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Policies for Inclusive Urbanisation in China

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POLICIES FOR INCLUSIVE URBANISATION IN CHINA

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Abstract/Résumé

Policies for inclusive urbanisation in China

Urbanisation in China has long been held back by various restrictions on land and internal migration but has taken off since the 1990s, as these impediments started to be gradually relaxed. People have moved in large numbers to richer cities, where productivity is higher and has increased further thanks to agglomeration effects. In the process, the rural-urban income differential has narrowed. Urbanisation also entails costs, however, notably in the form of congestion, all the more so as public transport provision has not kept up. Demand for living space is set to continue to increase as living standards improve, putting pressure on land prices. This can be offset by relaxing the very stringent restrictions on the use of agricultural land for building. For migrants to better integrate in the cities where they work, their access and that of their families to education, health and other social services must continue to improve, in particular via further changes to the registration system, coupled with more market-based rules on land ownership and use.

This Working Paper relates to the 2013 *OECD Economic Survey of China* (www.oecd.org/eco/surveys/china).

JEL classification: D63, H23, H41, H51, H52, H53, H54, H55, H77, I39, J11, J21, J61, K11, K39, N35, O18, O53, P21, P25, P26, P27, P28, Q15, Q18, Q53, R11, R12, R14, R21, R23, R28, R31, R38, R41, R48, R52, R58.

Keywords: agglomeration effects, agriculture, China, cities, congestion, housing, hukou, land, migration, pollution, public transport, scale economies, social services, urbanisation, urban-rural divide.

Comment favoriser une urbanisation plus inclusive en Chine

Alors que l'urbanisation était depuis longtemps freinée en Chine par diverses restrictions appliquées au marché foncier et aux migrations internes, elle s'intensifie depuis que ces obstacles ont commencé à être progressivement levés dans les années 90. Les villes plus riches, caractérisées par une productivité élevée et en constante progression du fait des économies d'échelle générées par l'urbanisation, enregistrent un afflux massif de migrants. Parallèlement, l'écart de revenus entre zones rurales et urbaines s'est resserré. Néanmoins, l'urbanisation a aussi un coût, notamment illustré par les problèmes de congestion, aggravés par le développement insuffisant de l'offre de transports publics. La demande de surface habitable devrait rester orientée à la hausse sous l'effet de l'amélioration du niveau de vie, ce qui exercera une pression sur les prix des terrains. Cette pression peut être atténuée en assouplissant les restrictions très sévères appliquées à l'usage des terres agricoles à des fins de construction. Pour veiller à une meilleure intégration des migrants dans les villes où ils travaillent, il faut continuer à améliorer leur accès et celui de leurs familles à l'éducation, aux soins de santé et aux autres types de services sociaux, notamment en poursuivant la réforme du système d'enregistrement et en adoptant une réglementation plus axée sur le marché en ce qui concerne la propriété et l'utilisation des terres.

Ce Document de travail a trait à l'*Étude économique de l'OCDE de la Chine*, 2013 (www.oecd.org/eco/etudes/chine).

Classification JEL : D63, H23, H41, H51, H52, H53, H54, H55, H77, I39, J11, J21, J61, K11, K39, N35, O18, O53, P21, P25, P26, P27, P28, Q15, Q18, Q53, R11, R12, R14, R21, R23, R28, R31, R38, R41, R48, R52, R58.

Mots clés : agriculture, Chine, clivage urbain-rural, congestion, économies d'échelle, effets d'agglomération, hukou, logement, migration, pollution, terres, transports publics, services sociaux, urbanisation, villes.

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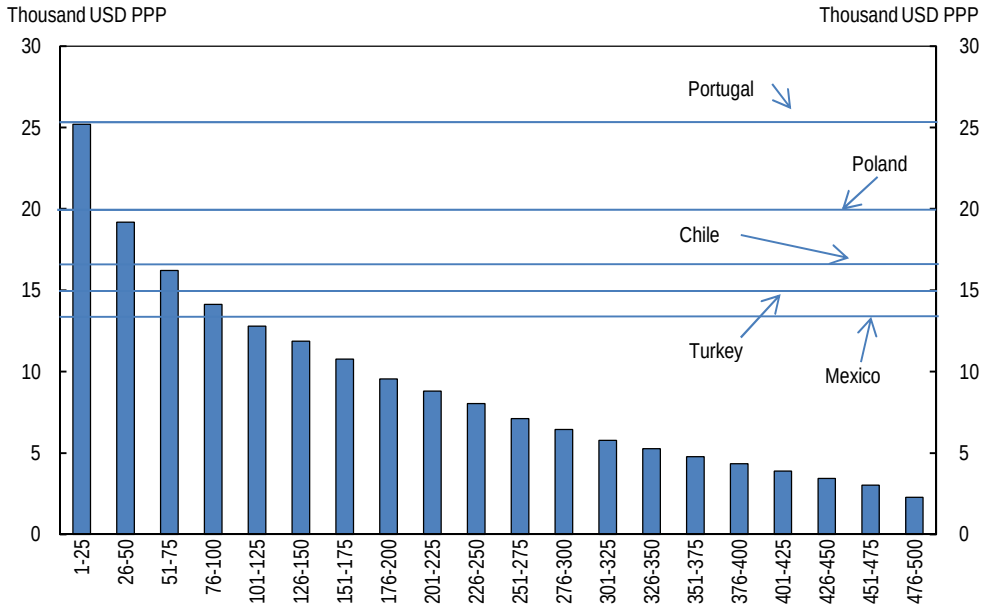
POLICIES FOR INCLUSIVE URBANISATION IN CHINA

Richard Herd, Thomas Chalaux, Vincent Koen and Xiao Wang[1]

Urbanisation has come a long way in China over the past two decades. Over half of the population is now officially classified as urban. By 2010, just under one-quarter of the Chinese population, amounting to 310 million people, lived in metropolitan areas with income per head matching that in the three lowest-income OECD countries: Chile, Mexico and Turkey (Figure 1). After a historical overview of the urbanisation process, this chapter discusses the associated benefits and costs (the environmental challenges stemming from the rapid expansion of cities are also discussed in Hill, 2013). It then examines the drivers of urbanisation – notably rural-urban migration – and the role played by government in the process. Going forward, both land rights and migrants' access to public services in cities are key for inclusive urbanisation.

Figure 1. The largest 500 Chinese metropolitan areas by GDP per capita: international comparison

GDP per capita by groups of 25 metropolitan areas in 2010, using the PPP exchange rate of the World Bank



Source: CEIC, National Bureau of Statistics: City Statistical Yearbook; Communiqués on 10th Census issued by local national Bureau of Statistics offices; World Development Indicators. The methodology for selecting and defining metropolitan areas is explained below.

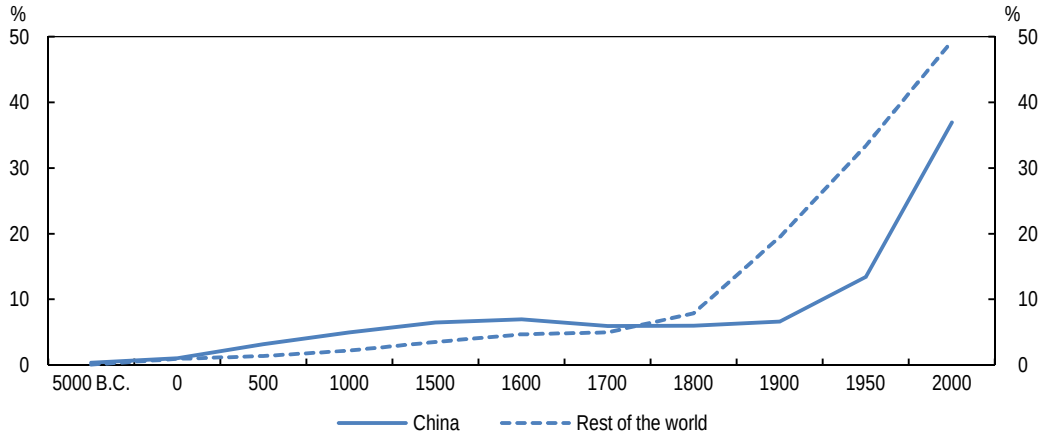
1. Richard Herd heads the China desk and Vincent Koen is Division Chief in the OECD Economics Department. Thomas Chalaux was a research assistant and Xiao Wang a consultant on the China desk at the time of writing. This paper was originally produced for the 2013 *OECD Economic Survey of China* published in March 2013. The authors thank Andrew Dean, Robert Ford, Sam Hill and Cristina Martinez as well as officials from the Chinese government for valuable comments on earlier drafts, and Nadine Dufour for editorial assistance.

Urbanisation in China: a long history

The first cities in China appear to have emerged after those in Mesopotamia, Egypt and India, probably because irrigation came later in China. By 1400BC the first major city of China (Anyang) developed with an area of around 3 km^2, substantially less than Babylon's. In contrast to Western cities, China's were part of a structured network of walled cities that controlled the neighbouring countryside (Trewartha, 1952). Chinese cities continued to grow under the Chou dynasty, with Chang'an (Xi'an) reaching a population of 146 000 by 195BC. They more than doubled in size in the next two centuries.

Under the Chi'in and Han dynasties, cities prospered and a two-level administrative structure was put in place with 36 provinces and 320 prefectures. After being destroyed, the city of Chang'an was rebuilt and became one of the largest cities in the world, along Babylon and Baghdad, with a population of over one million by around 700 – a size only reached by London in 1801 and Paris in 1850. Under the Ming and Qing dynasties, there were 13 cities with over 500 000 inhabitants (Chang, 1963). As a result, China's share of the world's overall urban population far exceeded its share of the total population up to the beginning of the industrial revolution in Europe (Figure 2). Even so, China largely remained a rural society with towns fulfilling a predominantly administrative and trading function. The urbanisation rate peaked around 1 600 and then slowly declined as the country remained inwardly-oriented economically and suffered from invasions. By the early 1900s, the urbanisation rate was barely above the rate achieved four centuries earlier.

Figure 2. Urbanisation rates in China and the rest of the world



Source: Goldewijk *et al*. (2010).

Urbanisation progressed slowly during the following 50 years. A number of major coastal cities emerged as foreign trade grew through the enforced opening of a number of cities with foreign concessions. Towns such as Shanghai, Tianjin and Guangzhou grew to over a million inhabitants. This process was interrupted by war and revolution, so that by 1949, at 12%, the urbanisation rate in China was only around one-third that in the rest of the world.

Government policies held back urbanisation until the 1990s

In the early years of the new China that emerged in the late 1940s, rehabilitation, the first five-year plans and the initial period of the Great Leap Forward brought the urbanisation rate up to close to 20% by 1960. However, the agricultural sector was unable to respond efficiently to the outflow of labour as it was still organised on a collective basis and grain supply fell. The government sent people back to the countryside to boost food production and by 1963 the urbanisation rate had dropped to 17%.

Government policies during this period left a long-standing mark on urban planning in China. The famines of the early 1960s reinforced the idea that national security requires a stable source of domestically-produced food, especially grains. An extremely restrictive household registration system (*hukou*) limited household mobility until the late 1980s.

The economic opening-up that started in 1978 saw a marked acceleration in urbanisation. Restrictions on population mobility were eased and many people were allowed to return to urban areas. In 1984, people with an agricultural *hukou* were allowed to move to cities as long as they could provide themselves with food and lodging. In addition, in small towns and county cities, pilot programmes were introduced to reduce differences between urban and rural *hukou* holders. Finally, a new temporary residence permit was introduced for people who moved outside their registered location. The entrepreneurial spirit generated by the liberalisation of farming helped create a large number of small enterprises drawing local people into towns and smaller cities, which were also favoured by the policy of industrialisation without urbanisation. The overall result was that during the 1980s and 1990s smaller cities grew faster than large cities (Fan, 1999; Anderson and Ge, 2005).

