively owned, showing a diversified ownership compared to the dominance of collectively-owned TVEs in the orthodox Sunan Model.

Table 4
Profile of surveyed firms in Nanchang district.

Category	#	%	
Year Established	Before 1992	4	6.7
	1992–1996	8	13.3
	1997–2000	10	16.7
	After 2000	38	63.3
Ownership Form	Collectively-owned Firm	1	1.7
	Share-holding Firm	7	11.7
	Private Firm	41	68.3
	Sino-foreign joint venture	7	11.7
Headquarters	Wholly Foreign-owned Firm	4	6.7
	Japan	3	10.3
	Hong Kong	1	3.5
	Beijing	1	3.5
Asset (RMB million)	Shenzhen	1	3.5
	Wuxi	23	79.3
	<1	3	6.4
	1–5	14	29.8
	5–10	5	10.6
Employee (persons)	10–25	12	25.5
	>25	13	27.7
	0–20	13	22.8
	20–50	18	31.6
	50–100	11	19.3
Profit Margin (%)	>100	15	26.3
	>10	14	23.7
	5–10	17	28.8
	0–5	20	33.9
<0	8	13.6	

Source: Nanchang firms survey.

Industrial location and relocation

The surveyed firms were asked to rank the most important factors for which they chose Wuxi, and the Nanchang District as their firm location. We found that one of the most important factors underlying firm location decisions in Nanchang was development zones; 59.3% of surveyed firms chose locating in developing zones as the most important factor (Table 5). Proximity to the city center, investment incentives, attitude/efficiency of government, and firm agglomeration are also significant factors (Table 5). These suggest the significance of institutions and agglomeration economies in location decisions. Interestingly, for reasons of investing in Wuxi, market potential and location are the most important factors while the effect of incentive policies is a minor factor. These findings suggest that the development in Wuxi is domestically oriented, spatially clustered, and institutionally driven.

Intentional guidance by the government was a major reason that firms clustered in Nanchang's Yangming Industrial Zone. In the interviews, some firm managers even said they were required or suggested by the government to locate in Yangming Industrial Zone. Local governments also intended to nurture high-tech firm clusters. For example, Guosheng is a leading firm in the precision mold industry in China. After it located in the zone, the government

Table 5
Location decision factors of surveyed firms.

Located in Wuxi City	# ^a (%)	Located in Nanchang district	# (%)
<i>Local states/infrastructure</i>		<i>Local states/infrastructure</i>	
Better infrastructure	19 (36.5)	Development zone	32 (59.3)
Better attitude/efficient government	9 (17.3)	Better investment incentives	18 (33.3)
Better investment incentives	8 (15.4)	Better attitude/efficient government	17 (31.5)
Better urban amenities	7 (13.5)	Better urban amenities	10 (18.5)
University and research institute	2 (3.9)	Government requirement or suggestion	2 (3.7)
<i>Location and market access</i>		<i>Location and market access</i>	
Founder's hometown or former place of employment	36 (69.2)	Close to city center	24 (44.4)
Better local/regional market potential	30 (57.7)	Agglomeration of similar firm	16 (29.6)
Better regional location	26 (50.0)	Lower land cost	15 (27.8)
Location of major customers	18 (34.6)	Close to freeway exits	15 (27.8)
Agglomeration of similar firm	17 (32.7)	Close to airport	14 (25.9)
		Close to railway Station	4 (7.4)
<i>Labor and suppliers</i>			
Better access to local/regional suppliers	16 (30.8)		
Better availability of managerial talent	7 (13.5)		
Lower labor cost	7 (13.5)		

^a Note: The score is based on the number of surveyed firms which chose the location decision factor.

Source: Nanchang firms survey.

