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Urbanisation and changes in the sectoral structure of economic development: the scale of the manufacturing sector in Chinese cities and the shift towards service industry

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Coordinated by CNRS (France's National Centre for Scientific Research), UrbaChina analyses China's urbanisation trends for the next 40 years and defines possible future scenarios with reference to concepts of sustainability.

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Urbanisation and changes in the sectoral structure of economic development: the scale of the manufacturing sector in Chinese cities and the shift towards service industry

By Peter Daniels[1] and Ni Pengfei[2]

Abstract

There are many dimensions to the evolving economic development model in China and the role for urbanization within it. One key component is a requirement to incorporate a wider range of service industries, especially in the nation's fast-growing cities where there is demand for knowledge and related advanced services that will support, for example, the necessary shift to more 'modern' manufacturing. This paper summarizes progress towards servicification and the rationale for undertaking more research that will deepen understanding of the actual and potential contribution of producer services. Some recent empirical evidence on the growth trends for producer service in selected cities, including the four case study cities of Shanghai, Huangshan, Chongqing and Kunming, is presented. It is shown that in majority of cities the manufacturing-services gap remains a significant.

Keywords: urbanisation, China, service industry

摘要

在中国的经济发展模式中有许多与城镇化相关的模式，其中一个很重要的部分是要广泛的发展服务性行业，特别是在快速发展的城市里，知识与服务可以协助支持传统制造业向先进服务的先进制造业升级。本研究总结了现阶段与未来生产性服务业的潜力与发展贡献，同时强调服务化(servicification)的重要性，根据上海，黄山，重庆和昆明的四个案例研究城市生产性服务业进行实证研究，研究结果显示，大部分城市的制造业与服务业间的差距仍然很显著。

关键词：都市化，中国，分税制，第三产业

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a) Servicification in China

More than 170 cities in China have a population in excess of one million; creating urban economies fit for the 21st century is a major challenge. Moreover, the expansion of such cities is expected to continue for at least three more decades as some 10 million people migrate from rural to urban areas every year. The number of mega-cities (or megalopolises) is expected to increase from three in 2003 to thirteen by 2020 (Economist Intelligence Unit, 2012; see also Woetzel et al, 2009; Dobbs et al, 2011; China Science Center of International Eurasian Academy of Science et al, 2012) and many of these will be located inland as efforts to shift city growth away from the eastern seaboard to cities such as Chengdu or Wuhan gathers momentum. They are already achieving annual GDP growth of more than 10 per cent, considerably higher than first tier cities such as Shanghai and Shenzhen (5-8 per cent). This is in line with the 'western development strategy' that seeks to take advantage of cheaper labour, lower land and infrastructure costs, good energy availability, and enhanced accessibility of the kind offered by the new high-speed rail network to encourage manufacturing and service firms to relocate from the coastal regions or to make FDI decisions favouring the western cites and provinces. It is likely that the provincial capitals that will attract much of the associated growth of service industries, replicating the experience of first- and second-tier cities in economies the world over (Sassen, 2001, 2012).

Rapid urbanisation coincides with a stage in China's economic development that requires a refinement of its manufacturing export dependent growth model towards a model that incorporates a wider range of producer and consumer services. More rapid expansion of consumer and producer service jobs and output that will enable a more balanced, competitive economy made up of less labour-intensive primary and manufacturing sectors and a dynamic, innovative service sector (for an overview, see Ghani et al, 2012). As part of this change, services are performing a complimentary role that is sometimes characterised as servicification; the intertwining of services with manufacturing as the latter make more use of, as well as produce and trade, in the former (National Board of Trade, 2012).[3]

An aspect of servicification that is relevant to the situation in China is that the manufacturing sector exports and imports more services than before. It also promotes goods exports in that some services assist with foreign markets by enabling reductions in transaction costs, the adaptation of products to new markets, devising and implementing marketing strategies, or improving productivity and competitiveness; all of which may result in larger export market shares (Lodefalk, 2012).[4]

Comparative advantage at the industry level has also been shown to be correlated with the intensity of the use of knowledge intensive business services (Bottini and Tajoli, 2010). Imports of business services not only have positive effects on manufacturing exports but also on value-added and employment in most technology-intensive industries (Francois and Woerz, 2008). However, such benefits are dependent upon the availability of a cadre of the highly-skilled services workers such as managers, professionals and technicians, especially in city labour markets where producer services, in particular, are prone to locate. As urbanisation in China continues apace access to human resources that will enable the development of producer services will be a key requirement.

[3] Also referred to as *servitization*, see Neely et al (2011). For a recent comprehensive analysis with a strong Asia focus, including empirical examples from China, see Hirakawa et al (2013).

[4] It has been estimated that the servitization rate in China has increased from 1 per cent in 2011 to 20 per cent in 2010 (Neely et al, 2011, cited in Bao and Toivenen, 2012, see also Liu, 2009, Vandermerwe and Rada, 1988).

Also worth noting is the role of agglomeration economies that accrue to producer services, as well as services such as retailing, personal, education, healthcare from being located in cities. These, in turn, support further rounds of new firm formation (see for example Jacobs, 1969, Rosenthal and Strange, 2001, Kolko, 2010). Services stimulate positive spillovers to other sectors; in the case of producer services such as industrial design, marketing or information and communications technology facilitate the process of developing new products or encouraging investment that then underpins a dynamic industry sector and creates further demand for producer services.

There is a good deal of historical evidence that shows how national urban and economic transformation includes an increasing share of employment and output in services as income levels rise and the share of manufacturing output reaches a peak (or even declines). A process that gradually unfolded over 150 years in Europe has however been concatenated into less than 30 years in China, not least because the very rapid pace of urbanisation has been accompanied by a necessary expansion of services. This fits with the well-documented association between the urbanisation rate and the share of services in employment; countries across Asia conform to this relationship (see for example, Asian Development Bank, 2012).

b) Services and development in China

'China's service industries will be the nation's most significant force for promoting economic development and the main channel for solving China's employment problems' (Hu Jintao, President of the People's Republic of China, 2004).

Research on aspects of services industries and urban development in Asia work has increasingly included coverage of China where rapid economic growth has boosted average per capita incomes and burgeoning demand for consumer services (see for example Kwan-yui, 1998; Daniels, 1998, 2001, 2004; Daniels and Harrington, 2007; Daniels, Hutton and Ho, 2005, 2012; Peilin, 2011; Hutton, 2013). Service industries have become one of the key activities participating in the dramatic expansion and transformation of China's large and numerous city-regions, especially those located adjacent to its coastal regions (Luo, 2001; Gong, 2002; Yang 2004; Lin 2005; Zhang, 2006) but also increasingly in the central and Western regions (Yeh 2011; Li, P., 2011).[5] But the size of the service economy in China still lags some way behind even other countries in Asia (Table 1). The share of services in total value-added in 1990 was less than half the equivalent figure for the US, with only a comparatively small increase to just over 50 per cent by 2010. Other countries in developing Asia, including India, have also been consistently ahead of China. Using another measure, in 2008/9 the urbanisation rate (share of urban population) was 43 per cent and the share of services in employment was 33 per cent (42 per cent for share of GDP). This compares with 98 per cent and 90 per cent respectively for Hong Kong or 82

[5] The rapidity of the transition to a service economy in cities is conveyed in the following observations in 2004 by a restaurateur in Beijing: *'When I first came to Beijing in 1978 to study medicine, I could find neither restaurants nor taxis. You could not find one empty taxi on the street. There were only two-star class hotels, the Beijing and Minzu. And there was only one foreign restaurant, Maxim's, in Beijing.'* By 2004 the city had more than 622 hotels, 572 of which were star-rated, with a total of 103,000 rooms. Delicious and exquisite cuisines from around the world could easily be found in Beijing. At the end of 2003, there were 11.09 million mobile phone subscribers, meaning that 76.1 mobile phone sets were in use for every 100 local residents. About 61 of each 100 families in Beijing had personal computers. The most popular departments in universities and colleges were those focused on professional service industries such as information technologies and telecommunications, logistics, law, auditing, human resources management and advertising (quoted in Li, 2004).

per cent/73 per cent for the Republic of Korea (World Bank, 2012).

While gains from the development of services can be demonstrated through the findings of research in the advanced economies, there are many obstacles still to be overcome in China. The situation has been likened to being 'trapped in traditional services' (Asian Development Bank, 2012, xviii); labour productivity lags far behind that of advanced economies, reflecting the ongoing dominance of traditional service industries that a much larger share of total services output compared with advanced economies where market producer services, alone, account for some 20 per cent of the total. Modernization of traditional services will generate improvements in productivity (including in the traditional sectors) and be more amenable to cross-border trade (see for example Goswami et al, 2012). The Asian Development Bank (2012) also identifies bottlenecks to the modernization of services such as a regulatory structure that is not fit for purpose, infrastructure limitations, and shortages of suitably qualified/skilled human capital. It is therefore not surprising 'our empirical understanding of how these diverse [service] sectors actually function and the type of economic policy initiatives that might promote sectoral growth, job creation, and innovation' remains underdeveloped (Kirkegaard, 2012, p.2). There is still much to understand about what determines the wide inter-regional variations in the types of services available and access to them (Wang, 2009).