The faster development of smaller cities was in fact an explicit policy objective. In 1979, the Chinese Communist Party decided that the country should develop its small towns and gradually equip them with modern industry so that they could transform the countryside. The growth of large cities was to be constrained by building satellite cities around them. Twenty years later this policy was still in place, with the Communist Party stating that the government should avoid the "blind" flow of labour to large and even medium-sized cities, and calling for measures to promote the development of small towns.

The fast development of small cities came in a period when the price of land was effectively set to zero. All land in the administrative area of urban district governments belonged to the state. Urban land was given to state-owned enterprises (SOEs) which developed in accordance with the priorities of the government bureaux which managed them. This led to an irrational use of land in cities. For example, in 1990 in Shanghai over one-quarter of land in the central districts was under industrial use, which included housing for the workers in those firms. Experiments in selling land-use rights started in Shanghai and Shenzhen during the 1980s but it was not until 1990 that the State Council disseminated the *Provisional Regulations on the Granting and Transferring of Land-Use Rights for State-Owned Land in Cities and Towns*. This document introduced the concept of time-limited land-use rights (similar to land leases) that were transferable but did not confer ownership of the land itself. The law was implemented at the local level and most projects involved commercial developments.

But land and migration policies changed markedly…

While the legal framework had changed, progress in introducing a market in land was limited during the 1990s. Most local governments saw land as a means of housing new industrial enterprises. New development meant higher tax revenues, part of which could be kept by the local government. This resulted in competition between areas which meant that most land for industrial use was assigned without any payment. The transformation of the land market only occurred once the housing market had been reformed.

Reform of the housing market took over a decade. A 1988 government document called for privatisation of housing, but few SOEs responded and this stymied the reform as most urban workers were housed by their employer at the time. In 1994, a State Council *Decision on Deepening Housing Reform* created two types of new housing construction: economic housing and commodity housing, with the former being reserved for low and middle-income families. At the same time a housing saving system was introduced. The reform did not deliver the desired results (Deng *et al*., 2009): development companies started but most new housing was sold to SOEs that in turn sold the flats to employees at a large discount.

The nature of the urbanisation process changed in 1998, however, when the State Council issued its *Decision on Further Deepening Reform of the Urban Housing System and Accelerating Housing Construction*. This document broke the link between the enterprise and housing for its employees. SOEs were forbidden to buy new housing and had to sell their existing stock to the occupants, opening the way for commercial development of housing that responded to market requirements.

While the above reforms set the scene for market-oriented development, the *Land Administration Act* that came into effect in 1999 has constrained the urbanisation process. It provides that land should be split into three categories: *i)* basic agricultural land, which cannot be rezoned into building land without permission from the State Council; *ii)* remaining agricultural land (20% of total agricultural land), which can be rezoned only if other land is brought under cultivation, and subject to permission from the State Council if the rezoning covers more than 35 hectares; *iii)* land which was designated for development prior to the passage of the law.

Migration laws and regulations were liberalised after land and housing markets. As noted above, in the 1990s, the policy focus was still on preventing the rural labour force from moving to large cities, to wit the notice from the State Council and other Ministries on *Further Improving the Control of the Outflow of Migrant Workers*. Only in 2002 did policy start to change with measures to cancel fees for migrant workers and improve training.

…allowing rapid urbanisation and city expansion

Between 1978 and 2011, the urban population has grown by a factor of four. Before the late 1970s, the urban population was growing by less than 5 million people per year. By the decade that ended in 2010, it was expanding by 20 million per year. As a result the proportion of people living in urban areas rose from 17% to 51% between 1978 and 2011.

Not all people who live in urban areas live in cities (see Annex A1), yet cities rather than urbanisation are key to growth. Cities provide large labour markets where specialist occupations can thrive, facilitate the exchange of information and allow to cluster activities. In addition, cities offer diverse cultural and entertainment possibilities that are only viable in large economic catchment areas. For this reason, the development of cities seems more important than urbanisation itself. A dispersed set of villages each with a population density of more than a set level might be considered as urban but would not constitute a city where agglomeration economies can be reaped.

In China, the word city is used to describe an administrative area that might not, outside of China, be seen as city. A city can cover an area that is physically huge and contains both a large urban core and a vast rural hinterland (*e.g.* Chongqing). Within that hinterland, there can be areas that are also known as cities but which differ little from neighbouring areas which are not called cities. By the administrative definition there are over 600 cities in China, ranging in status from directly-controlled municipalities to provincial capitals with a direct link to the central government, prefectural-level cities and finally relatively small county cities. This classification takes little account of urbanisation factors but generates a hierarchy of areas, each with less administrative power. In order to exclude areas that are actually more rural than

urban, the new analysis presented below rests on the notion of metropolitan areas, identified using two criteria: an overall population greater than 300 000 and a population density exceeding 500 people per square kilometre at the lowest administrative level, which is that of a county. On this basis, there were 515 metropolitan areas in 2010 (Table 1). These generate the bulk of valued-added in China: indeed, just 200 of them accounted for slightly over half of GDP in 2010. The population data for 100 of the metropolitan areas, defined as above, are given in Annex A1.

Table 1. Administrative structures identified as metropolitan areas[1]

Type	2000	2010	2000	2010	2010		
	Number		Population (millions)		% of national population	% of national GDP	Density (people per km^2)
Directly-controlled municipalities[2]	4	4	39.0	58.6	4.4	10.7	2 317
Specially designated cities and provincial capitals	25	26	74.2	102.8	7.7	16.0	2 222
Specially designated cities which are not provincial capitals	5	5	16.8	22.5	1.7	5.3	2 421
Prefectural cities	143	157	151.8	180.9	13.5	20.7	1 205
County cities	111	112	92.2	99.1	7.4	11.0	762
Counties	226	211	170.0	149.7	11.2	7.6	656
Total	514	515	543.9	613.5	45.8	71.2	1 041

1 The definition of a metropolitan area excludes the population of those urban districts which had a population density of less than 500 people per km^2 in 2010.

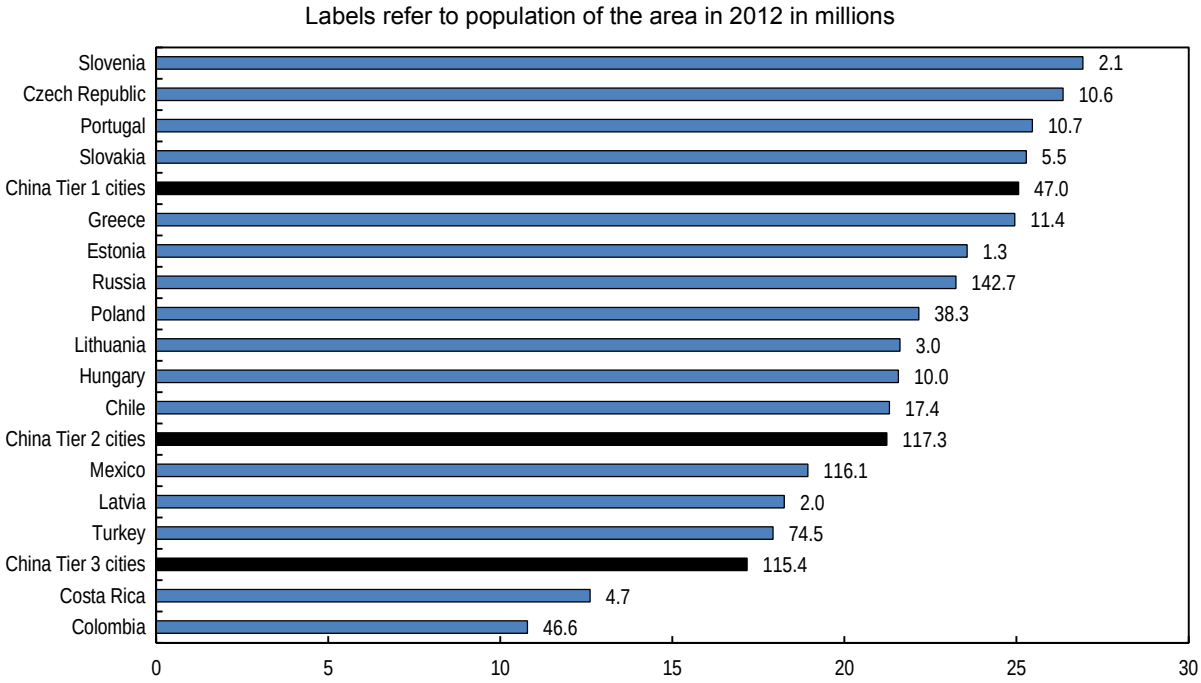
2. In the Chongqing Municipality, only the population of the urban districts of Chongqing city has been included.

Source: OECD calculations.

There are no precise rules that determine the place of a city in the administrative hierarchy and so often cities in China are referred to as belonging to a certain tier. While there is usually agreement about the areas in Tier 1 (Beijing, Guangzhou, Shanghai, Shenzhen and Tianjin), there is often no agreement about the cities in Tier 2 or Tier 3 and lower. Here, cities have been ranked on the basis of the average of their population and GDP ranks. The 25 cities following the Tier 1 cities are designated Tier 2, while the next 70 become Tier 3 cities. The ranking of the cities, their population, population growth and GDP in 2010 are shown in Annex 1, together with a summary table for the averages for Tier 1 to 5 cities.

Estimates updated to 2012 show that the average PPP GDP per capita (using a nationwide PPP exchange rate) of Tier 1 cities is close to that of several Central European OECD members (Figure 3), while Tier 2 and Tier 3 cities had GDP per capita similar to those in Chile, Mexico, Turkey but well above the latest Latin American countries in accession talks to join the OECD.

Figure 3. GDP per capita in Chinese cities and lower-income OECD member and accession countries in 2012

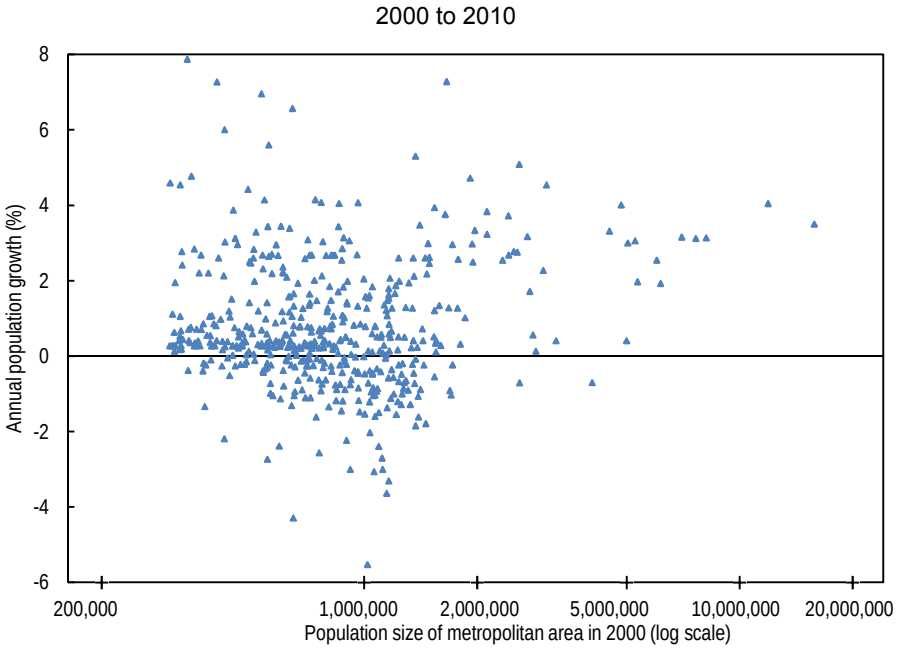


Source: OECD EO93 Database, IMF WEO April 2003 database; Annex 1, Table 1 2.1.