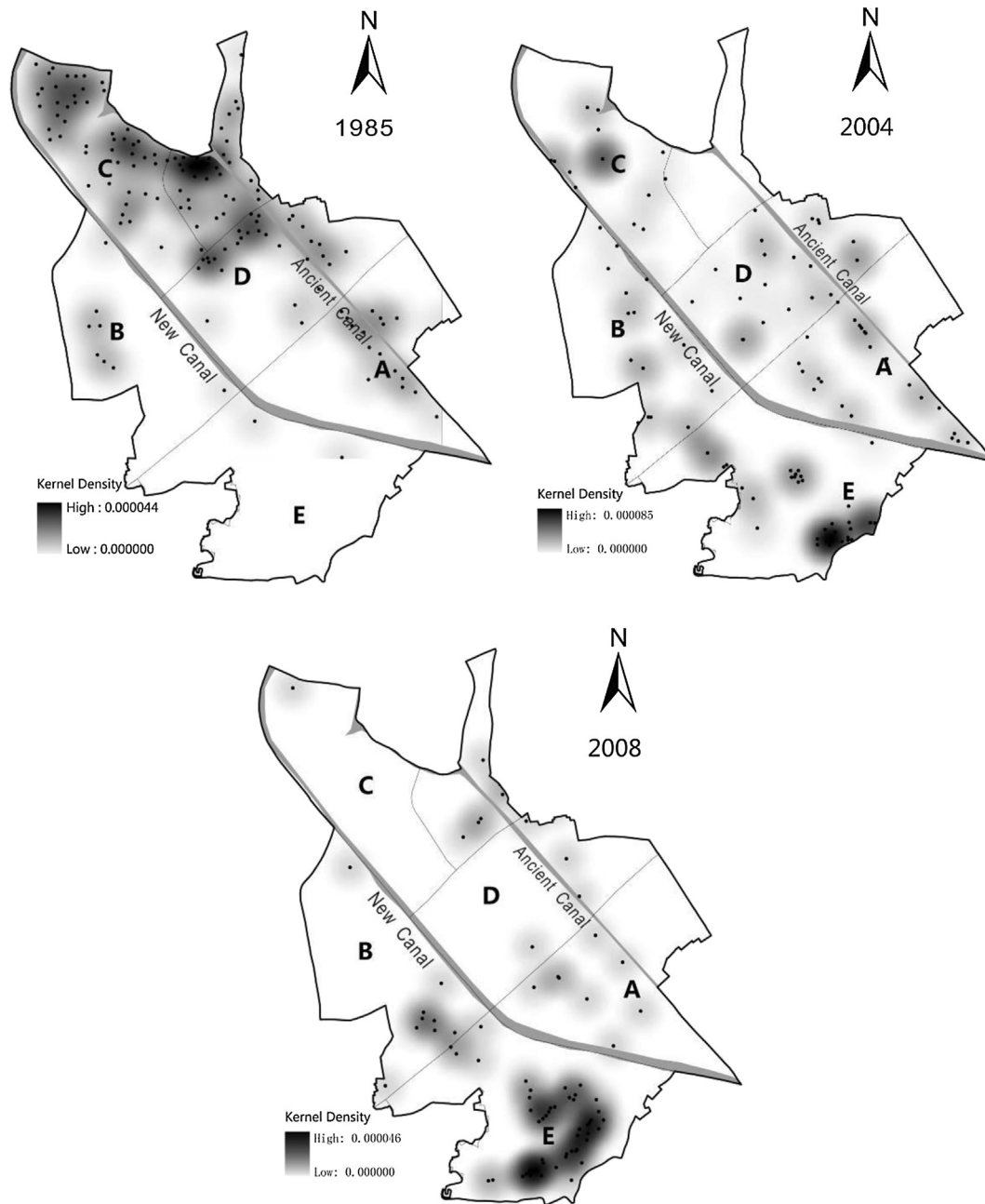


Fig. 4. Kernel estimation for manufacturing firms in Nanchang District in 1985, 2004 and 2008. A: Nanmen Industrial Zone; B: Zhongqiao Industrial Zone; C: Jiankanglu Industrial Zone; D: Yangming town; E: Yangming Industrial Zone.

recruited firms in the same industry to initialize industrial agglomeration. Another important factor was that Wuxi is the hometown or former place of employment of almost 70% of firm founders, which further confirmed the local nature of the surveyed firms.