The comment by Wang is especially applicable to producer services. Thus, 'research on intermediate or producer services, which are younger services in China, is still in a relatively early stage of development, despite the fact that these activities are becoming crucial in the economic development process' (Yeh and Yang, 2012, p.4). These services are a major player in economic urbanisation and regional development in Europe and elsewhere (Taylor et al, 2011, Rubalcaba and Garrido, 2006) and it is now recognised that they have at least three 'strategic level' impacts on Asian cities, including those in China. These are: recomposition of city industrial structures towards services in line with the rise of post-Fordist production systems, the intra-urban reconfiguration of land use towards services, including the emergence of first- and second-tier cities as centres of knowledge development and innovation, and the formation of a new metropolitan class of professional and managerial workers (Yeh and Yang, 2012, p.9). To these might be added another strategic level impact, a requirement for labour that can sustain the development of producer services i.e. the availability of workers with appropriate higher level educational qualifications and/or professional skills. A shortage of these kinds of workers will constrain the ability of the cities to nurture domestic producer service firms as well as efforts to attract foreign-invested services and manufacturing firms.

c) Why research on producer services is important

The Secretary General of the OECD very recently observed that:
'The information revolution has changed the way our economies function and laid the foundations of a knowledge-based world. In today's knowledge-based economy, wealth comes more and more from ideas and innovations embedded in products and services. The assets and competitive advantages of firms or countries are rooted in research and development (R&D), software and brands, organisation and production structures, and many other "intangible" assets. Moreover, in this knowledge-based economy production is spread around the world, involving countries of different income levels, research and development networks, design and marketing, assembly lines, and customer support.' (Gurría, 2013, p.1)

This is the backdrop for the 'producer services challenge' that confronts rapidly emerging economies such as China and this has been summarized as follows:

'State-of-the-art services are needed for manufacturing firms to connect to global value chains and to develop competitiveness in more skill-intensive activities along the value chain' and more 'open business services markets would generate a win-win scenario where countries with comparative advantage in business services would generate well-paying jobs in this sector, while countries with comparative advantage in manufacturing would benefit from access to state-of-the-art business services that would help them move up the value chain in manufacturing.' (Gonzalez et al, 2012, 176)

Therefore, for service and manufacturing firms to stay competitive in their industry sector they need to constantly review and improve processes, product design and utility, ways of contacting customers, service delivery, or ways of using capital. Deployment of numerous different business models, such as just-in-time delivery, economies of scale, lean production, flexible specialization, product customization, sourcing high quality components, or conforming to local market product specifications, is necessary. Success will depend upon the procurement of the expertise available from a wide range of knowledge intensive business services such as computer, R&D, legal, accountancy, logistics, and management consultancy services. If companies want to move up the value chain, as is the case for many firms in China, the requirement for such inputs will become even greater. On the other side of the coin, the bundling of services with goods has become increasingly important so that, for example, an engineering company making components and systems for delivery will provide freight, packaging, storage of spare parts as part of its contract with client companies. If it is too small to provide all these services efficiently it may work with strategic partners to ensure a comprehensive solution. Likewise, manufacturers offer post-sales services such as maintenance and repairs, sales of spares, diagnostic tools, surveillance, and management and rental/leasing of equipment, either separately or incorporated into their products. The options are numerous and shaped by the type product and whether the after-sales are business-to-business or business-to-consumer.

Chinese scholars are devoting more research attention to producer services but there are analytical hurdles to overcome (Cheng, 2006a, 2006b; 2013, see also Appendix). Wang (2009) draws a distinction between research that has focused on specific services and studies concerned with the service sector as a whole. Examples of the former include financial services (Wang et al, 2007), retail services (Wang and Chan, 2007), and the internet (Zhang, 2008) and they tend to outnumber the latter. Analysis is fraught with difficulties (see for example, Gong 2002; Mattoo 2003; Yang 2004; Lin 2004, 2005; Wang 2009), not least because of the universal problem of the availability of robust disaggregated cross-sectional or time series data for groups or classes of activity within services (Qiang and Xue, 1998). Efforts are being made to rectify these shortcomings, although it is perhaps not surprising that one of the activities that has largely been overlooked is producer services (see for example Yeh, 2005; Cheng, 2006a; Liu and Cui, 2006; Li and Gao, 2008).

Some of the data problems can be overcome using input-output analysis (Cheng 2006b). It is shown that, firstly, producer services developed rapidly between 1981 and 2000 (the period covered in Cheng's study) in absolute value of output as well as in relative proportion. Annual growth rates for their use as intermediate inputs exceeded the rates for services and for national output but this still left the share of producer services in national output at less than half the levels for the UK and the US. Secondly, input-output analysis also shows that labour-intensive sectors such as commerce rather than high technology and knowledge or human capital

intensive services are prominent. These are the activities, even though they are now expanding, that make the producer services 'gap' in China a significant problem. Cheng's (2006b) also examines the destinations of producer service outputs; in 1981 almost two-thirds went into manufacturing and a third into services but by 2000 the balance had shifted with services using 38 per cent of producer service outputs. Again, while this trend is encouraging, and but even allowing for further change since 2000, it likely still leaves China some distance behind the US and the UK where the majority of producer services output is utilized by other services.

d) Diverse role of producer services in urban economic development

Demand for producer services is expected to grow rapidly as they provide both the essential infrastructure for production and export trade and a conduit for ideas and innovation leading to improvements in the competitiveness of local/regional economies, sectors of economic activity, or individual firms (Hansen 1994; Bryson, Daniels and Warf, 2004, Yang and Lin, 2007). Because producer services provide intermediate inputs throughout the value chain they interface with a large number of economic sectors across the economy; many small and medium-sized firms start-ups are producer services which, by supplying state-of-the-art knowledge and expertise, contribute to the success of small firms in other sectors (Daniels and Bryson, 2002; Rubalcaba and Kox, 2007). Because they are so intensively knowledge-based, many producer services are also at the cutting edge of creating innovative new products and to be effective they need to initially develop to support a local client base and then follow clients outside their national markets (export and FDI) (Bryson, 1997). The precise pace and direction will be shaped by several considerations and some of these will be explored before turning to some recent empirical evidence on the growth of producer, especially in the major cities.

China's ability to compete abroad in goods, services, and agriculture will be partly shaped by the liberalization of telecommunications, financial and business services in accordance with WTO commitments (Yeh, 2004).[6] Liberalization in parallel with a rapidly expanding and restructured manufacturing sector creates potential demand for producer services provided that, in contrast to firms in the advanced economies, those that are internalised by manufacturing SOEs, for example, are externalized (Li and Gao, 2008).[7] It is suggested that this has held back the formation of independent business and professional service enterprises, to some extent explaining why such producer services are relatively underdeveloped and incapable of meeting demand from domestic, as well overseas, firms for high quality knowledge and expertise. Foreign invested service and goods-producing enterprises also prefer imported producer services or those available through other overseas suppliers with a presence in China, especially in the large cities along the coastal margins. One of the principal challenges is therefore how to implement a shift in the demand for producer services to external specialist firms (both domestic and inward invested) that will function in a more efficient, quality driven and professional way that will have the effect of providing much better support for the development, upgrading and enhanced competitiveness of manufacturing firms (Li and Gao, 2008).

[6] India's liberalization of business services has made it a leading exporter of these services (Kumar and Joseph, 2005).

[7] Li and Gao (2008) cite the interesting case of a study in 2006 by the China Federation of Logistics and Purchasing of the market for logistics services by manufacturing enterprises in China, It emerged that 49 per cent of manufacturers had their own car teams, 46 per cent owned their own warehouses, 48 per cent had their own mechanized offloading facilities, 9 per cent owned elevated or cubic warehouses, 13 per cent had dedicated rail lines, and only 19 per cent of the manufacturers had raw materials logistics managed by third parties.

The challenges to be overcome vary across different types of producer service. The capacity of the Chinese economy to export goods and services will be increased if, for example, domestic logistics services are able to access foreign capital and technology that substantially reduces the cost of exporting goods from the inland provinces as well as increasing their attractiveness for FDI (Qui, 2005). However, many SOEs, especially in manufacturing, still operate their own logistics businesses and are reluctant to outsource to third party logistics providers. Secondly, logistics are subject to significant levels of localized regulation, often enacted by several different local and provincial government bodies, that discourages the provision of logistics services that cover the whole country. In addition, the logistics market is highly fragmented because of the spatial imbalance in economic growth and local protectionism, while the legal system regulating logistics is also geographically variable. This has not prevented an expansion of logistics services such as the express delivery by some 20 per cent per annum since 1990 (much higher that annual GDP growth), although more than 80 per cent of the market is now occupied by multinational logistics companies after it was fully opened to foreign investors in 2005. FedEx, UPS, TNT and DHL constitute the major players in the express service segment; for example, FedEx set up its Asia-Pacific Hub in Guangzhou in 2006 and provides a network covering over 250 cities and TNT's service includes 200 cities, making China its second largest market after Europe. Yet, in certain respects the development of logistics services has now fallen behind China's economic growth.

There are also several structural challenges facing the development of financial services in China, including the fact that capital markets remain underdeveloped, the absence of an institutional market, the immature banking system, and a regulatory structure that does not foster innovation in a predictable and transparent way (Paulson, 2007). The banking system, for example, is changing but it is far from modern, efficient, and market-driven system with proper controls, management, and professional staff. Some bank credit officers still prefer to make 'safe' loans to SOEs backed by implicit government guarantees, rather than to 'risky' dynamic small, medium-sized, and private businesses. Effective corporate control of a massive and geographically dispersed branch network is also a demanding challenge, and local pressures still exert excessive influence on branch lending decisions. Better risk management; more consumer finance products; greater competition, including of electronic payment systems; and opportunities for new banks to expand branch networks far more quickly are amongst the improvements needed (Paulson, 2007). The insurance sector would also benefit from greater opportunities to expand branches in China since such limitations impact commercial (intermediate) as well as (consumer) final demand for these services.