People have moved to higher-income cities

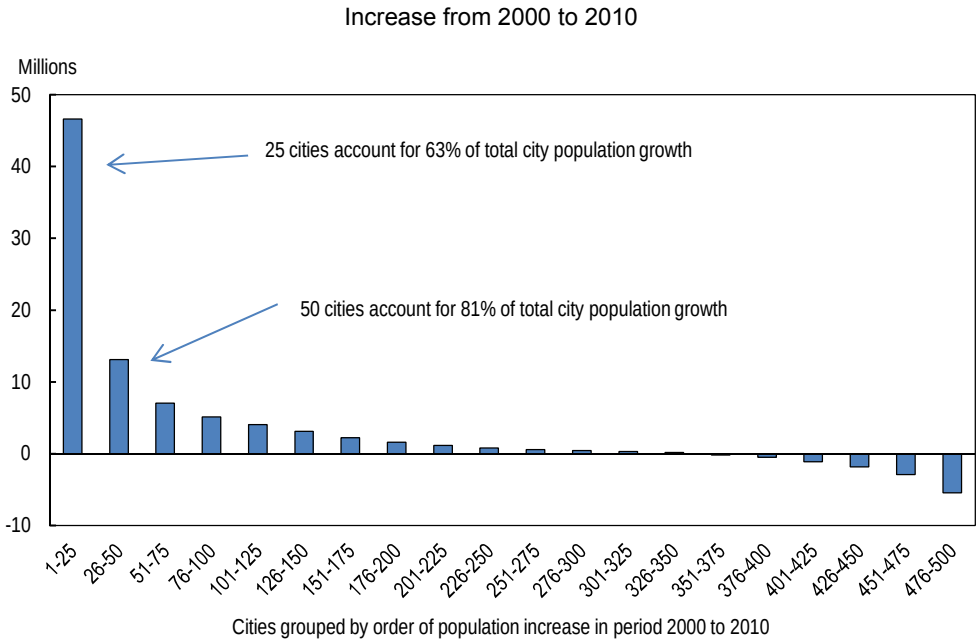
Higher-income cities have been acting as magnets for migrants from rural areas. Across the metropolitan areas considered here, a level of GDP per capita 10% above the average in 2000 has been associated with a 1.5% increase in population through 2010. In 2000, the largest cities already tended to have the highest incomes and so they have tended to see their population grow fastest (Figure 4). Indeed, just 5% of cities which had the largest population in 2000 accounted for over 60% of the absolute increase in the population of all the selected metropolitan areas (Figure 5), despite policy efforts to constrain the growth of large and super-large cities. At the same time, policies to favour the growth of small and medium-sized cities have indeed spurred the growth of cities of below one million inhabitants. In contrast, nearly one third of the selected metropolitan areas saw their population shrink in the decade ending in 2010. Moreover, a further 145 experienced net outward migration, even though their population did not fall.

Figure 4. Metropolitan areas: annual population growth and initial size



Source: National Bureau of Statistics: Statistical communiqués on the census issued by prefectural NBS offices.

Figure 5. The concentration of population increase across metropolitan areas



Source: OECD calculations using 2010 Census data.

But the urbanisation rate and size of cities remain relatively low

With larger cities expanding faster than smaller cities the size distribution of Chinese cities has moved closer to that seen in the rest of the world (Table 2). The share of the population living in cities of over 8 million inhabitants has almost tripled but, reflecting constraints on the growth of very large cities, still remains well below the proportion of the population living is such large cities in the rest of the world.

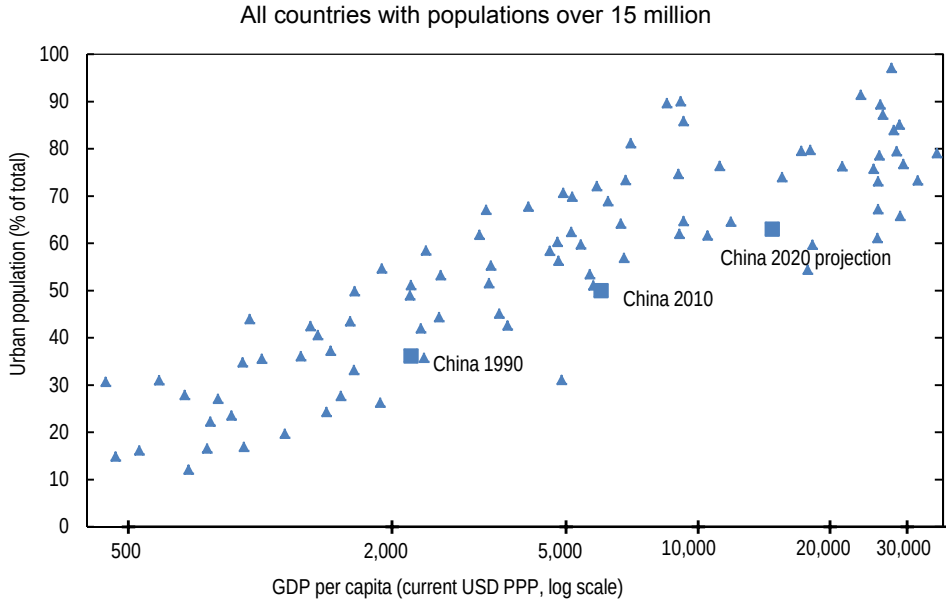
Table 2. City size distribution: China and the rest of the world

City size	2010		2000	
	China	World ex China	China	World ex China
	As share of total population			
Over 2 million	16.9	19.4	11.8	11.6
Over 8 million	5.9	9.6	2.1	5.7
	Number of cities per billion population			
Over 2 million	33.6	23.0	26.6	29.1
Over 8 million	4.5	5.6	1.6	4.4

Source: China 2010, 2000: National Bureau of Statistics Census communiqués and Census tabulations; World ex China 2010: Demographia (2012), 2000: Henderson and Wang (2004).

Despite the rapid growth of cities, the urbanisation rate in China is still somewhat below the level that might be expected on the basis of its per capita income (Figure 6). Indeed, the gap has barely changed in the past decade. The question remains whether urbanisation is a driver of income growth or whether higher incomes result in people wanting to move to cities, or whether it reflects the decline of the agricultural sector as a country develops. While estimating the agglomeration economies due to urbanisation is difficult, there is a robust consensus that such economies are substantial (Glaeser and Gottlieb, 2009).

Figure 6. Urbanisation and level of income worldwide



Source: World Development Indicators (IBRD) and National Bureau of Statistics.

Urbanisation has brought considerable benefits

Productivity and living standards are higher in large metropolitan areas

Agglomeration economies allow larger cities to be more productive, and explain that growth tends to be concentrated geographically. While urbanisation is thus a powerful engine of growth, it also brings other welfare gains, including by improving the variety of available goods and services for consumers (Glaeser, 2011). Moreover, agglomeration benefits obtain even when individual metropolitan areas are not completely contiguous. To wit, GDP per capita is very high in several urban corridors or clusters of cities, such as the two corridors running north-west and south-east of Shanghai. In all, there may be between 28 and 53 such areas across China (Kamal-Chaoui *et al*., 2009).

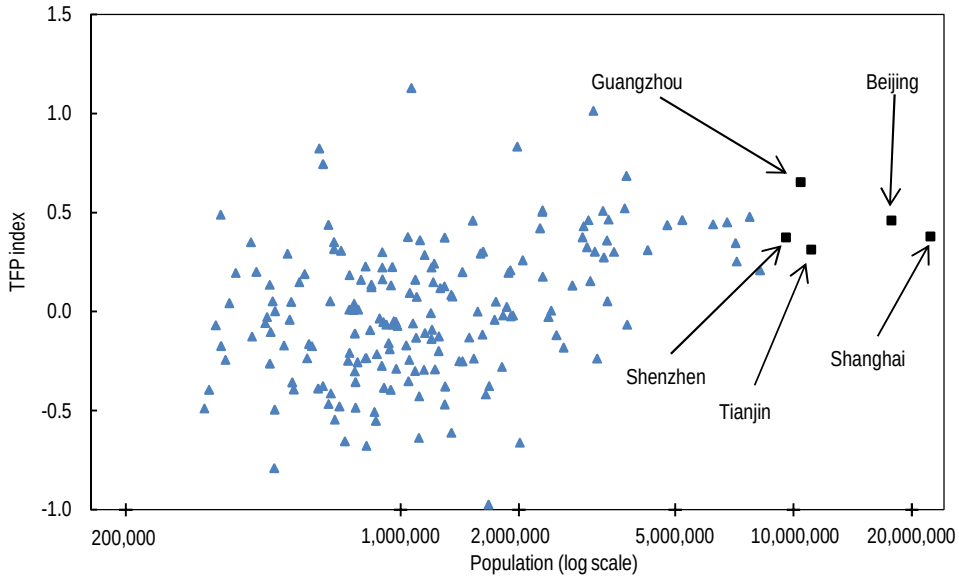
As with the increase in population, the creation of value-added is concentrated across cities. Indeed, 40% of the GDP produced in the 515 metropolitan areas stemmed from the top 25 ones in 2010, where on average GDP per capita, at purchasing power parity, was equivalent to Portugal's (Figure 1). The following 75 metropolitan areas produced a further 30%. The concentration of GDP is more extreme than that of population because the larger cities also display higher productivity. As with population, the extent of the concentration of GDP has increased somewhat since 2000. Even allowing for the differences in prices between urban and rural areas, the higher income levels in cities translate into higher living standards.

City size is a major determinant of income per capita, even if a simple correlation between the two can be misleading. Many factors influence city competitiveness (OECD, 2006): cities that were initially more productive thanks to a favourable physical location or political supremacy, for example, may have accumulated more capital; better educated people may have moved to larger cities, raising productivity. Focusing on size, two approaches have been used in the literature on Chinese cities: one used size as an input to explain the productivity of a city (Wang and Xia, 1999), the other tried to allow for increased commuting times in bigger cities (Au and Henderson, 2006). These two approaches gave very different results. Wang and Xia found that productivity gains outweighed external costs (as measured by government expenditure) until cities reached a size of 10 million people. Au and Henderson found that net of external costs associated with city size the productivity of cities peaked at a size of around 1 million. They concluded that most cities were undersized but a few were oversized, even in 1999. However, both studies used registered rather than actual city population, thereby overstating the extent of agglomeration economies since migrants are predominately in large, high-income cities.

Even so, the relationship between city size and productivity (proxied by GDP per capita) is fairly robust in China. In the largest ten (2%) metropolitan areas, GDP per capita is nearly 60% higher than in the bottom 2%. One major factor that can explain the differences in productivity across cities is the amount of capital available per person. The total capital stock in each of the chosen metropolitan areas cannot be measured. However, for the major areas the total fixed assets of industrial enterprises is available and can serve to proxy the total capital stock in a city. Using the actual population, as given by the 2010 census (rather than the registered population), as a proxy for employment, a simple Cobb-Douglas production function can be estimated and yields a capital share in income of 0.47. This estimate is in line with the results of macro-economic production functions and with income shares, as well as with the estimates in the two above studies.

Once the inputs of capital and labour are accounted for, there remain significant differences in productivity across cities that are correlated with city size (Figure 7): there is a clear positive relationship between the productivity that is unexplained by a standard Cobb-Douglas production function approach and population size. There are diminishing returns, however: the gain in efficiency from moving from a population of 400 000 to a population of 500 000 is much greater than the gain from moving from 20 million to 25 million.