We used Kernel density estimation to investigate spatial distribution of manufacturing firms in the Nanchang District (Fig. 4). In 1985, manufacturing firms mainly clustered along the Grand Canal in four groups, including Nanmen Industrial Zone (A), Zhongqiao Industrial Zone (B), Jiankanglu Industrial Zone (C), and Yangming Town (D). Industrial Zones (A)–(C) were planned as the industrial centers in Wuxi after liberation with SOEs by the majority. In the late 1970s TVEs emerged in Yangming Town. From 1985 to 2004, industries became dispersed along both sides of the new canal, while the original Industrial Zones (A)–(D) played a less important

role in industrial distribution. The area along the new canal became a new industrial clustering zone especially Yangming Industrial Zone (D). The original industrial zones were close to the central area and were gradually merged into the urban area as the city expanded. The area along the new canal was made of predominantly suburban districts with relatively sufficient space for industrial development. By 2008, except for some machinery firms still in the Nanmen Industrial Zone (A), other manufacturing firms basically clustered in Yangming Industrial Zone, which has rapidly expanded.

The interviews also found that given the rising rentals and insufficient industrial land supply in the central city of Wuxi, many industrial enterprises have been relocating from the central city to suburban areas where development zones are concentrated. Our interview of Wuxi municipal government revealed that one reason

why the government wanted to encourage industrial enterprises to move to suburban areas is to develop the urban land market. The land left by relocated firms was mostly used for real estate and service industry development. For instance, after the relocation of Wuxi Compressor Factory, Nanxiatang N1955 Creative Industrial Park was established to develop creative cultural industries. Besides, the pressure from environmental protection, especially after the Taihu Lake water crisis in 2007, forced the government to intensify its relocation of polluting firms, which led to the relocation of many firms to the Xishan and Huishan districts in northern Wuxi far away from the Taihu Lake.

Policies such as “moving out of the CBD and entering industrial zones” have also facilitated industrial relocation. Before the implementation of this policy in 2005, the Nanchang government had encouraged industrial enterprises to relocate in Yangming Industrial Zone to change the dispersed distribution of firms in the traditional Sunan Model. Our interview found that local governments have provided some incentives including financial incentives like tax compensation and reduction of misc. fees to motivate industrial enterprises to relocate to development zones in suburban areas. Our interviews with development zone officials further found that, since many firms in the central city are of good economic returns, in order to attract these firms to locate in their zones, they worked with those enterprises that had already planned to move out of the central city. Through interactions between the governments of central and suburban districts, suburban industrial zones succeeded in attracting the firms previously located in city centers.

At the end of 2009, another 59 firms had signed relocation agreements, among which 43 had previously relocated some of their production facilities to the suburban development zones. More specifically, of the 40 relocated firms we checked, most moved to development zones in Xishan and Huishan districts, while four high-tech firms relocated to Yangming Industrial Zone (Fig. 5). Only two moved out of Wuxi to cities in Northern Jiangsu, a lagging region in the province. Although cities in northern Jiangsu have provided cheaper land, manufacturing enterprises in Wuxi still favor suburban areas in the city given their localized production and supply networks. Consequently, over 70 firms in textiles, metallurgy, machinery and chemical industries relocated to development zones in suburban areas.

In addition, to offset the fiscal loss due to the global financial crisis, a municipal development zone was developed in North Huishan District to relocate the traditional industries from the central city. Those firms which did meet the investment requirements of national and provincial development zones were relocated to the municipal development zone. Therefore, our

investigation has partly confirmed the importance of the government, agglomeration economies and geography in firm relocation.