A further consideration is that producer services are key to developing standards and practices and training of the professional occupations that are critical for the continued growth of activities such as China's public accounting profession (that will enable the development and international harmonization of the country's accounting standards and tax system). Management consulting services also need boosting since:
'….weak management is the major constraint on the competitiveness of Chinese companies. Despite two decades of joint ventures and enormous investments in training, Chinese managers continue to fail in the critical tasks of systems integration and optimization. The problem is fundamental, embedded in the economic system itself. The dominance of state-owned enterprises in major manufacturing and service sectors, together with extensive state intervention throughout the economy, has sustained the premium on good political skills over modern management capabilities' (Lieberthal and Lieberthal, 2004, 8).

The way forward for commercial and professional services will require a mix of foreign firms and local firms, with commercial presence essential for the former. Joint ventures with foreign majority ownership in foreign invested construction and engineering projects have been allowed since 2001 but in legal services, for example, foreign firms are not permitted to directly practice Chinese law and can only advise on legal affairs related to their home country or provide information on the impact of the Chinese legal environment.

As a constituent part of the pathway towards the construction of a new industrialized economy in China, proactive support for the development of producer services is now a given (Wu, 2005). Yet many key issues remain, including improvements in timeliness and conditions associated with cross-border transfer and storage of data; the movement of services business people; sounder and clearer rules on the role of State-owned and linked enterprises creating competitive markets; improving the conditions for commercial presence for foreign companies; and the development of a set of principals providing best practice regulation (Global Services Network, 2011).

e) Growth of producer services in China: Provinces and selected cities, 2004-2009

As a precursor to more detailed research that examines some aspects of the production and consumption of producer in a sample of businesses in the cities used as case studies for the UrbaChina project, it is necessary to explore the existing level of producer service activity in Chinese cities (see also Yeh and Yang, 2013a, b). In 2009 more than 40 per cent of the total GVA of 37 leading cities was accounted for by service activities with cities in the west generally performing less well poorly compared with the leading cities in the coastal provinces (Fig. 1) (see also Appendix, Fig. 1 and Fig. 2). This compares with a share nearer 70 per cent typical for equivalent cities in Europe. Beijing is the only city with services GVA (75.5 per cent) larger than the European average; Guangzhou and Shanghai are still some way behind at around 60 per cent. Producer services[8] GVA was 15.7 per cent of total Chinese GVA in 2009 and, with few exceptions, the share in the top cities exceeded the national average, especially Beijing (39.9 per cent), Guangzhou (26.7 per cent), Hohhot (28.4 per cent), Shanghai (32.7 per cent), Shenzhen (26.4 per cent) and Urumqi (23.8 per cent). This is illustrated in Fig. 2a which illustrates the stronger positive relationship between city size and producer services GVA (r^2 = 0.399) compared with all services GVA (r^2 = 0.179). As city size increases the share of producer services GVA is larger than in smaller cities. This is illustrated in a slightly different way in Fig. 2b which shows that the absolute values of both services and producer services GVA are closely correlated with city size. The trend line for services is steeper than for producer services, although the correlation is very similar and this reflects the ability of the larger cities to attract and retain a wider mix of service functions (such as corporate headquarters, regional offices of financial institutions) than lower order cities.

Based on the same sample of 37 leading cities, financial intermediation and transport, storage and postal services account for the largest share of producer services GVA with Beijing (13.2 per cent), Hangzhou (10.2 per cent) and Shenzhen (13.5%) prominent for financial intermediation and Huhehot (17.6 per cent), Shijiazhuang (9.1 per cent) and Xining (9.8 per cent) prominent for transport, storage and postal services. In addition to financial intermediation, information transmission, computer services and software are major contributors to total GVA in Shanghai (12 per cent) and Beijing (8.8 per cent). With some

[8] Excluding real estate. Producer services are classified as: Transport, storage and post: Information transmission, computer services and software; Financial intermediation; Leasing and business services; Scientific research, technical services, and geologic prospecting.

exceptions such as Dongguan (9.7 per cent), Guangzhou (7.5 per cent) and Beijing (6.7 per cent), leasing and business services account for a small share of total GVA in all the cities (even less than information transmission, computer services and software). It would seem that in the majority of cities the knowledge-intensive market services that are crucial to some of local and national economic adjustments discussed earlier, are still relatively underdeveloped. There are exceptions such as the cities at the apex of the hierarchy, notably Shanghai, Beijing and Guangzhou, but even there the absolute values of leasing and business services GVA are not much higher than those for scientific research, technical services and geologic prospecting (Fig. 3).

The relationship between city size, total GVA and share of producer services GVA is in line with expectations based on the results from similar research on European and North American cities (Yeh and Yang, 2013c). But the overall level and diversity of producer service activity remains lower than in the cities of the advanced economies and it is therefore interesting to look more closely at the trends in producer service activity in a number of Chinese cities. The average annual change for producer service employment in 120 cities between 2004 and 2009 relative to the numbers employed in these services in 2009 is interesting (Fig. 4). In the case of cities with more than 100,000 employed in producer services in 2009 the average annual change since 2004 has been consistently positive. In broad terms, for these cities as the scale of producer service employment has increased so has the average annual change. The picture is less consistent for cities with fewer than 100,000 producer service jobs; approximately one-third recorded negative average annual rates, while others recorded rates at or above those typical of cities with larger producer service clusters (see Fig. 4). There are likely to be several reasons for the variable performance of the smaller city clusters, these include: city location (western, central, eastern regions), proximity to larger, competing city, the structure of economic activity, functional role, level of foreign investment, or presence of foreign-owned firms.

Thus, almost all of the provincial capitals show higher annual rates of producer services employment growth than the major cities that have maintained the largest share of producer services employment throughout the period 2004-2009. Many of the former are engaged in a catching up process, often from a low employment base. This is apparent when the average annual change in producer services employment (2004-2009) is plotted against the average annual change in city population (Fig. 5). For the 64 cities shown, some of the highest producer service annual growth rates have occurred for cities with modest population growth such as Wenzhou, Hefei, Xiameng and Qingdao. While the recent expansion of producer services in China has been concentrated in the largest cities, in much the same way as in Europe, it is also the case that as the demand for these services increases supply will trickle down to cities lower down the hierarchy. Although the time period is just five years, there are indications that the hegemony of cities such as Shanghai and Guangzhou for the production of producer services is being displaced by some dispersal, albeit slowly, to the provincial capitals (see Yeh and and Yang, 2013c). In most of the provinces producer services are also disproportionately concentrated in the capital cities, replicating the national dominance of Beijing and Shanghai at provincial level.

However, the overall growth (or contraction) or producer services in cities may mask differences between different types of producer service. It is therefore useful to disaggregate the totals for each city into the five sub-groups (excluding real estate) available from official statistics. The annual average employment change (2004-2009) for each of these has been plotted against the equivalent values for producer services as a whole, covering 184 cities (Fig. 6a-e). In more than two-thirds (131) of the cities employment growth in all producer services has been positive

between 2004 and 2009 with some cities recording changes in excess of 20 per cent per annum (this may of course have taken place in circumstance where the absolute number of jobs is small). Employment in transport, storage, and postal services has grown in most of the cities at a similar rate to all producer services (r^2=0.542) to produce a tight distribution that reflects the need for these services to be available in every city; many of them cannot be made available to customers remotely using IT for example (Fig. 6a). However, only 70 cities achieved positive growth over the period. For information and computer services there is a much weaker relationship (r^2=0.169) with the overall rates for producer services (Fig. 6b). While the changes in the majority of cities are greater than those typical for transport, storage, and postal services, there are still more than 20 cities where overall and sub-sector employment change has been negative and there is also a similar number of cities where overall growth has been positive but information and related services have failed to keep pace.

Not only have financial intermediation services been the major source of absolute growth in producer services employment, they have also performed better than average across all 184 cities (Fig. 6c). Even where overall producer services employment has declined between 2004-2009, employment in financial intermediation services has expanded so that 153 cities have seen these activities expand. This is by far the best performance by any of the sub-groups of producer services. Perhaps the most disappointing performance is shown by the most knowledge-intensive activities: leasing, and especially, business services (Fig. 6d). Not only does the scatter diagram reveal wide variations between the cities, showing that those locations with the highest overall growth of producer services are also associated with a high growth of leasing and business services, but 57 cities recorded negative growth during the period (compared to 53 cities for producer services overall). Finally, the smallest sub group of scientific, technical services and geological prospecting includes activities that are often found in the largest corporate complexes such as Beijing, Shanghai and Shenzhen. It is therefore not surprising that there is a poor correlation (r^2=0.152) overall and sub-group employment change and, as for leasing and business services, about one-third of the cities recorded negative employment changes between 2004 and 2009 (Fig. 6e).