Figure 7. Total factor productivity and city size[1]



1. The vertical axis of this chart shows the residual from an estimated Cobb-Douglas production function where the labour and capital coefficients have been constrained to add to unity. Employment has been proxied by population and capital by industrial sector fixed assets. The equation has been estimated over 180 metropolitan areas for which a full dataset was available in 2010.

Source: Authors' calculations.

It might be that as cities increase in size, efficiency stabilises or even starts to fall. In order to assess whether this might be the case in China, the average efficiency gain as size increases for cities with a population between 300 000 and 9 million has been used to estimate the average efficiency level in the five largest cities in China (Beijing, Guangzhou, Shanghai, Shenzhen and Tianjin). Actual efficiency levels in the mega-cities turn out to be in line with this relationship, except for Shanghai, the largest metropolitan area, where it is lower. This need not be related to size, however. Other factors affect the efficiency of a city, such as the business environment and economic model pursued by the local government.

Across OECD countries, the relationship between city size and productivity is much looser. There is some evidence that productivity rises with city size up to a population of around 6 million and then starts to decline – exceptionally large cities (so-called "mega-cities") may become "dysfunctional" (OECD, 2006). However, the relationship is extremely weak and barely statistically significant. One reason for the differences in the productivity relationship between cities in China and those in the OECD area may lie in the non-market barriers to city expansion in China both in the labour market and in the land market where administrative hurdles have, in the past, tried to restrict migration so preventing wage equalisation across the country and even within provinces (OECD, 2010a).

Such evidence as is available from outside China points to economies of scale in administration costs. In 635 Japanese cities, the cost per capita of providing public services was shown to decline with size (Nakamura and Tahira, 2008). When looked at by cost centres for a sub-sample of around 130 cities, increasing returns to scale were most noticeable in areas involving infrastructure but could also be important in the provision of some social services (Table 3).

Table 3. Elasticity of public expenditure per capita with respect to population size

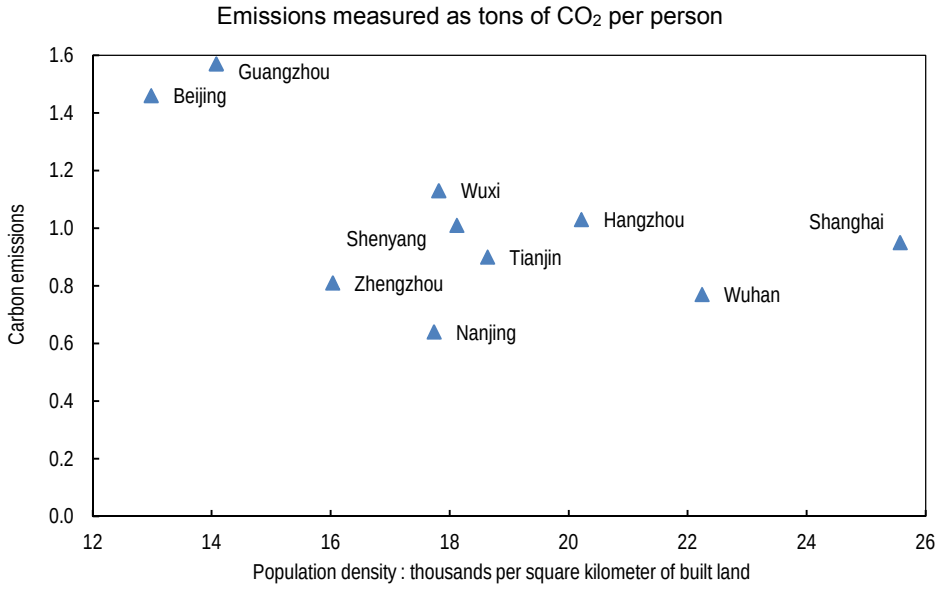
Prefecture	Sanitation	Civil engineering	Education
Hyogo	-0.101	-0.189	-0.117
Osaka	-0.573	-0.531	-0.598

Source: Nakamura and Tahira (2008).

Compact cities are energy efficient but industrial parks have proliferated

Cities in China tend to be compact and compactness can contribute to urban sustainability in many, mutually reinforcing ways (OECD, 2010b). The dense and proximate development patterns of compact cities reduce the intra-urban travel distances, result in a lower level of automobile dependence and offer the possibility of more district-wide energy utilisation and local energy generation (Matsumoto and Sanchez-Serra, 2012). Several studies in OECD countries have shown that it is the density rather than the overall size of a city that is important in reducing carbon dioxide emissions and this also appears to be the case in China, where cities are far denser than in the OECD area (Figure 8).

Figure 8. Carbon emissions from ground transport per capita and population density



Source: Wang *et al.* (2012).

However, while cities are relatively compact, standalone industrial and mining sites have proliferated. During the initial stages of China's economic take-off, national development zones were a key source of growth. Following their success, most local authorities, down to the county level, created similar zones or industrial parks. By 2003, there were nearly 7 000 zones covering an area nearly 30% greater than the then built-up area of the country. Even though the government closed many of the undeveloped zones, standalone industrial and mining sites still cover vast areas, using up more land than cities and designated towns (Zhang, 2011, He *et al.*, 2012). The central government is concerned that frantic industrial land development by local government may lower the efficiency of land use and give rise to excessive demand for transport.

Mitigating the costs associated with urbanisation

While urbanisation brings a number of benefits, it also has costs, especially beyond a certain size. One relates to congestion, which can be alleviated through congestion charging (Hill, 2013) and by developing the transport network and providing adequate public transport infrastructure. Cities also regroup many industries and generate more trips than rural areas, so generating an increase in emissions of pollutants. However, the evidence from Europe is that the external costs of emissions do not rise in line with city size. As a result, the per capita external cost of pollution tends to fall with increases in city size beyond a relatively low threshold (Holland and Watkiss, 2004). Moreover, if appropriate pollution taxation is introduced, the externalities can be internalised and reduced, making the city more attractive (Henderson, 1974).

Public transport provision has fallen behind urbanisation

Public transport policy began to change a few years ago. In 2006, the NDRC, Ministry of Finance, Ministry of Construction and Ministry of Labour jointly spelled out guidelines to cities on the *Economic Policy for Priority Development of Urban Public Transport*. In 2007, the State Council made increasing public transport use a key element of its Comprehensive Energy Reduction Work Programme. However, at city level, there is often no integrated structure for achieving this goal: responsibilities are spread over many departments (Pan, 2011).

The 12th Five Year Sub-Plan for Transport calls for the orderly construction of light rails, subways, tramcars, and so forth, and for urban rail transit networks based on differentiated targets reflecting size and characteristics. Cities with a population of over 10 million should gradually enhance their existing urban rail transit network, cities over 3 million should establish a framework for an urban rail transit network, and cities over 1 million should construct large-capacity ground public transport systems as needed. The government has an objective of raising the market share of public transport to 40% by 2015.

A considerable deficit in provision needs to be overcome. In the ten largest cities, the average rail density per square kilometre is only one quarter that in major urban areas outside of mainland China and the density per million people is only one fifth (Table 4). In these ten areas, bringing rail density up to world averages would require constructing 5 000 kilometres of track. The new metro system in Hangzhou is expected to cost CNY 0.9 billion per km ($140 million), far less than new subways systems in Europe. Even so, the cost of bringing the ten major Chinese cities up to the world level of provision, given their population in 2010, would amount to CNY 4.5 trillion (11% of 2010 GDP).

With around 20 million people migrating to urban areas each year, the target for public transport will need to be raised. If the experience of the past ten years were repeated, just over half of the increase in urban population would take place in the 50 cities with a population currently at or close to 2 million. The density in the smallest quarter of these cities (in terms of population per square kilometre of built area) may not be high enough to justify metros as it is well below the 15 000 threshold considered necessary for a subway system. Even so the built area of the largest three-quarters of these cities is likely to expand at least in proportion to population, creating the need for around another 1 500 km of urban railways. Starting with the stimulus plan of 2008 and continuing with the announcement of projects authorised under the 12th Plan, the government has given the green light for the construction and extension of subways in 33 cities, which will bring the total number of cities with subways to 35 (Table 5). The effort is being undertaken at a time when the level of economic development in major cities is in line with that in the United Kingdom and France when their subway lines were largely completed. In the following five years, construction is projected to continue apace and by 2030 the total length of all networks may approach 11 000 km. The eventual expected availability and density of the networks varies considerably across cities. A number of smaller ones have objectives in terms of availability and density that are well above those found in bigger cities. There may thus be a degree of over-investment in subway networks in smaller cities.

Table 4. Rail transport systems in large metropolitan areas

As of 2012

	Length of transport system			Demographic indicators			Transport indicators	
	Commuter rail	Subway	Total	Popula-tion	Area	Density	Availability	Density
	Kilometres			million	km^2	people/ km^2	km/million people	metres/ km^2
Outside mainland China								
Hong Kong, China	0	174	174	7	275	25 455	25	633
London	1 912	436	2 348	12	4 144	2 951	192	567
Osaka-Kobe-Kyoto	1 095	234	1 329	15	2 719	5 608	87	489
Paris	1 012	213	1 225	10	2 745	3 515	127	446
Seoul/Incheon	249	701	950	23	2 163	10 402	42	439
Tokyo-Yokohama	1 779	360	2 139	31	5 258	5 934	69	407
Singapore	0	147	147	5	466	10 944	29	314
Nagoya	528	89	617	8	2 823	2 851	77	219
New York	979	456	1 435	20	11 137	1 823	71	129
Taipei	0	110	110	8	1 140	7 281	13	96
Mainland China								
Shanghai	56	312	368	22.3	2 825	5 776	16.5	130.3
Guangzhou	0	232	232	10.4	1 953	5 263	22.3	118.8
Tianjin	0	131	131	11.1	1 400	5 166	11.8	93.6
Shenzhen	0	178	178	9.6	2 505	6 579	18.5	71.1
Beijing	86	372	458	17.7	7 537	4 804	25.9	60.8
Fosham	0	20	20	6.8	333	20 420	2.9	60.1
Wuhan	0	56	56	7.7	1 024	7 520	7.2	54.7
Chongqing City	0	87	87	7.5	1 774	7 979	11.6	49.0
Nanjing	0	87	87	7.2	2 741	4 758	12.1	31.7
Dalian	0	63	63	3.4	3 068	7 930	18.5	20.5

Source: Various.

As cities become larger, the strategy may need to change from building subway systems to building commuter rail systems that have less frequent stations and hence achieve faster journey times from the more distant parts of cities. In Beijing, a commuter rail system is being developed. It is not managed by the urban transport system but by a subsidiary of the Ministry of Railways. By 2020 it is expected to be of a similar size to the current metro network.

A newer development has been the growth of bus rapid transport (BRT) systems but this has not been sufficient to improve the overall availability of buses. Eleven cities now have BRT, with dedicated lanes for buses on existing highways or in some cases on newly-built roads. The total length of these systems is very modest, at around 650 km, and BRT is not widespread yet: one third of the Chinese network is in a single city, Guangzhou, where the 22 km dedicated route carries slightly over 800 000 passengers per day and has quickly paid back its investment. This passenger flow is greater than that on all but two metro lines in China and equivalent to 40% of the entire number of bus riders in New York City (Hughes and Zhu, 2011). This experience replicates success in other cities where BRT delivers high passenger flows at relatively low cost (Suzuki *et al.*, 2011). However, local governments have not invested sufficiently in this form of public transport. The overall number of buses grew by 5.4% per year between 2000 and 2010, barely faster than the growth of built land in metropolitan areas. By contrast the road area grew by 8.4% annually and the number of privately owned cars at an annual rate of 25%.