Corporate networks and R&D activities

Production linkage is the key component of network configuration. Firms in the Nanchang District have their own local networks. We found that importing materials and components were not significant in their total purchase (Table 6), although a high share can be found from purchase of key components. This partly reflected the local nature of surveyed firms, most of which were locally funded private enterprises. While the firms had broad supply bases, the majority of supply linkages was within Wuxi, which accounted for 24.1% of equipment, 38.7% of material and 30.6% of key component supplies. The importance of localized supply chains was obvious for the surveyed firms. They also tend to purchase from other firms in the YRD, which accounted for 60–85% of their total purchase. Similar to what have been found in Suzhou (Wei et al., 2011, Wei, Zhou, Sun, & Lin, 2012), a network of production has formed in the Yangtze River Delta.

Different from foreign firms in Suzhou, which also serve as production bases of the global market (Wei et al., 2011), firms in the Nanchang District mainly served the YRD and the domestic market. Most of them were not export-oriented, and 75% of the firms didn't have any exports. Only 11.6% of the firms had an export rate over 50%. In terms of leading destination of exports, North America and Southeast Asia dominated the destinations with almost 67% of exports going to these two regions (Table 7). Among their domestic sales, 45.5% were sold to domestic firms, followed by FIEs.

Moreover, some large enterprises have established subsidiaries or share-holding companies elsewhere. Four of the largest enterprises (Weifu, Xichai, Xidian and Changlian) in the Nanchang District have their production bases or subsidiaries outside Nanchang, most of which are located in Jiangsu Province, especially in Wuxi, for the purpose of providing quick and stable supplies for parent companies (Fig. 6).

We have also investigated the characteristics of R&D activities carried out by industrial enterprises in Wuxi. In 2009, high-tech industry accounted for 47.7% of the total industrial output with an output of 10.22 billion yuan, 96.7% of which was from manufacturing industries. Special equipment manufacturing was the most significant industry with the largest firm number of 27. These firms were mostly machinery firms with high-tech and high value-added products. Currently, they are still characterized by small size, but many of them are competitive in specific niche markets.

In the traditional Sunan model, TVEs focused on labor-intensive manufacture and processing and they were seldom involved in cutting-edge R&D activities. However, along with the development of high-tech industries in the Nanchang District, the new generation of domestic firms has paid more attention to R&D and promoted technological upgrading (Table 8). In 2010, R&D personnel accounted for 12.6% of total employment and R&D personnel had a

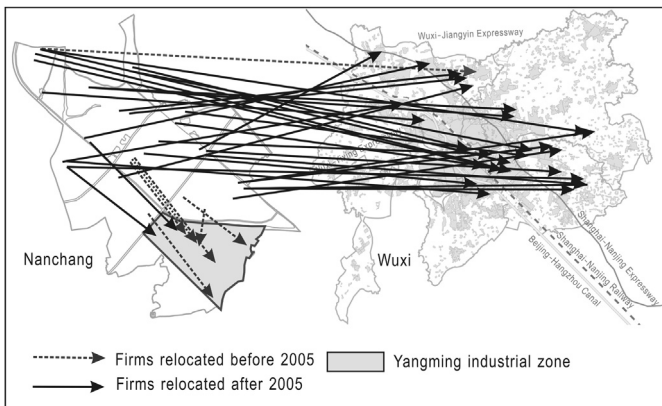


Fig. 5. Firm relocation in Nanchang district.

Table 6
Production network of the surveyed firms.

	Purchase of equipment	Purchase of material	Purchase of key components
Import as % of total purchase	10.6	6.1	18.9
% from Wuxi	24.1	38.7	30.6
% from Sunan region	42.9	59.4	50.6
% from YRD region	62.6	81.1	75.0
% from PRD region	3.1	0	1.1
% from Other region	23.7	12.8	5.0

Source: Nanchang firms survey.

Table 7
Marketing activities of surveyed firms.

Export rate	# (%)	Destination of export	(%)
0	45 (75.0)	North America	38.9
0–10%	3 (5.0)	Southeast Asia	50.0
10–20%	2 (3.3)	West Europe	33.3
20–50%	3 (5.0)		
50–70%	2 (3.3)	Domestic marketing	(%)
>70%	5 (8.3)	Consumers	13.9
		Domestic firms	45.5
		FIEs	40.1

Source: Nanchang firms survey.

much higher income (3,818 yuan) than the average (1,215 yuan). From 2006 to 2009, 48% of firms increased R&D spending significantly while 52% had little change. Twelve surveyed firms had their own patents within average of 4.6 domestic patents and 0.8 foreign patents per firm.