In summary, some 54 per cent of the average annual growth of producer services in the Chinese provinces is a function primarily of the size of the urban population (Table 2). The regression analysis, which excludes the four province-level municipalities (Beijing, Tianjin, Shanghai and Chongqing) shows that average annual change in city population (2004-2009) and nominal city GVA explain more of the growth variation than a city's share of total producer services employment or the change in that share over the five-year period. Some 55 per cent of the variation in the average annual growth of producer services (2004-2009) in 58 cities can be explained by city employment in producer services (2009) and each city's share of total producer services employment (2009) (Table 3). Interestingly, city population (2009), as well as average annual change of city population (2004-2009), are less significant explanatory variables. This underlines the significance of cumulative causation for the location and development of producer; cities, irrespective of population size, that have accumulated a significant cluster of producer services (by volume or diversity) tend to attract further rounds of growth and investment that reinforces their initial advantage.

f) Producer services in the case study cities: brief overview

Most of the published case studies of producer services in Chinese cities have focused on their intra-urban location, especially in Shanghai and

Guangzhou (Zu et al, 2006; Zhong and Yang, 2008; Han and Qin, 2009; Yan, 2011, Yi et al, 2011; Zhong, 2011; Qin and Han, 2013, Zhou, 2013; Gu et al, 2013). There is scope for more research that examines the production and consumption of producer services in cities using information gathered from a sample of firms with establishments in the case study cities for the UrbaChina project.

Given the differences in the population and location of the four case study cities there are considerable variations in the size and structure of the producer services activities in each (Table 4). Services are by far the largest contributor to total GVA in Shanghai which is the dominant 'service city' followed by Huangshan although here it is consumer services linked to tourism that are important. This is evident from the very low proportion of total GVA attributed to producer services (8.9 per cent), less than half the equivalent value for Chongqing and about a quarter of the value for Shanghai (32.7 per cent). In line with the differences in city population, there is wide variation in the numbers employed in producer services in 2009 (Fig. 7). With the exception of Huangshan transport, storage and postal services is the largest overall employer, especially in Shanghai. While leasing and business services are the second largest employer in Kunming ahead of financial intermediation, the latter is prominent in Chongqing, Shanghai and Huangshan. Chongqing and Huangshan are notable for the very low level of employment in leasing and business services compared with Shanghai which, as expected, has almost as many employed in this sector as in financial intermediation. Scientific and related services are notable sources of employment only in Chongqing and Shanghai.

Finally, between 2004 and 2009 most of the changes in employment in the different types of producer services in the case study cities have been positive (Fig. 8). Huangshan is the only city where overall producer service employment has declined. It is clearly very different to the other three cities since leasing and business services have also contracted at an almost comparable average annual rate which is the opposite of the position in Chongqing and Kunming; both have recorded the highest average annual growth rates in these services. They have also grown, but more slowly, in Shanghai where information transmission and related activities, financial intermediation and scientific research have grown faster during the six year period covered here.

There are limits to the extent to which analysis of secondary data on the development of producer services in the wider context of very rapid urbanization in China can provide any meaningful answers to questions such as: how aware of the benefits of using producer services are potential client firms; why have producer services grown and diversified more quickly in some cities; what are the factors contributing to the establishment of new producer service firms in cities as well as to the behaviour and growth of existing firms; what types of firm are the clients of producer services, where are they located, what is the scale of the transactions, what has determined the choice of supplier, and what are the determinants of externalization decisions. In-depth information from a small sample of businesses (suppliers and users of producer services) is the principal way of filling some of the gaps left by an analysis of secondary data.

It is also important to understand the local context for the development of producer services and a series of meetings with city officials, corporate representatives and academic colleagues in Kunming and Shanghai (March 2012) have provided some insights on the role of service activities in economic planning and policy. The urban economy and strategies for shaping economic restructuring of the kind that will diversify urban employment or make available to local enterprises the types of knowledge and expertise that will help to make enterprises (primary, secondary and tertiary) more competitive in domestic, but especially

international markets, are not at the forefront of research in these cities. The discussions highlighted that urbanization strategy is driven to a considerable extent by the challenges of accommodating the rapid expansion of the urban population. This has overshadowed issues arising from the rapid industrialisation that has been dominated by the growth of manufacturing but, until recently, without a corresponding recognition of the growing importance of services, including producer services. This has remained the case even as cities like Shanghai and Kunming, amongst many others, are heavily engaged in the development of new growth centres beyond the existing city limits. Apart from the challenges that this presents for sustainable urban growth (water, energy, waste management, food production), there are also questions about its relationship with existing and potential producer services activities/employment growth. There is an emphasis on provision of infrastructure and the formation of functional areas such as new towns or new business zones that is not necessarily supportive of the marketization of activities such as producer service. Since in many cities these activities are still relatively immature it is important not to dilute any of the agglomeration economies that are crucial for nurturing their role in urban economic development or, indeed, the market access crucial to providers and clients alike. In many cities, including those like Kunming, the development of the service sector has been relatively slow although, as noted earlier, the growth of leasing and business services is notable. Even so, the ongoing shift towards a form of market economy has made some cities, particularly in the inland provinces, vulnerable to the greater flexibility of location choice for some manufacturing activities (that may previously have made location choices dictated by government directives). If they choose to move away this will hold back the demand for, and discourage the development of, producer service activities.

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Tables and figures

Table 1: Share (%) of services in value-added: China and selected other economies, 1990 and 2010

Country	Trade		Hotels and restaurants		Transport and storage		Real estate and dwellings		Communications, finance, and business services		Public administration, community, personal and other services		Total services	
	1990	2010	1990	2010	1990	2010	1990	2010	1990	2010	1990	2010	1990	2010
Developing Asia														
China	6.8	8.5	1.6	2.1	3.8	4.9	2.1	7.3	9.4	9.4	7.9	11.2	31.5	43 .4
Hong Kong	21.8	24	3	3.3	7.7	8.1	5.1	5.2	19.4	24.4	30.3	27.9	87.2	92.9
South Korea	11.8	8.3	2.4	2.4	4.7	4.5	6.5	8.1	11.2	16.4	14.8	19.2	51.5	58.5
India	11.8	15.1	1	1.4	6.4	6.3	5	6.1	8.7	11	13.3	14.5	46.1	54.7
OECD														
Japan	12.8	12.3			4.9	4.5	9.4	13	13.6	17.2	19.1	25.7	59.8	72.6
United States	12.9	11.6	3.4	3.8	3	2.8	12.1	12.2	18.9	25.1	23	24.8	73.4	80.2

Source: After Noland et al (2012), Extracted from Table 2, 36.

Table 2: Multiple regression, with average annual change in producer service employment as the dependent variable, provinces (excluding Tianjin, Shanghai, Beijing and Chongqing)

Regression Statistics	
Multiple	0.737093
R. square	0.543305
Adjusted R. square	0.399086
Standard error	2.486692
Observations	26

ANOVA

	df	SS	MS	F	Significance F
Regression	6	139.7706	23.2951	3.767216	0.012197
Residual	19	117.4891	6.183637		
Total	25	257.2597			

	Coefficients	Standard error	t-stat	P-value	Lower 95%	Upper 95%
Intercept	4.334517	1.28239	3.380031	0.003143	1.650444	7.018589
Urban population (2009) (10.000)	-0.00022	0.001742	-0.12581	0.901205	-0.00387	0.003428
Average annual change in urban population (%) 2004-2009	0.063767	0.348637	0.182904	0.856811	-0.66594	0.793472
Nominal GDP (2009) (100mill CNY)	3.38E-05	0.000143	0.235806	0.816106	-0.00027	0.000334
Total employment in PS (2009) (excl Real Estate) (10000)	0.128171	0.229151	0.559329	0.582471	-0.35145	0.607789
Share (%) of total PS employment (excl Real Estate) 2009	-2.68398	3.774971	-0.71099	0.485726	-10.5851	5.217124
Difference 2004, 2009	6.120753	1.916396	3.193888	0.004779	2.109691	10.13182

Independent variables: Urban population (2009) (10,000); Average annual change (%) in urban population 2004-2009; Nominal GDP 2009 (100 mill CNY); Total employment in producer services 2009 (excluding Real Estate) (10,000); City share (%) of total producer service employment in cities 2009 (excluding Real Estate); Difference in city share (%) of total producer service employment in cities 2009 (excluding Real Estate).

Table 3: Multiple regression, with average annual change in producer services employment as the dependent variable, leading cities

Regression Statistics	
Multiple R.	0.739995678
R. square	0.547593604
Adjusted R. square	0.504092989
Standard error	3.041532654
Observations	58

ANOVA

	df	SS	MS	F	Significance F
Regression	5	582.2613	116.4523	12.58818	5.02E-08
Residual	52	481.0479	9.250921		
Total	57	1063.309			

	Coefficients	Standard error	tStat	P-value	Lower 95%	Upper 95%
Intercept	4.529737311	0.658347	6.880466	7.68E-09	3.208666	5.850808
Total employment in PS (2009) (excl. Real Estate) (10000)	1.292890379	0.473331	2.731475	0.008591	0.343083	2.242698
Share (%) of total PS employment (excl Real Estate) 2009	-21.40533051	8.469946	-2.52721	0.014577	-38.4015	-4.40914
Difference 2004, 2009 Nominal GDP (2009) (100mill CNY)	10.38409206	1.361833	7.625085	5E-10	7.651374	13.11681
City population (2009)	-0.003315138	0.002455	-1.35011	0.182829	-0.00824	0.001612
Average annual change in urban population (%) 2004-2009	-0.047378182	0.062653	-0.75621	0.452939	-0.1731	0.078343

Independent variables: Urban population (2009) (10,000); Average annual change (%) in urban population 2004-2009; Nominal GDP 2009 (100 mill CNY); Total employment in producer services 2009 (excluding Real Estate) (10,000); City share (%) of total producer service employment in cities 2009 (excluding Real Estate); Difference in city share (%) of total producer service employment in cities 2009 (excluding Real Estate).