Table 5. Existing and planned subways in China

	Population of urban districts 2010	Area	Length of subway and commuter rail network as of 2012	Length of projects under construction	Planned over the longer haul	Eventual target 2020 or 2030	Eventual availability of network	Eventual density of network
	million	km^2	km	km	km	km	km per million people	metres per km^2
Foshan	6.8	333	20	139	107	266	39.1	799
Wuhan	7.7	1 024	56	63	411	530	68.8	518
Zhengzhou	4.3	455	0	53	149	202	47.0	444
Guangzhou	10.4	1 953	232	318	291	841	80.9	431
Fuzhou	2.9	556	0	55	129	184	63.4	331
Shanghai	22.3	2 825	368	202	307	877	39.3	310
Taiyuan	3.4	839	0	49	187	236	69.4	281
Dongguan	8.2	1 088	0	37	227	264	32.2	243
Shenyang	5.2	1 353	50	94	182	326	62.7	241
Nanjing	7.2	2 741	87	58	455	600	83.3	219
Tianjin	11.1	1 400	131	90	81	302	27.2	216
Ningbo	3.5	478	0	21	80	101	28.9	211
Xi'an	6.5	2 868	21	75	501	597	91.8	208
Shenzhen	9.6	2 505	178	159	126	463	48.2	185
Nanning	2.3	1 014	0	32	146	178	77.4	176
Chongqing	7.5	1 774	87	128	86	301	40.1	170
Wuxi	3.0	1 460	0	58	188	246	82.0	168
Beijing	17.7	7 537	458	28	650	1136	64.2	151
Harbin	4.8	1 142	0	17	145	162	33.8	142
Hangzhou	6.2	2 465	0	49	230	279	45.0	113
Qingdao	3.7	2 081	0	54	177	231	62.4	111
Nanchang	2.3	1 622	0	50	118	168	73.0	104
Guiyang	2.3	2 129	0	55	142	197	85.7	93
Dalian	3.4	3 068	63	150	49	262	77.1	85
Suzhou	1.6	1 669	25	22	94	141	88.1	84
Wenzhou	3	2 908	0	51	184	235	78.3	81
Changchun	2.9	3 547	51	43	163	257	88.6	72
Kunming	3.3	2 612	18	83	86	187	56.7	72
Lanzhou	2.5	2 922	0	27	180	207	82.8	71
Hefei	3.4	4 727	0	56	266	322	94.7	68
Shijiazhuang	2.7	1 188	0	35	24	59	21.9	50
Xiamen	2.3	5 155	0	31	215	246	107.0	48
Chengdu	7.1	5 473	40	67	143	250	35.2	46
Changsha	3.1	2 560	0	46	60	106	34.2	41
Changzhou	3.3	7 128	0	54	75	129	39.1	18
Total	**197.5**	**84 599**	**1 885**	**2 549**	**6 654**	**11 088**	**56.1**	**131**

Source: Various.

While there are no statistics on average daily commuting times in all Chinese cities, in Beijing and Shanghai, they are 79 and 69 minutes respectively (Zhaopin *et al*., 2012), well above the OECD average of just under 40 minutes and higher than in Korea, the OECD country where commuting takes up most time (OECD, 2011). The development of high-volume urban transport systems has not kept pace with city growth, leading to excessive growth in the number of cars. In Shanghai, though, new car owners have to purchase a licence plate in an auction, at a cost that in spring 2013 exceeded $14 000 per car. Use of effective pricing could reduce the extent of congestion to an efficient level. Indeed, in August 2013 the Beijing government announced a plan to introduce time-varying congestion charging.

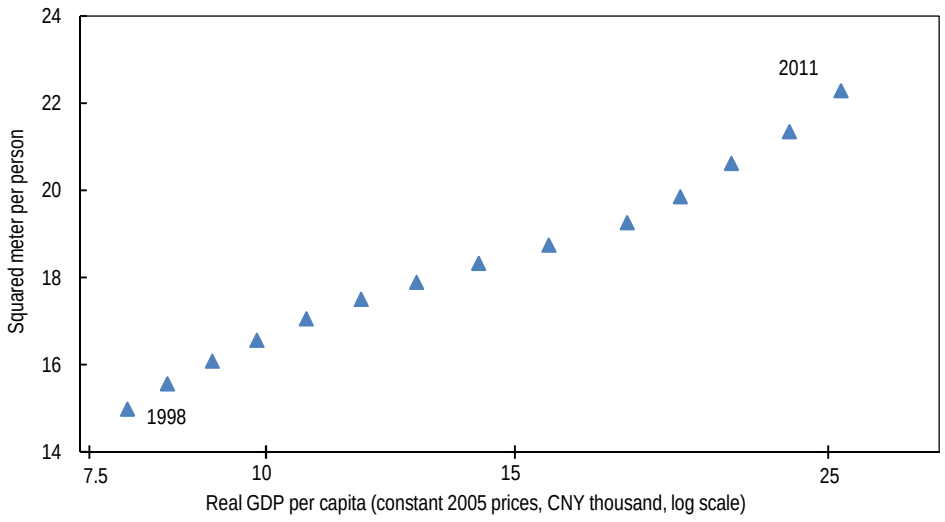
Housing and land

Demand for living space has been rising

Since the liberalisation of the housing market the average floor space occupied by an individual has steadily increased, helped by a decline in average household size. It is difficult to be precise about the extent of the improvement. Survey data are available but in urban areas they exclude migrants, whose housing demand is much lower (*e.g.*, in Beijing, their average floor space is just 8.2 m^2, against 27 m^2 for official residents, according to Zheng *et al.*, 2009). It is possible to estimate the total floor area of housing from new construction data but these suffer from another defect. The official data only counts housing on state land and not that on collective land within cities. Such housing is always considered by the government as rural even if it is quite clearly urban in the normal meaning of the word. This anomaly stems from the legal distinction between rural and urban land. The former is owned by the village council on a collective basis whereas in the historic urban areas, land is owned by the state. As cities have expanded the urban areas have surrounded rural areas. A significant proportion of what by appearance and location is urban land is officially classified as rural land. In many major cities, developed collectively-owned land is equivalent to one-third of the area of developed state-owned land.

Given the conflicting definitions of urban and rural in different official statistics, the most effective way to assess the increase in overall living space is to use a national average. Based on initial average living space data for 1978 (when this distinction was of little importance due to the smaller size of cities and the near absence of migration), and the subsequent construction of new property and demolition of existing buildings, the average living space gross floor area available to an individual has increased from around 7.5 m^2 to around 22 m^2 in 2011, very much in line with the growth of real incomes (Figure 9).

Figure 9. The relationship between living space and GDP per capita



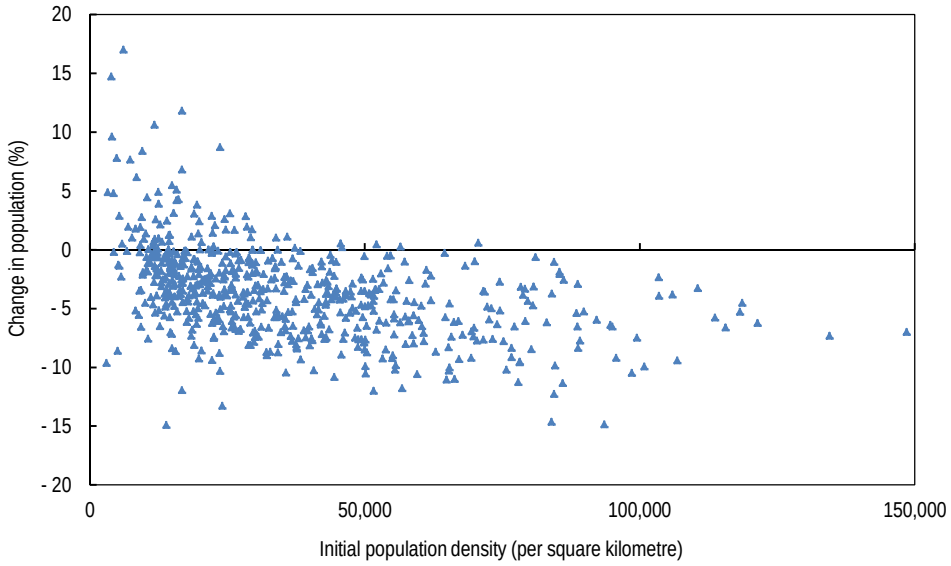
Source: CEIC, NBS and OECD calculations.

Demand for housing space has, however, increased less than in other East Asian countries: in China, a one percentage point increase in income has been associated with an increase of living space of 0.06 m^2, compared with a gain of 0.13 to 0.25 m^2 in a cross-country panel (Berkelmans and Wang, 2012). This is probably related to the scale of internal migration in China. As the income of migrants rises, their incremental demand for housing is extremely low (less than one quarter of the increase registered for official urban residents). Even so, with rapid per capita income growth since the liberalisation of the housing market in 1998, per capita absolute housing demand has risen by 0.5 m^2 per year, equivalent to a demand increase of 2¾ per cent annually.

And people prefer lower-density living

The fall in population density has been concentrated in the metropolitan areas with the highest initial population densities: where population density was initially low (below 10 000 people per km^2), it has in fact often increased (Figure 10). This is in line with studies showing that higher wage levels are associated with lower densities and with studies of local housing prices showing that high plot ratios for apartment developments lower housing prices.

Figure 10. Change in population density and initial density



Source: National Bureau of Statistics census communiqués.

Densities are likely to continue to decline in a number of major urban areas for many decades. In the Pearl River Delta area, for example, the city of Dongguan has an average population density of 89 000 per km^2, while in certain areas of Shenzhen population densities are over 200 000 per km^2 of residential land (Wang, Wang and Wu, 2009). Such high densities are unusual in developed countries and in China are a reflection of the small amount of space demanded by migrants and historical acceptance of dense living conditions.

The extent of new and existing transport infrastructure has also been a key factor in lowering the very high densities formerly seen in Chinese city centres. In cities with one radial railroad line, 14% of central city output moves to the outskirts. Road networks have an even more pronounced impact on the location of people. Each ring road in Chinese cities results in a marked drop in the share of the city centre population in the prefecture and in an outward movement of industrial population (Baum-Snow *et al.*, 2012). The latter tends to reduce the cost of central accommodation and so allows a greater influx of migrants. Indeed, the provision of a peripheral ring road to each prefectural city without such infrastructure in 2010 would likely raise the urban population by 50 million people (Baum-Snow and Turner, 2012). Moreover, the outward movement of production generated by rail networks benefits neighbouring rural areas, as documented in other studies of Chinese counties (Banerjee *et al.,* 2012).

Population growth has added to the demand for extra housing

The growth in the population of cities has added to the demand for extra living space generated by higher incomes. Overall, population density has fallen (Table 6), mostly reflecting greater floor space per person. In the 515 metropolitan areas, almost 52% of the increase in the built area between 2000 and 2010 has been the result of an expansion in the average living space, while population increase has accounted for 44%. In county-level cities, population growth has not contributed much to demand for land, which has rather resulted from a decline in the building density and an increase in average floor space per person. The extent of land used for construction has been a major source of concern to the authorities in China. Yet, between 2000 and 2010, the overall increase in the use of land for construction in the 515 metropolitan areas has been just 1% of total arable land, bringing the total built-up area of theses region to just one fortieth of total arable land, with the average diameter of the built-up surface of these metropolitan areas rising from 9 km to 12 km.