R&D has become a major concern of the surveyed firms since their R&D networks are highly domestic oriented with very limited ‘global pipelines’, which is also a problem for Suzhou’s domestic Chinese firms (Liao & Wei, 2013). For instance, 64% of the surveyed firms had more cooperation with domestic firms and only 11.1% had more cooperation with foreign firms (Table 9). Among the cooperative foreign firms, the majority was located in Nanjing (27.1%) and Wuxi (22.9%). Despite Suzhou as the leading destination of FDI in Jiangsu, firms in Nanchang had limited cooperative relationships with firms in Suzhou (12.5%). In general, the cooperation network tended to be focused in the YRD.

The problem of insufficient linkages with globally leading high-tech companies and external sources of cutting-edge technologies has prompted the Wuxi government to adopt a more ambitious approach to the development of high-tech industries. The government proposed a “530” program in 2006, which intended to attract 30 innovative leading talents from overseas in 5 years and provide them with one million yuan each as start-up capital, over 100 m² area for work space and an apartment of more than 100 m². Also, three million-yuan venture capital will be guaranteed for each program. By 2010, 1189 “530” plan projects and more than 3500 industry talents were introduced (1104 of them with at least a master’s degree or senior professional title). With China’s push for high-tech industrial development and the dramatic expansion of

Table 8
Employment structure and R&D activities of the surveyed firms.

Employment structure	(%)	R&D employee	
R&D	12.6	Average persons	17
Management	14.6	Average income (RMB)	3818
Marketing	8.2		
Bachelor or higher degree	14.5		
Local employment	# (%)	% R&D spending	(%)
<25%	11 (20.4)	Increase significantly	48.0
25–50%	16 (29.6)	Little change	52.0
50–75%	14 (25.9)	Decrease significantly	0.0
>75%	13 (24.1)		
Employee		Firms with patents# (%)	12 (20.0)
Average persons	129	# Domestic patents per firm	4.6
Average income (RMB)	1215	# Foreign patents per firm	0.8

Source: Nanchang firms survey.

financial resources in response to the global financial crisis, the “530” program was followed by the “post-530”, “pan-530”, and Wuxi One Thousand Talents programs providing more incentive and support for the development of the high-tech industry. The local government in Wuxi has attempted to pave a new way by coupling with the Chinese high-tech community rather than transnational corporations (Chou et al., 2011). Through the implementation of this plan, a large number of returnees has been attracted to Wuxi, and 835 high-tech firms in electronic information, biomedicine, new materials and new energy resources have been incubated.

Conclusion

This paper analyzes the economic restructuring and development in Wuxi, with a particular attention to industrial location and corporate networks. Under decentralization, local governments have become active agents in the spatial restructuring of industrial locations in Chinese cities. We have found that in Wuxi, the traditional Sunan Model is phasing out but the influence of the original industrial base and management model is still evident. Given the legacy of a strong TVE-based economy and relatively interior location in the YRD, remaking the Sunan model in Wuxi is driven by domestic oriented industrialization, which differs from the