Table 4: Population and GVA (2009): UrbaChina case study cities

City	Population of urban area (2010)	Total GVA (100 million yuan) (2009)	Services GVA (100 million Yuan) (2009)	Services share (%) of total GVA	Producer services GVA (100 million Yuan) (2009)	Producer services share (%) of total GVA
Chongqing	5,402,721	6,530.01	2,474.44	37.89	1,042.60	15.97
Huangshan	1,500,000	266.96	122.99	46.07	23.73	8.89
Kunming	3,184,580	n.a.	n.a.	n.a.	n.a.	n.a.
Shanghai	22,315,426	15,046.45	8,930.85	59.36	4,920.55	32.70

Figure 1: Services and producer services share (%) of total city GVA, selected cities, 2009

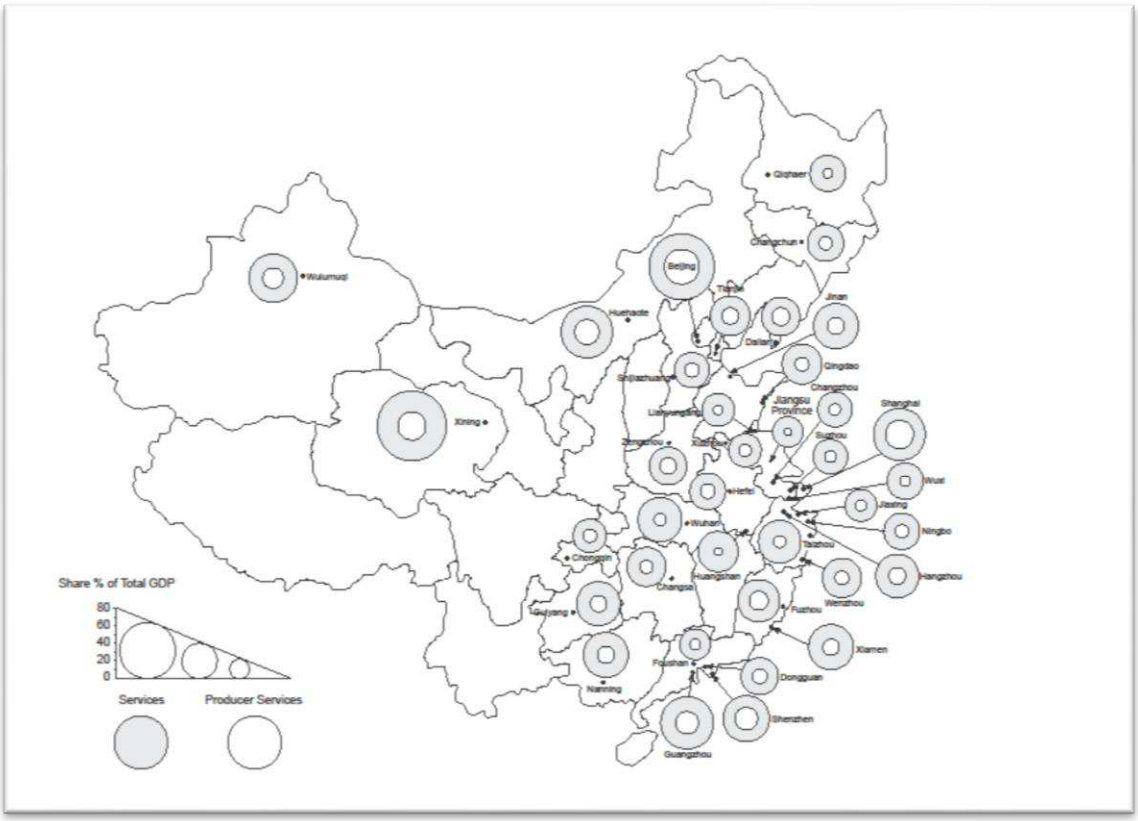


Figure 2a: City population (2010) and share (%) of city GVA (2009) in services and in producer services: selected cities (377)

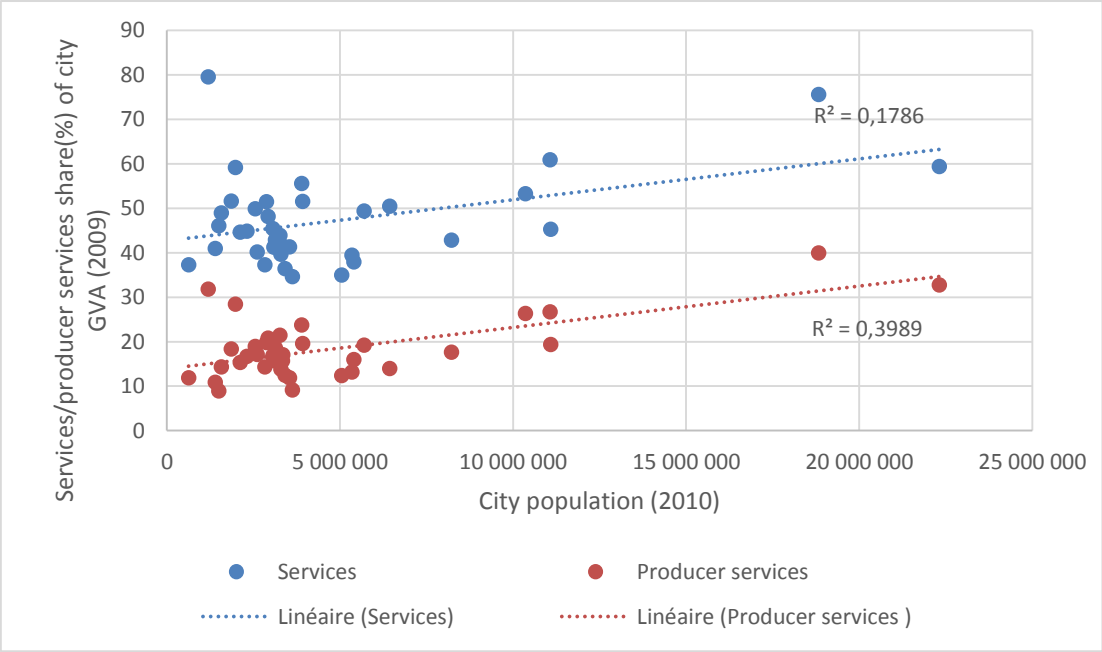


Figure 2b: City population (2010) and absolute value (10,000 yuan) of services and producer services GVA (2009)