Table 6. Population and building densities for metropolitan areas

	All metropolitan areas				
	Annual average growth rate 2000-10				
	All densities	Higher densities			Lower densities
	Type of administrative city				
	All	All	Above county level	County level	Other cities
Population	1.5	2.1	2.4	0.7	0.3
Floor space per person	2.8	2.8	2.8	2.8	2.8
Total demand for floor space	4.3	4.9	5.2	5.0	3.1
Total built area	5.1	5.1	5.4	6.5	3.9
Building density	-0.8	-0.2	-0.2	-1.5	-0.8
Population density	-3.4	-3.3	-2.8	-5.5	-3.5
Memorandum items					
Built-up land as share of cultivated land (%)	3.1	2.4	2.1	0.3	0.8
Number of areas	631	305	192	113	326
Share of total population (%)	100	67.2	51.8	15.4	32.8

Source: City Statistical Yearbook, Statistical communiqués for census results of individual cities.

Urbanisation and the demand for more space has pushed up housing investment

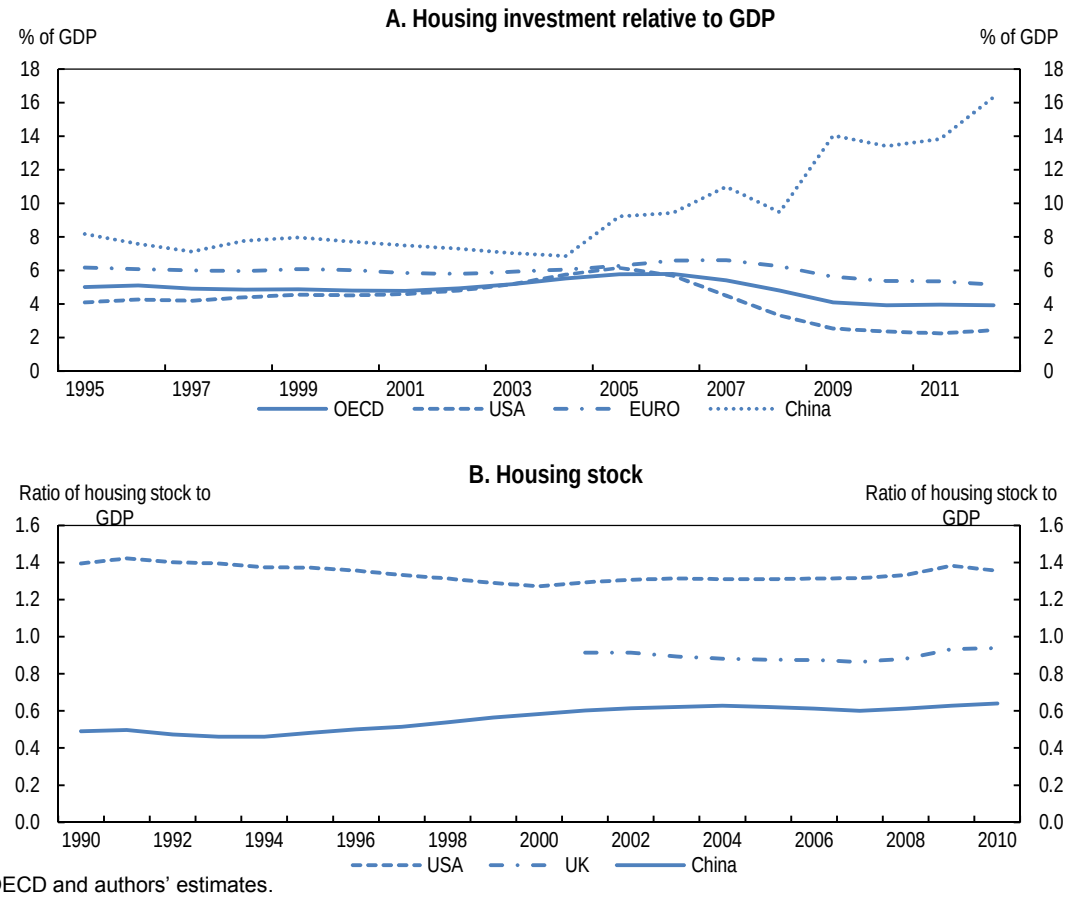
Massive urbanisation has necessitated a marked increase in the resources devoted to housing. In the first 30 years of the new China housing was not seen as a priority. Indeed, it was not until 1981 that the average living space for urban dwellers recovered its level of the early 1950s. By then the average per capita living space was still only 4 m^2 per capita, equivalent to around 8 m^2 of gross floor area per person (see Annex A2 on the various measures of living space). After 1980, urban housing was given more emphasis but investment remained low, at around 2% of GDP. In rural areas, however, the liberalisation of agriculture and the migration to small towns and cities gave rise to a boom in rural housing that ended in the mid-1990s as migration to small towns fell back.

The urban housing market began to expand in the second half of the 1990s as land-use rights became marketable. Property developers entered the market, but initially few individuals bought their own apartment. Rather, housing units were still purchased by SOEs and allocated to their employees. But with the liberalisation of the housing market in the late 1990s investment in housing surged. Moreover, the nature of the market changed, with real estate developers selling apartments to individuals. Rural investment also grew rapidly. Two trends underpinned this boom: first, many rural areas were effectively engulfed by urban areas; secondly, migrant workers invested in a house in their village of origin.

Overall, the coincident boom in urban and rural housing pushed up investment in housing. There are no official data for residential fixed capital formation or for the housing capital stock. However, both series can be estimated from other official data sources (see Annex 2), and suggest that residential gross fixed capital formation rose to over 14% of GDP by 2011 (Figure 11, Panel A). The share of investment in GDP is over three times that in OECD member economies, but with high capital consumption and rapid GDP growth the value of the housing (excluding land-use rights in China and land elsewhere) remains low in relation to developed economies and has been quite stable despite high net investment (Figure 11, Panel B). However, the estimates of gross fixed capital formation exclude the cost of transforming raw land, be it farmland or land that already has structures on it. This investment is undertaken by the government and included in the sale price of land (see below). A further factor causing the level of investment to be understated is that most Chinese apartments are sold either as shells or in a semi-finished state with the fitting-out spending borne by the acquirer.

Figure 11. Residential investment and housing stock

Construction costs only



Source: OECD and authors' estimates.

The extent of investment in housing has raised concern that dwellings have been built in some areas without any underlying demand, giving rise to so-called ghost towns, *e.g* the new suburb of Kangbashi outside of Ordos in Inner Mongolia. There is no up-to-date information on the extent of vacant housing as the last housing Census in China was conducted in 1985.

Four types of vacant property can be considered: property under construction, property that has been finished and sold but is awaiting fitting-out by the owner, property that is completely finished, sold but left empty and finally property that is finished but unsold. Official information is only available on the last category of property. This type of vacancy is relatively limited since 75% of all property is sold before construction starts with payment being made in instalments. At the end of 2011, there were approximately 2.5 million apartments awaiting sale. Given the normal plot ratio and the need to provide roads and public facilities, these apartments probably occupied around 200 km^2 of land. While this may seems large, the unsold stock represented no more than three months of total sales, though a much higher proportion of sales of completed properties.

In a number of areas, the extent of new property that has been left unused has resulted in significant declines in prices, especially when there have been adverse developments in the local economy. In the new suburb of Ordos, major price declines of up to 70% have been reported as the local economy stumbled following declines in coal sales. Similarly in Wenzhou and in the province of Hainan significant falls have been reported. Nationally, however, after a short decline, prices rebounded. That said, any market where there are significant amounts of empty housing bought in anticipation of price increases remains vulnerable to changes in the economic outlook.

Responding to the demand for affordable housing

After the government opened the housing market to private sector development in the 1990s, it created three programmes to ensure that certain groups in society were still able to access the housing market (Table 7). These programmes were based on the "Economic and Comfortable Housing" (ECH) plan. Under this plan, households satisfying certain criteria were eligible to buy apartments at below their market value. No cash subsidy was paid to households, rather the local government supplied land to a developer at no cost and the developer was obliged to keep the profit margin to 3%. This programme was popular with local governments as it involved only foregone income from land sales rather than a cash outlay. However, it only benefitted relatively high income households. Eligibility for this programme was gradually tightened and by 2009 only 2.5% of housing was sold through this plan, down from 25% at the beginning of the decade.

Table 7. The Social Housing Programme of the 12th Plan

Sub-programmes	Target group	Share in Social Housing Programme under the 12th Plan	Start of sub-programme
Economic and comfortable housing	Low income households	12%	1998
Price cap housing	Middle-income households	9%	2007
Public rental housing	Low and moderate income, new employees and migrants in certain cities	39%	2010
Cheap rent housing	Very poor households		1994
Resettlement from demolished houses	Owners of demolished house but not tenants	40%	

Source: Zou (2014) and Ministry of Housing and Urban Development

Eventually, as eligibility for this programme was tightened, a new programme was introduced, the "Price-Cap Housing" (PCH) plan. Under this scheme, property developers bid for land but the local authority sets a cap on the sale price of the apartments. The main difference between the ECH and the PCH programme is that under the former the owner cannot resell the apartment for between five and seven years, whereas under the latter programme there is no lock-up period. This programme was unpopular with local authorities as they feared it would push down the price of land and so jeopardise their ability to build infrastructure with the proceeds of land-use right sales. The third of these programmes was designed to provide cheap rental dwellings. It was not popular with local governments because it imposed a considerable cash burden on their budgets both for construction and for subsequent maintenance which was generally not covered by rental income.

By 2007 about 4% of the registered urban population lived in either ECH or PCH units with almost 70% of the households concerned falling in the in the upper-middle income group (the 5th to 7th decile of the urban household distribution) (Man, 2011).

Faced with the sharp rise in housing prices induced by the 2008/9 stimulus package, the government introduced a new social housing policy, sometimes known as an affordable housing policy. In total, the objective was to provide 36 million apartments during the period of the 12th Plan. This policy aimed to expand the three programmes listed above and added a new programme called "Public Rental Housing". These four programmes were expected to produce around 22 million dwellings in the period 2011 to 2015. In addition, a further 14 million new units would be built as compensation for the demolition of low quality housing in urban areas, but situated on rural land and labelled as "shanty towns". The apartments

designated as re-settlement compensation do not necessarily represent extra construction; as the housing law requires developers to compensate existing land use-right others with alternative accommodation, and sometimes with several apartments depending on the value of the use-right.

By June 2013, halfway through the programme, about one-third of the scheduled number of apartments had been completed, with total outlays on completed housing amounting to 2% of GDP over the same period. No detail of outlays under the various categories has been released. However, in 2010, the value of construction of economic housing, one of the components of the social housing plan, amounted to only 0.2% of GDP. Budgetary information also shows that outlays on subsidies for rental housing have increased substantially from 0.2% of GDP in 2009 to a 0.8% of GDP in 2012. Excluding the dwellings built as compensation for shanty town redevelopment, if the plan should result in an extra 10% of urban households living in one form or another of affordable housing.

The role of government in urban development

While the housing sector has become almost completely market oriented, government still plays a key role in urban development. Land in urban areas is owned by the state, which can either sell land-use rights or allocate them to third parties, or transfer them to companies wholly owned by the local government in exchange for equity in these companies. Once the market in land-use rights was established, local governments quickly realised that the powers given to them under the Land Management Act meant that they could control the supply of development land in their administrative area. This markedly changed the institutional structure from that which prevailed in the first decade of urbanisation in the 1990s, when there was a significant black market in the land occupied by SOEs which sold their use rights even though there was no legal basis for the transaction.