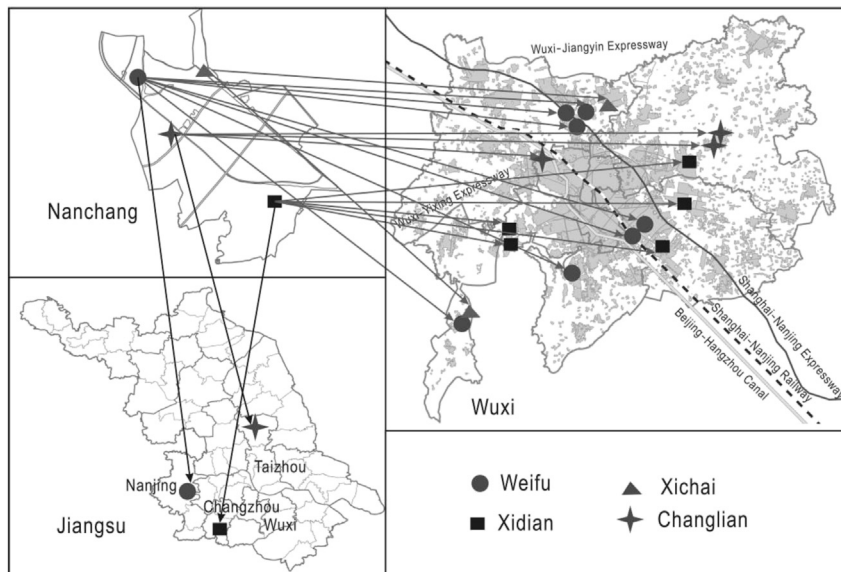


Fig. 6. Production subsidiaries of main firms in Nanchang district.

Table 9
Cooperation of surveyed firms.

Firms with FDI# (%)	7 (11.3)
Cooperation with	# (%)
More foreign firms	4 (11.1)
More domestic firms	23 (63.9)
Almost the same	9 (25.0)
Cooperative foreign firm location	# (%)
Nanjing	13 (27.1)
Wuxi	11 (22.9)
Suzhou	6 (12.5)
Shanghai	5 (10.4)
Other cities	13 (27.1)

Source: Nanchang firms survey.

globalized development in Suzhou. However, if compared with Changzhou, which has been struggling to attract FDI and develop the high-tech industry (Wei & Gu, 2010), Wuxi's economy is more globalized and technology-oriented.

We also find that the spatial strategies undertaken by local governments in Wuxi have similar elements with other coastal cities, characterized by a strong ambition toward high-tech industrialization and promoting urban expansion under 'development zone fever'. Nevertheless, different from local governments intervening directly with firm operations in the traditional Sunan Model, local governments in Wuxi have magnified the influence of various economic and location factors to firm location through government policies, with the consideration of market forces. More importantly, local governments in Wuxi push the development of a knowledge economy by emphasizing innovative talent recruitment and developing linkages with the Chinese high-tech community. Such strategies are common among core cities in the YRD, but are hard to imitate for interior cities in China.

With the global financial crisis, Wuxi is facing new challenges during the process of restructuring. First, most firms in Wuxi remain engaged in labor-intensive industries such as textiles and clothing and machinery manufacturing, which tend to have thin profit margins due to rising production cost and the over capacity of production. Upgrading to high-tech industry is limited by an insufficient intellectual labor force and limited linkages with global lead firms. Second, the ability of local governments to lead urban restructuring and support the development of high-tech industries requires sufficient financial support. Along with a massive expansion of development zones, the government has been faced with potential fiscal deficits, leading to shortsighted decisions such as overdevelopment of real estate and insufficient resources to support other service industries. The shrinking supply of land for development means that the government has to find alternative sources of funding, and most importantly, reform public finance and reduce state investment in development zones and projects. Third, although a number of scientific firms and R&D talents has been introduced to Wuxi through the "530" plan, very limited communication between local firms and R&D talent results in weak spillover to the local economy and failure of some projects directed by these returnees. Lastly, the global financial crisis has also brought new challenges to Wuxi, although more funding has become available. Wuxi Suntech Power, the largest producer of solar panels in the world went into insolvency, as a result of over capacity in solar panel production and the shrinking demand for energy. The global financial crisis also has made industrial upgrading and technological development an urgent task for Wuxi.

The Wuxi case shows that the restructuring of the Sunan model varies across cities in Sunan, and trajectories of regional development remain varied over space, despite globalization and marketization. The East Asian development state is still active in China, and where the state is even more directly involved with economic

development and industrial location. Moreover, the geographical context is playing a lasting effect on trajectories of regional development, echoing recent studies on the role of geographical contexts in urban and regional development in China (Luo & Shen, 2012; Wei, 2002b; Zhou et al., 2011).

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