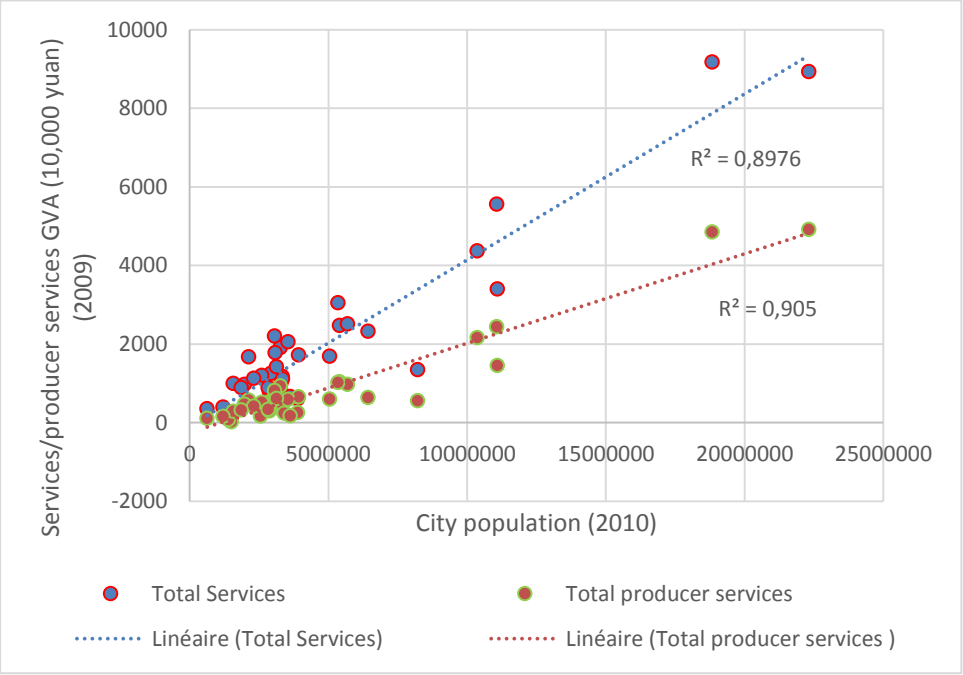
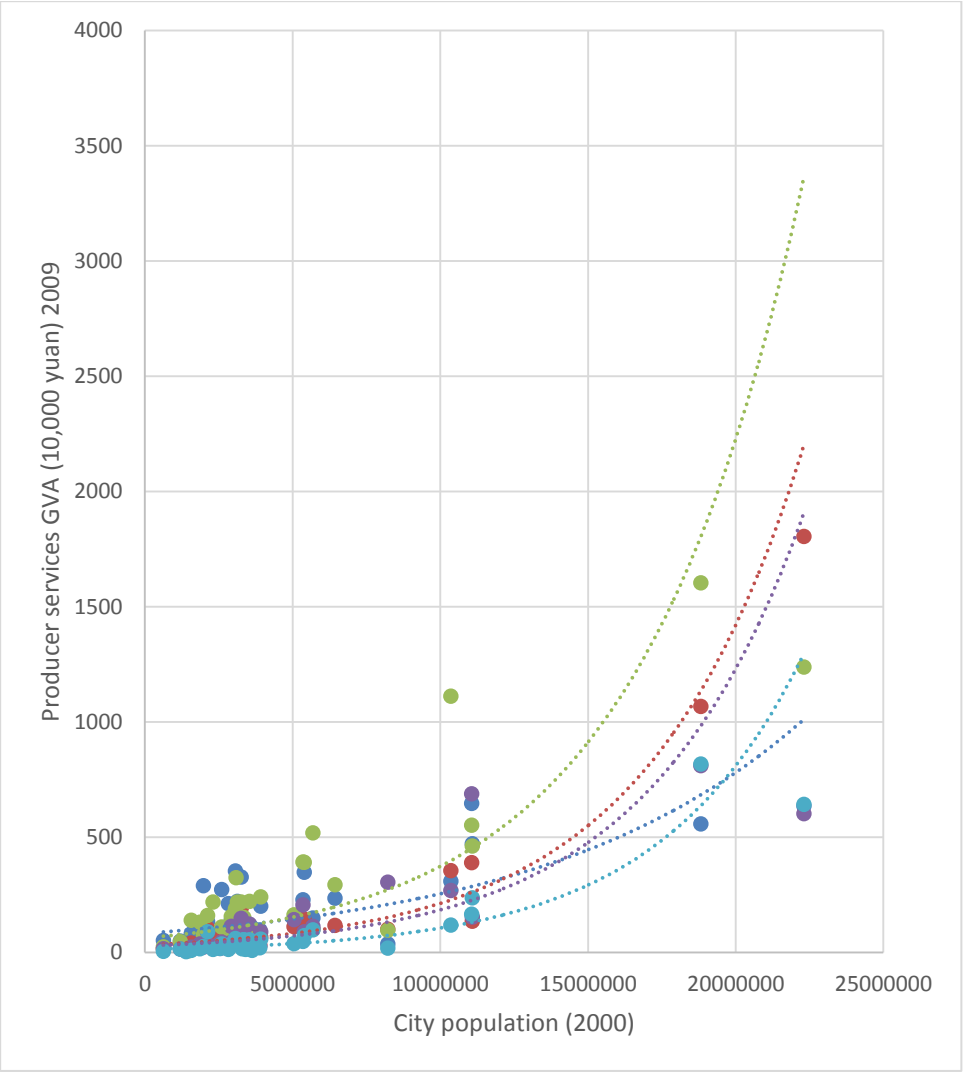


Figure 3: City population (2000) and producer services GVA, 2009: by type of service



- Transport, Storage and Post
- Information Transmission, Computer Services and Software
- Financial Intermediation
- Leasing and Business Services
- Scientific Research, Technical Service and Geologic Prospecting
- Expon. (Transport, Storage and Post)
- Expon. (Information Transmission, Computer Services and Software)
- Expon. (Financial Intermediation)
- Expon. (Leasing and Business Services)
- Expon. (Scientific Research, Technical Service and Geologic Prospecting)

Figure 4: Total employment in producer services (excl. real estate) (2009) and average annual change % in producer services employment, 2004-2009 (selected cities excl. Beijing and Shanghai)

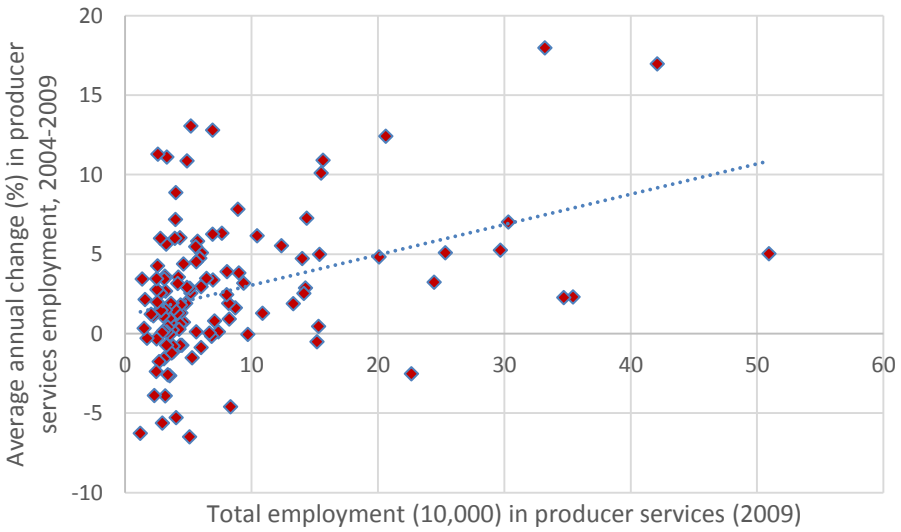


Figure 5: Average annual change (%) in (1) city population and (2) producer services employment, 2004-2009 (selected cities)

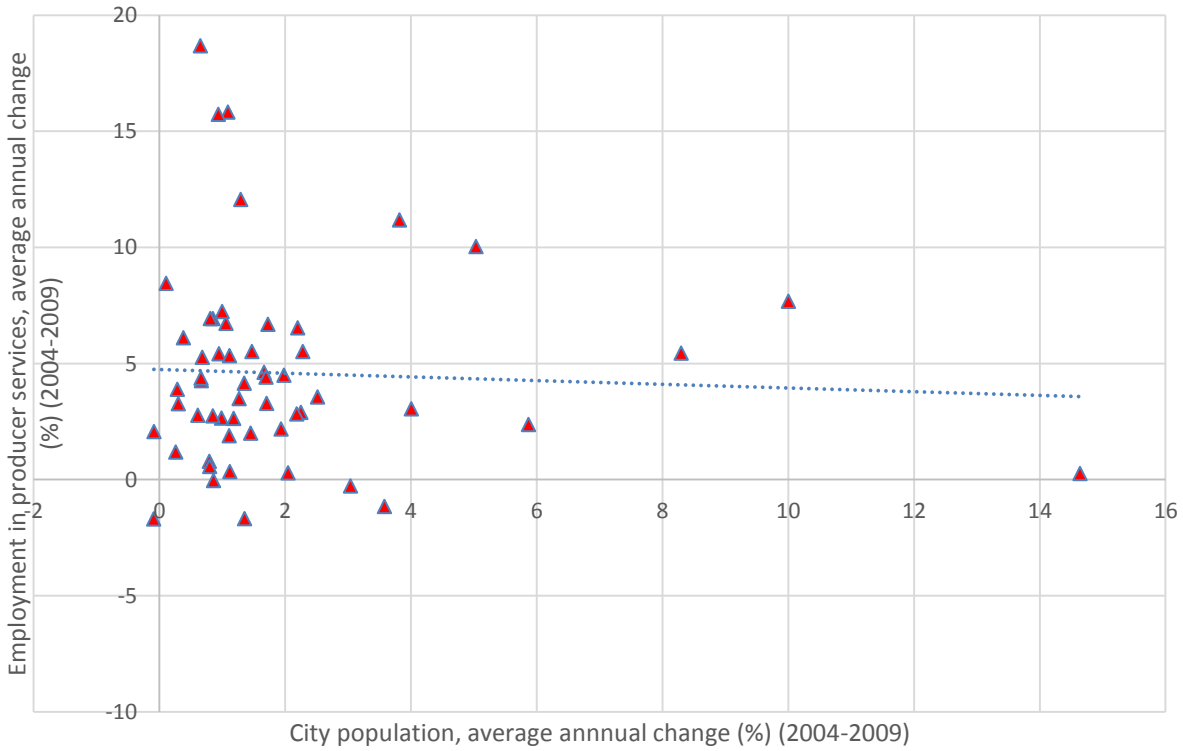


Figure 6a: Average annual change (%) in employment in (1) all producer services and in (2) transport, storage, and post services, 2004-2009 (selected cities)

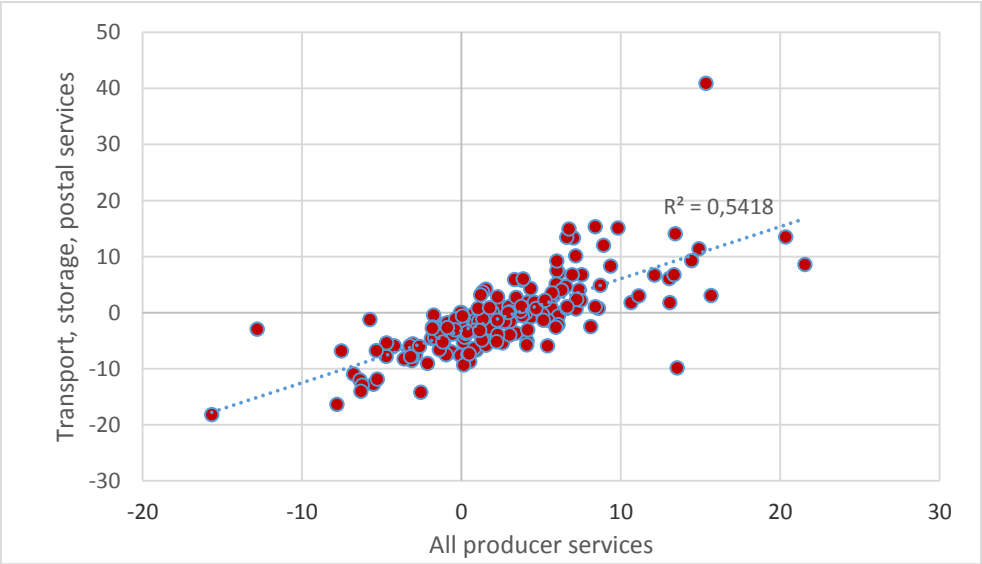


Figure 6b: Average annual change (%) in employment in (1) all producer services and in (2) information transmission, computer services and software, 2004-2009 (selected cities)