Local authorities were quick to establish a series of agencies known as land banks. These were not established as companies but as public service units (PSU – a form of government agency). In 1998, there were just 49 such units. Five years later, 1 600 of the 2 300 administrative units in the country had established such land banks (Yang *et al.*, 2005). The focus of these agencies is generally land rather than city development. They acquire greenfield sites from village collectives and purchase existing structures for redevelopment in cities. Once either the land or the use-right has been acquired and the previous land users compensated, the PSU clears the land and installs basic urban infrastructure such as drainage, roads and utilities. Only then can a real estate promoter purchase the land-use right. Since 2007, land-use rights have to be sold by public auction or tender with the government setting a minimum reserve price. Local governments prefer to sell large development plots. In 2006, in Beijing, the average size of a lot was 55 000m^2, about the size of four city blocks in a North American city. With a plot ratio of 2.5 and an apartment size of 120 m^2, the average sales revenue from such a plot would be $450 million with slightly more than 1 000 units sold. Consequently, well capitalised firms dominated the property development market. The large size of plots is surprising in that, in Beijing, the larger the plot size the lower the land price (Bao *et al.*, 2008). This could occur because there are fixed costs of dealing with permits. It could also reflect problems in the design of auctions for the sale of land-use rights. Some auctions are designed as two-stage processes and often in the second stage there is only one bidder, resulting in a lower price than in traditional English-style auctions. There is evidence that officials choose to place the larger and most attractive plots into two-stage auctions, so raising the likelihood of corruption (Cai *et al.*, 2009).

Property developers have to comply with myriad of administrative procedures in order to start construction of commercial or residential projects (Box 1). In total, 33 procedures have to be followed, a number that is only exceeded in the Russian Federation. Overall, local experts estimate that the full procedure takes 311 days, in contrast to 26 days in Singapore and the United States; 30 days in Korea and 67 days in Hong Kong, China. Of 190 territories worldwide, only 15% take longer than China to complete formalities (World Bank, 2012).

Box 1. Regulatory requirements for new construction

- Submit application to obtain approval of the project proposal from the District Development and Reform Commission
- Request and obtain the approval of request of construction project planning and design from the competent Department of Urban Planning
- Request and obtain the approval of planning and design project for construction and the notification of the review of the design plan from the Urban Plan Department
- Request and obtain the Planning Permit of Using Land for Construction Purposes from the Urban Planning Administration Bureau
- Request and obtain the land using permit for construction from the State Land, Resources, and Housing Agency
- Request and obtain an environmental evaluation
- Request and obtain construction project planning permit
- Request and obtain certificate of safety operation on construction project at the Safety and Quality Supervision Office of the Municipal Construction Commission
- Request and obtain evidence of capital from bank
- Hire an authorised supervision agency
- Register construction drawings at the People's Civil Defence office
- Review of construction drawings by the City Appearance and Environmental Sanitation Administration Bureau
- Review of construction drawings by the Fire Protection Bureau
- Review of construction drawings by the Traffic Police District Level Team
- Obtain a letter of notice after review of building drawings by a building drawing examiner authorised by the Construction Project Document Review Centre
- Register for direct contracting of construction with the District Tendering Office
- Have the building contractor and supervisor seal the application form
- Pay the fees for funds of concrete and energy-saving wall materials with the Office of Building Materials of the Municipal Construction Commission
- Request and obtain building permit after having obtained all previous permits
- Receive on-site inspection by the Construction Commission
- Receive "Four-Party" Inspection from the site inspector, the designer, the builder and the supervisor
- Request and receive inspection of the completed construction from the planning department
- Request and receive the fire department inspection upon building completion
- Request opinion on whether the construction project is lightning-proof
- Request and obtain certificate of the completed construction from the fire department
- Request and receive inspection of the completed construction from the environmental protection department
- Request and receive inspection on construction completion and inspection from the Municipal Construction Committee
- Request and obtain certificate of completion and certificate of final inspection from the Municipal Construction Commission
- Register building with the Real Estate Registry

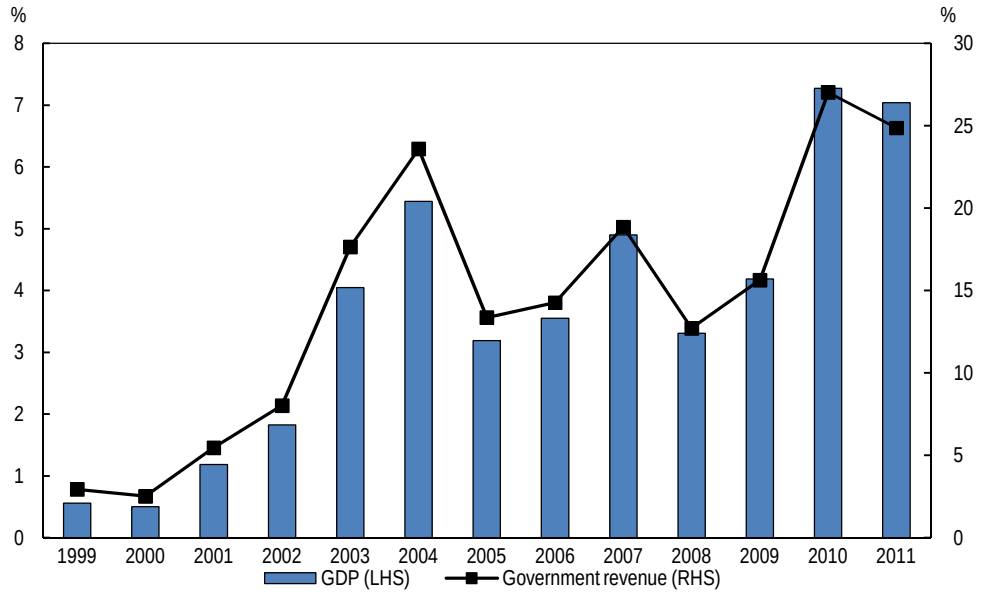
Source: World Bank (2012).

Land sales as a source of revenue

During the period of strongly rising house prices from 2008 to 2010, the gross revenue flowing to local governments from the sale of land-use rights increased rapidly but it is difficult to trace the exact use of the money. Total revenue from the sale of land-use rights peaked at 7.3% of GDP in 2010 (Figure 12). The allocation of this money is far from transparent. In 2011, according to the Ministry of Finance (2012), nearly four-fifths of the gross revenue of local government from land sales was spent either on compensation to previous owners/users or on redevelopment costs. The redevelopment work probably includes the standard public facilities on the land, such as schools, clinics and the like, the size of which is set down by law. A further 8% of total revenues were earmarked for specific purposes by legislation – notably for creating new farmland. The surplus available for spending by the local authorities amounted to 18% of the gross revenue from sales (1.3% of GDP) and represented 6.4% of total local government expenditure.

Figure 12. Gross revenue from sale of land-use rights

As percentage of GDP and of national tax and social security revenues



Source: Wu (2012).

Where do the compensation funds go?

The amount allocated for compensation and redevelopment, however, seems on the high side. No detail was given of who received this compensation, nor of the cost of land improvement, nor of the split between greenfield acquisitions and redevelopment. An example from the suburbs of Beijing shows that the compensation for the acquisition of collective agricultural land is less than one-tenth of the money raised from land-use rights. The compensation for collective land expropriation is, at the maximum, around 130 times the gross annual yield of the land. In the outer Beijing area, this formula gave compensation that at most amounted to around CNY 119 per m^2 in 2011 (Wu, 2012). The price of the developed land, when auctioned, amounted to CNY 4 600 per m^2, so in this case compensation amounted to 2.6% of the value of the land-use right. This is broadly consistent with an estimate covering 17 provinces which showed that the amount going to farmers was 2.2% of the money received by the government after it improved the land and sold it for commercial use (Landesa and Renmin University, 2012), even though official data showed that half of the proceeds of land sales were paid as compensation.

The impact of the very strict restrictions on the conversion of agricultural land to building land can be seen when comparing the edges of Beijing with Greater London, where prices are equivalent to CNY 5 700 per m^2 (Valuation Office Agency, 2011). Indeed, in rapidly growing areas in the London metropolitan area, the land zoned for residential use is worth 800 times neighbouring agricultural land and 600 times the value of the land before necessary infrastructure has been constructed. Compensation adequacy has to be judged against the current ownership status of the land. Farmers only own a 30-year use-right to cultivate the land and so legally cannot benefit from any change of use. However, they are clearly aware of the value of their land in alternative use and in a number of cities have taken illegal steps to attempt to secure the development value of the land for themselves (see below). In any case, such high differentials highlight the opportunity costs of not exploiting the land in its highest value use.

Urban planning

Local governments also influence urban development through the urban planning process. They must create 20-year master plans for the development of their areas and have them approved by the superior administrative authority. These master plans are essentially very broad-brush descriptions of how an area might develop, setting out objectives for transport, economic development and integration with the environment. A common problem faced by the designers of the master plan is that their planning cycle is far behind the speed of development of the local economy. This can be seen in the successive master plans for Beijing (Yang and Zhou, 2007) and Hangzhou (Wei, 2005), where targets for urban populations one decade in the future were exceeded within a few years. This problem is even apparent in the national 12th Five-Year Plan, where the government set a target for an increase in the urbanisation rate of 0.8 percentage points per year, to reach 51.5% by 2015. By 2012, less than halfway through the plan period, the urbanisation rate had reached 52.6%, with the expansion rate since 2010 being nearly 60% faster than envisaged under the Plan.

These master plans, however, do not regulate the use of individual pieces of land. That is decided at the lower level of the plot plan and often in isolation from other plots or after negotiation with developers (Bertaud, 2007). Thus within a city there is often no systematic consideration of how dense development should be in different parts of the city, in contrast to the approach in New York or Hong Kong where plot ratios are determined as a function of the attractiveness of the land with building density rising as the distance to the centre of the city diminishes.

Development of collectively-owned land

While the planning procedure for state-owned land in metropolitan areas is complicated, procedures for developing collective land are much simpler and have enabled villagers to capture a significant part of development rent. Collectively-owned land is split into three parts: residential, reserved and agricultural. For residential land, each household of the collective is allowed one plot of land of between 150 and 250 m^2, depending on the region, to construct their own house. In practice, when the village collective is close to a densely populated area, or surrounded by such an area, the villagers have often become property developers. This is also common when the agricultural land of a village has been expropriated leaving just the collective owning the residential land. In some areas, to avoid dissent amongst the villagers, the urban authority has compensated the village with a certain proportion of the expropriated land – up to 12% in a number of fast-expanding southern cities (Hsing, 2010). In these areas village collective land was transferred to a company owned either by the collective or by the villagers. The company then develops the land and pays dividends to the owners. In other cases, the individual villagers develop their own site usually ignoring limitations on property height. In the absence of the usual planning regulations, users of land are often affected by externalities generated by neighbouring sites (Zhu and Hu, 2009).

Despite the illegality of the construction on rural land, this development has provided much of the rental housing for migrants and a low-cost ownership route for many residents with a local urban *hukou*. In Beijing, new, but illegal, property development (known as *xiangchanquan* housing), built by township governments on collective land classed as agricultural, accounted for 18% of all new property developments on the market in 2006 (Hsing, 2010). Generally, these properties sell for less than half the price of an equivalent property on state land, even though the two are often indistinguishable from developments on state land (Cao, 2007). The lower price reflects the legal risk attached to owning the property (Ye and Wu, 2010). Purchasers are willing to take the risk, despite the regular warnings from the authorities on the need for buyers to ensure that they have legal title to property, especially where the development is relatively large.

Indeed, little is done to enforce such warnings nationwide, though the risk for residents varies across areas. Demolition and confiscation are common in Beijing and Shanghai, but less so in Chengdu and Chongqing. Nanjing recently granted full property rights to one community after it dealt with the proper land transfer procedures (Chen, 2012). It is not clear that there is a legal deterrent as the urban authority has no jurisdiction in collectively-owned areas. In fact, in 2004 the Shanghai Higher People's Court ruled that while it was illegal for such housing units to be transferred to people with no residence rights in the community, if the property had actually been transferred to them and they were living there, then the status quo should be respected.