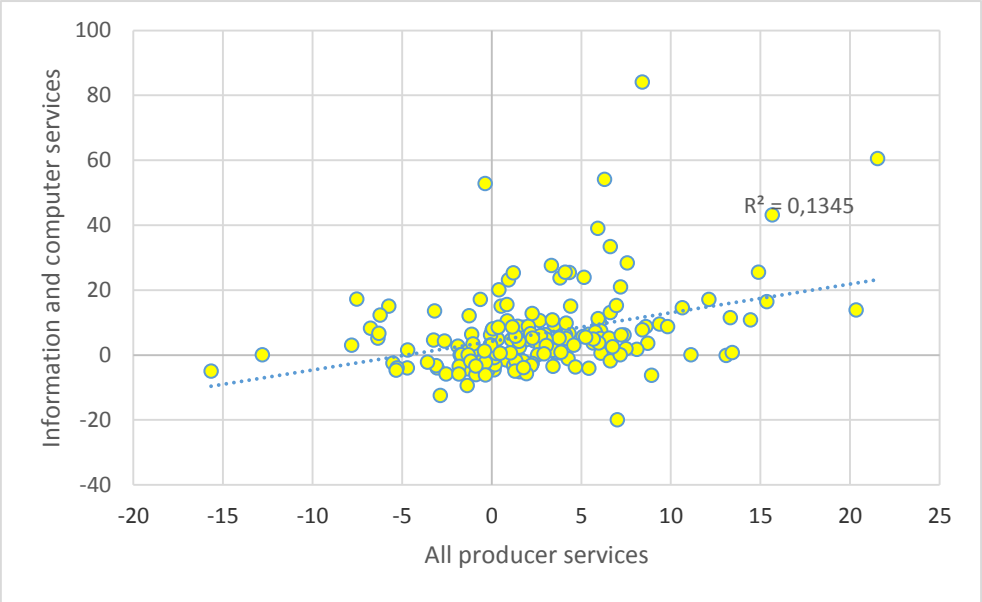


Figure 6c: Average annual change (%) in employment in (1) all producer services and in (2) financial intermediation services, 2004-2009 (selected cities)

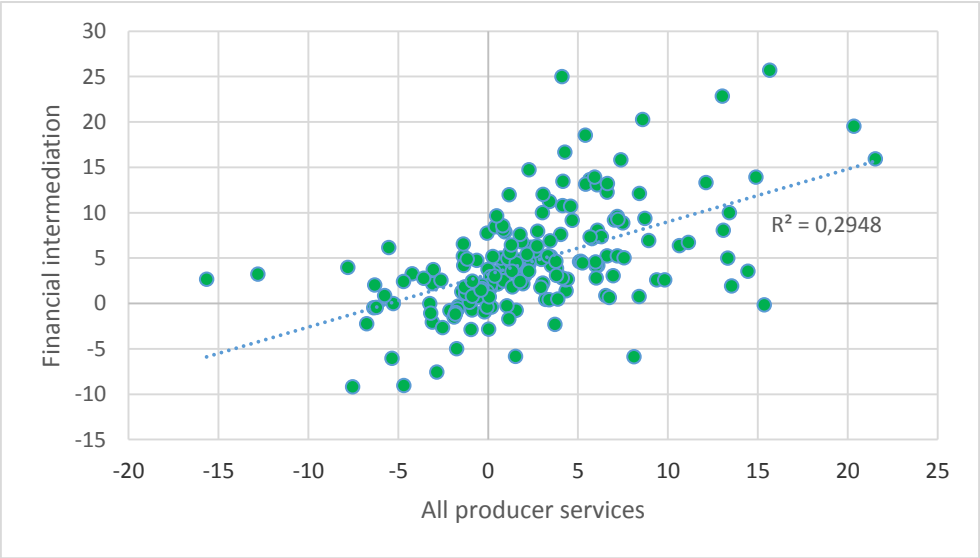


Figure 6d: Average annual change (%) in employment in (1) all producer services and in (2) leasing and business services, 2004-2009 (selected cities)

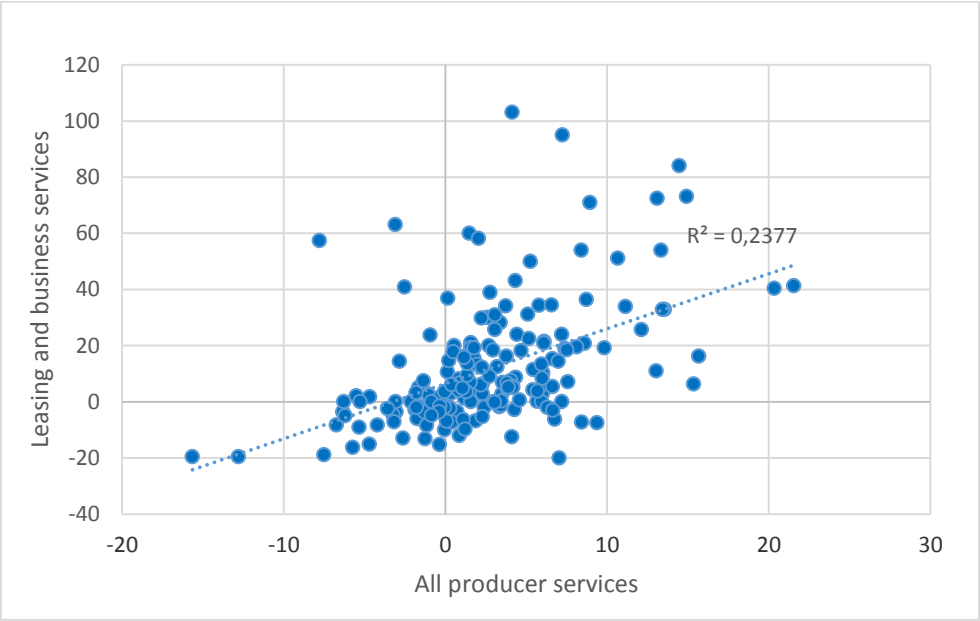


Figure 6e: Average annual change (%) in employment in (1) all producer services and in (2) scientific research, technical service and geological prospecting services, 2004-2009 (selected cities)

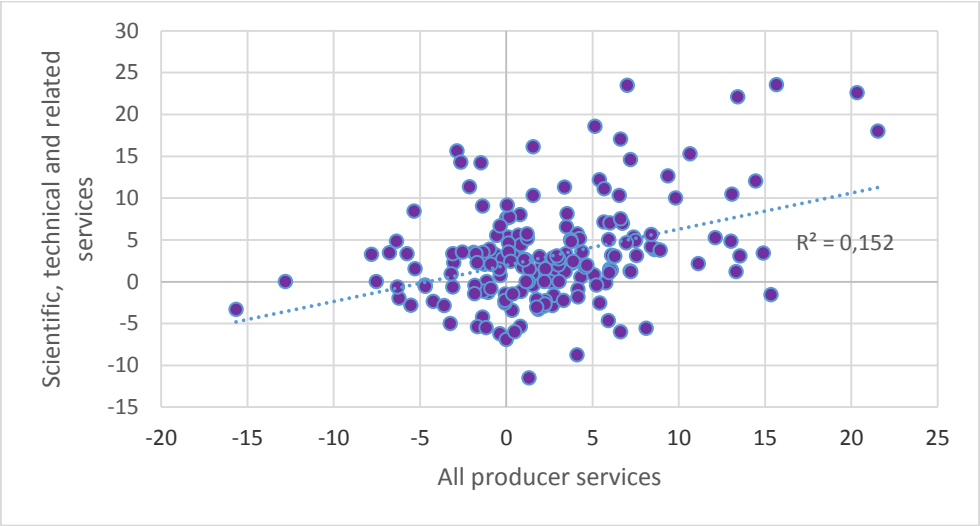


Figure 7: Structure of employment in producer services (000s): UrbaChina case study cities, 2009

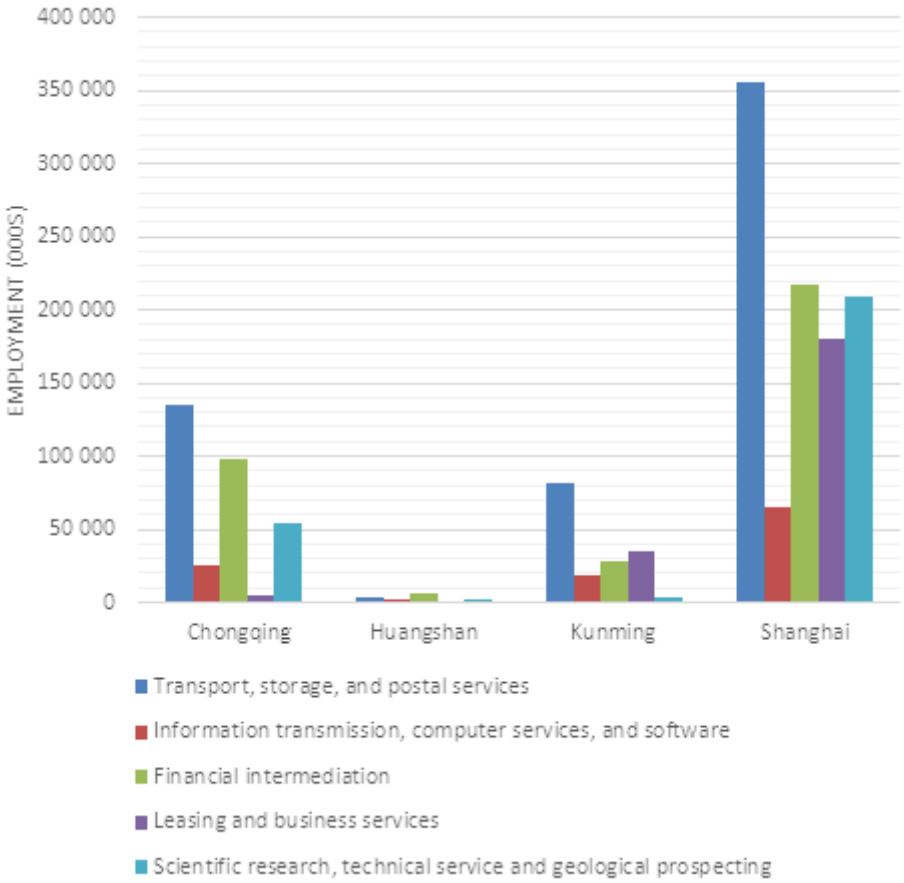
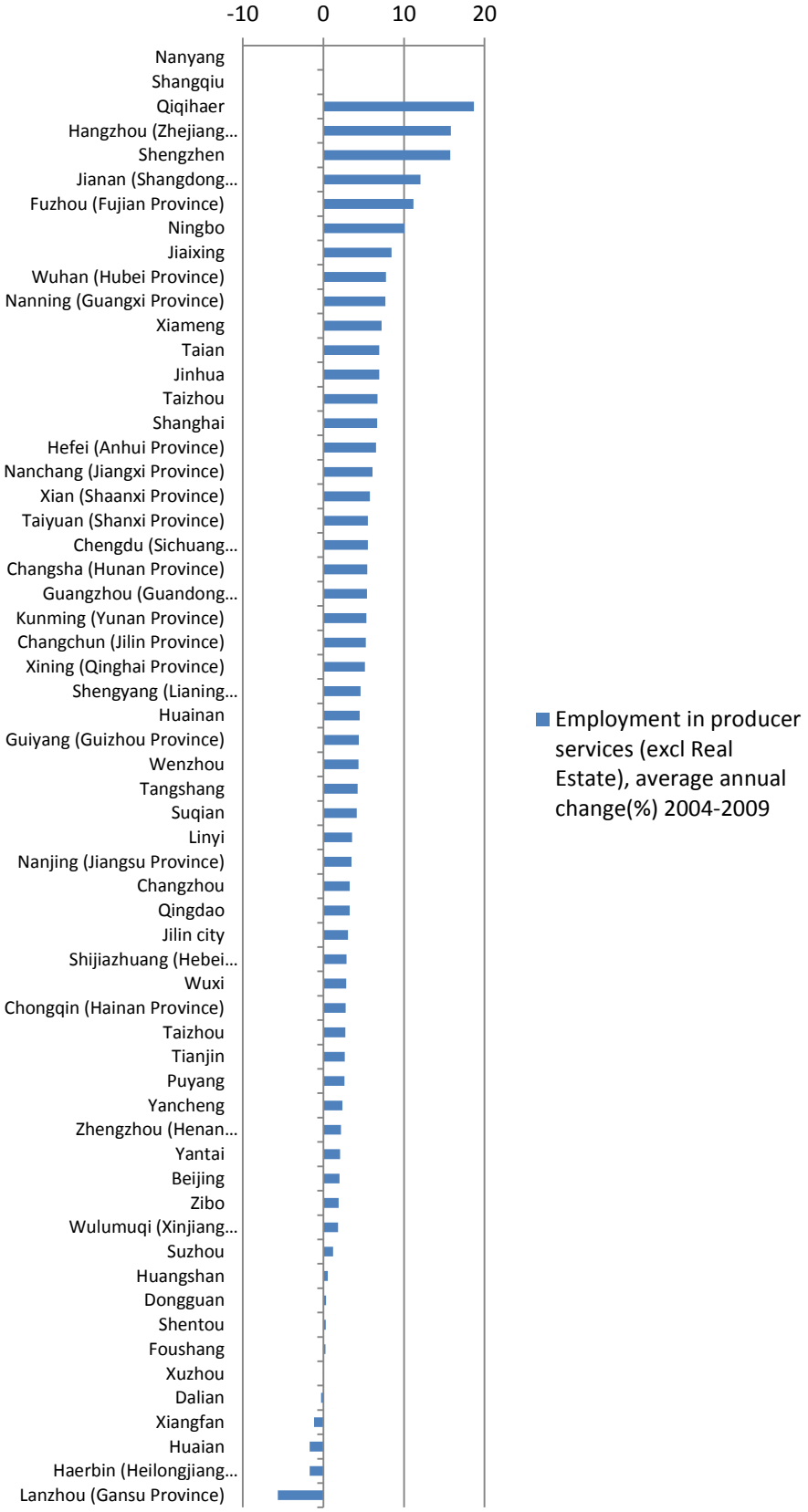
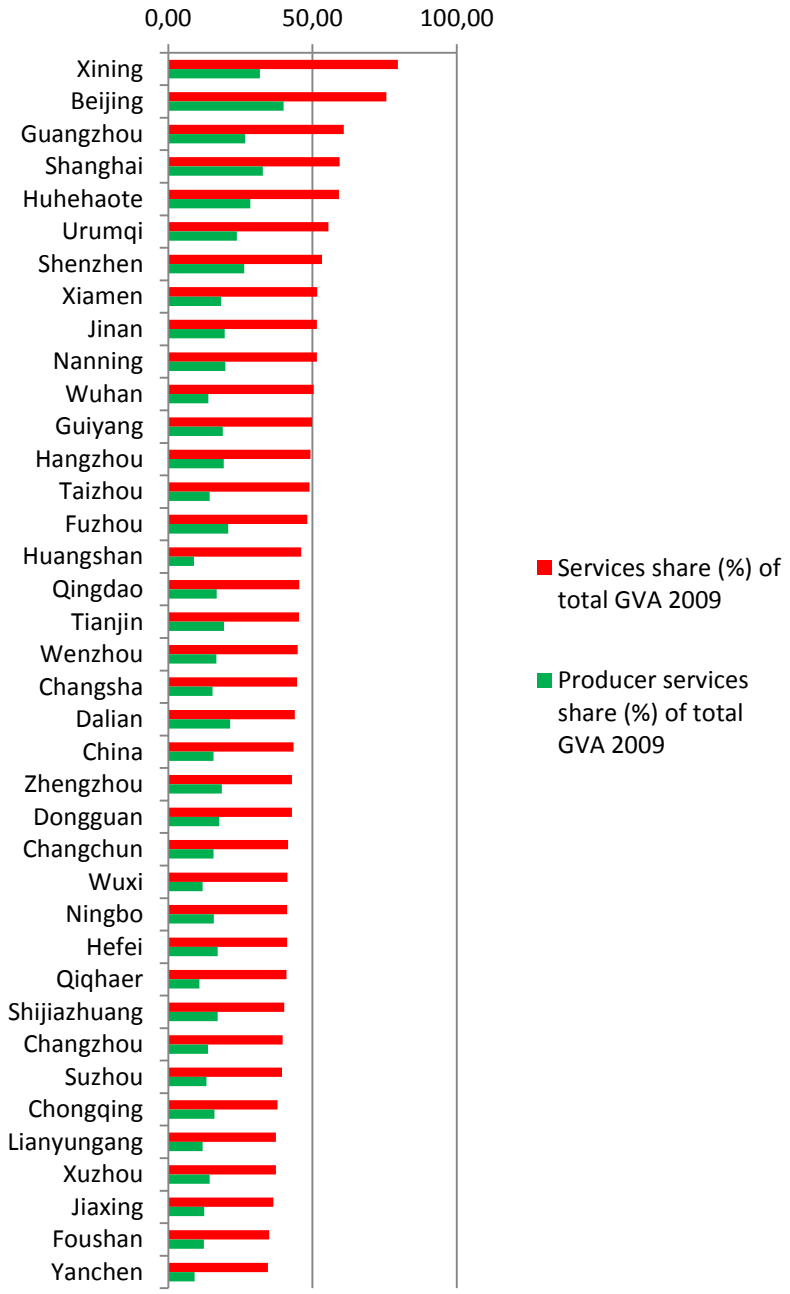


Figure 8: Employment in producer services, average annual change (%) (2004-2009: UrbaChina case study cities

Appendix, Figure 1: Average annual change (%) in producer services employment, leading cities (ranked), 2004-2009



Appendix, Figure 2: Services and producer services share of total GVA, major cities ranked by size of services GVA, 2009