The risk of expropriation is greater for older property as some cities have a policy of acquiring older properties to redevelop the site. As a result, in central areas housing units on collective land have a much shorter life than similar housing on state land. One study found that village property was demolished after 12.7 years, ten years before property on nearby state land (Nie, 2012). Many southern cities have issued redevelopment plans for urban villages. These plans have often not been put into practice, however, as, with population densities of 200 000 per km^2, the only politically feasible solution is to negotiate with the village property company rather than expropriate. In such cases, the existing value of the site has been found to be sufficiently high that redevelopment is not financially viable. Overall, new property development on collective land has accounted for 8% of urban development between 1995 and 2010 (Wu, 2012). Since most of this property is rented by migrants and other new entrants to the labour market, who accept space one third that of official residents, the share of the population in major cities housed, illegally, on collective land is probably as high as 25%, rising to 70% in parts of Guangdong province.

The development of collective land by farmers, while providing housing for migrants, does have drawbacks. According to law, the zoning and urban planning of village collective land is the responsibility of the township government which governs the villages. However, the villages have the right to convert agricultural land to non-agricultural use as long as it is for their own use. Thus there is a legal ambiguity in how land can be developed. Village collectives resist the application of zoning by the township government and development often follows a haphazard pattern decided by competition between villages to develop land before it is expropriated (Zhu, 2012). This usually results in a lack of public facilities but has the advantage of providing lower-cost housing. Proximity to village land can also lower the value of nearby urban land and housing. Thus there is a need for a solution which provides for more of an overall development plan for village property while maintaining the right of villages to develop land.

One method that allows a degree of control over development has been the formation of village co-operatives which then decide a development plan and deal with nearby urban governments and real-estate developers. This allows village collectives to keep a much higher proportion of the increase in value flowing from redevelopment. Experiments along these lines in the Beijing area have considerably calmed disputes about land (Po, 2011).

Reforms are under way to improve the position of farmers whose land-use right is expropriated. In late 2012, the State Council authorised the Shenzhen government to pay farmers half of the increase in value of the land when it is converted to non-agricultural use. Furthermore, a national plan was announced in early 2013 to create a complete property register of all rural land in order secure property rights of farmers and give them legal proof for compensation in cases of land transfers. The law is to be changed to give a greater share to farmers of the appreciation in land values following expropriation. However, rural land on which construction has been authorised will not be allowed to be freely bought and sold. Furthermore, the current 30-year term of rural use-rights may be extended.

Migration and urban growth

Migrants have been essential to urban growth

Migration has driven around 70% of the growth in the urban population (Table 8) over the 40 years to 2010 but is difficult to measure accurately. Without migration the population of cities would probably barely have increased due to the one-child family planning policy, which has limited the natural growth of the urban population to around 0.6% per year. There are two types of migration in China: official and unofficial. In the former people change both their place of residence and the place in which they are enrolled for the household registration system. In the other type of migration, people change their residence but are not allowed by the government to change the locality where they are enrolled. Different agencies publish different data for the total number of unofficial migrants. The census estimated the unofficial migrant population to be 261 million in 2010 but does not include local migration. This number, though, includes migrants from one urban area to another. In 2005, such migrants were about half of the total number of migrants (OECD, 2010a). Such migration does not change the overall urban population. There is also an annual survey of the number of rural migrants who hold an agricultural *hukou*. It distinguishes both local and longer-distance migration but the figures have only recently been placed in the public domain. Overall, this survey suggests that the number of long-distance migrants and their non-working family members was 185 million in 2010, broadly consistent with the number shown in the census. In addition, there were nearly 90 million local migrants, bringing the total number of rural migrants to 275 million in 2010.

Table 8. Sources of growth of the urban population

	1970-80	1980-90	1990-2000	2000-10	1970-2010
	average annual change per period, millions				Total change
Change in urban population	4.7	11.1	15.7	20.7	521.4
of which					
1) Natural increase of registered population	1.3	1.5	1.8	2.1	66.4
2) Migration	2.9	9.5	9.2	15.8	374.0
Official migration from rural to urban areas	2.0	1.8	3.0	3.0	98.0
Unofficial migration	0.9	7.7	6.2	12.8	276.0
Local	0.6	4.5	2.4	1.4	89.0
Longer distance	0.0	2.1	3.0	10.0	151.0
Families of migrant workers	0.0	0.9	0.7	1.5	31.0
Less urban-rural and rural-rural migration	0.3	0.2	0.1	-0.1	5.0
3) Areas that became urban (residual)	0.6	0.1	4.7	2.8	8.1
	Share of increase in population (in %)				
Natural growth	26.8	13.4	11.4	10.2	12.7
Migration	61.4	85.9	58.6	76.5	71.7
Expansion of urban area	11.7	0.7	30.0	13.3	15.5

Source: Unofficial migrants: Private communication from Lu Feng, as presented in Lu (2011) citing *China Agricultural Yearbook* 2010, Urban population: *China Statistical Yearbook*.

The drivers of urban population growth have varied with the regulations governing population movement. Before the first liberalisation in the early 1980s, only official migration was allowed. In the early 1980s, migrants had to provide food from the countryside for themselves if they moved to an urban area: they were not eligible for the food rations allocated to local residents. As a result, nearly three-quarters of migration was to local towns where it was possible for migrants to assure their own food supply. The only urban areas exempted from this rule were those designated as Special Economic Zones, which were experimenting with more liberal economic regulations. It was not until the decade ending in 2010 that large-scale migration across administrative borders occurred following liberalisation of regulations: local migration dropped sharply and longer-distance migration surged. There has also been a substantial flow of official migrants, which has been relatively stable, though in recent years a number of cities have tried to attract skilled or wealthy migrants using point-based *hukous*. Hardly any rural migrants have been able to benefit from this policy change.

Migration was temporarily held back by the financial crisis that erupted in August 2007 (Table 9). The number of areas that previously absorbed large number of migrants (such as the Pearl River Delta) fell. The stock of within-township migrants even declined in 2009, suggesting that longer-distance migrants may be more reluctant to move back to their farms than shorter-distance migrants when the demand for labour falls. In 2010-11, the flow of migrants quickly picked up as the economy improved, moving above the ten-year average, especially for local migrants.

Table 9. Recent developments in rural migration

	2000	2008	2009	2010	2011
			Millions		
Stock of people having migrated outside their registered township	94.5	169.0	175.0	184.1	191.4
Workers	78.5	140.4	145.3	153.4	158.6
Family	n.a	28.6	29.7	30.7	32.8
Total stock of workers who have migrated	149.7	225.4	229.8	242.2	252.8
Total stock of people who have migrated	n.a	254.0	259.4	272.9	285.6
			%		
As % of total non-farm employment	41.5	49.4	49.0	50.3	51.2
Total migrants as % of urban population	20.6	27.1	27.1	27.5	27.7
			Millions per year		
Flow of migrants (net)	n.a.	11.0	5.4	13.5	12.6
Inside township	n.a.	1.4	-0.6	4.4	5.3
Outside township	n.a.	9.6	6.0	9.1	7.4

Source: National Bureau of Statistics (2012), *China's Migrant Workers Survey and Monitoring Report,* Beijing, April (in Chinese).

Urban growth has helped narrow rural-urban income differentials

As noted, migrants have moved to higher-income urban areas, which have gained further from agglomeration economies as their size has expanded. In the process, per capita income levels in the poorer areas have also risen as workers leave small farms with little if any reduction in output. There are also spillovers from the higher level of activity in the rich areas, on top of migrants' remittances to relatives in the rural areas. As incomes rise, property prices increase in the rich areas and land-intensive and transport-intensive activities will tend to move to outlying areas. To some extent urban districts in China have attempted to internalise this movement by expanding their boundaries well into the countryside. Nonetheless, in the past decade the countryside around big cities has benefited from all of these changes. A further factor has allowed incomes in rural areas to benefit from urbanisation, namely the extensive investments undertaken in rail and road infrastructure. In the case of rail, this has taken the form of markedly increasing the footprint of the network by creating new radial lines from the main prefectural cities – a development that has still to be completed fully in the south-west of the country. In addition the provincial and prefectural road network has been improved. Railway communication has made it easier for manufacturing to relocate and better highways have reduced public transport times for migrants living in cities relatively close to their homes.

These changes have helped reduce income differentials between cities and the countryside, as measured by GDP per capita (Table 10) and have improved the living standards of families one of whose members has migrated (De Brauw and Giles, 2012). Moreover, GDP per capita differentials are probably lower than the official estimate of urban-rural income differentials (Box 2).

Table 10. GDP per capita in cities and the countryside

For the 160 prefectures with a dense core city with a population of over 30 000

	GDP per capita in urban districts/GDP per capita in selected areas			
	2000	**2010**	**2000**	**2010**
Ratio of urban districts to:	weighted average		unweighted averaged	
All counties in same prefecture	2.9	2.4	4.3	2.3
All less dense counties in same prefecture	3.1	2.7	2.5	2.4
All more dense counties in same prefecture	2.7	2.2	2.7	2.3

Source: OECD calculations.

Box 2. The urban-rural income differential in China appears to be overstated

The urban and rural surveys of household income are probably overstating the ratio of urban to rural income, possibly by as much as over 40% (Xu and Gao, 2012). The deficiencies in the household surveys are known to the National Bureau of Statistics, which is to launch a new national household survey in 2013.

The problems with the existing surveys stem from the rapid change in the labour market and the consequent migration of people from the countryside to the city. Given that migrants in China, as in many developing countries, keep close links with their family in their birth place, it can be difficult to allocate the income and consumption of a migrant worker.

The protocol for the surveys indicates that when migrants working in an urban area are an economically inseparable part of a rural household, their income should be counted as part of that household's income. In practice, this means that the income of a household where both spouse and children live in an urban area should be counted in the urban household survey, while other migrants should be included in the rural household survey.

However, a survey in two provinces (Zhejiang and Shaanxi) indicates complete migrant families represented around 30% of urban households in Zhejiang and 7% in Shaanxi, while nationwide they accounted for less than 1% of households in the urban household survey. So there are many missing households in the urban survey and this group is not counted in the rural household survey either.

For the rural household survey there is also another measurement problem linked to migrants. Rural households are supposed to report the complete income of urban migrants where a spouse or children still live in the rural area. In addition all unmarried adult children who are urban migrants should be counted in the rural survey. In reality, according to interviews with a sample of people included in the rural survey, rural households only report the income that the migrant sends back to the household. Detailed interviews showed that the remitted share of income for migrants where there was a spouse or child in the rural household was 70%, but only 40% for unmarried children. This latter group represented the largest group of migrants whose income should have been fully counted in the rural survey, accounting for 80% of the total in Zhejiang and 40% in Shaanxi. Insofar as the two provinces under consideration are representative of nationwide patterns, this information on its own would suggest that the urban-rural income differential was 2.2 in 2009 and not 3.1 as shown in the official data. However, to the extent that underreporting of income is more of a problem for urban than for rural households, especially at higher income levels, the overstatement of the urban-rural gap would be less pronounced (Wang and Woo, 2010).

Providing public services to the families of migrants in cities

The scale of the problem

Most of the migrants to major cities do not bring their families with them. Data from earlier censuses suggest that there were 11 million migrant children of compulsory education age in 2000 living without one of more of their parents, while in 2005 around 30 million children of the same age range were in the same position. If the number of such children has risen in proportion to the number of migrants, then by 2010 there were about 17 million migrant children in cities and 36 million left-behind children, a total of 53 million children representing about one-third of the total number of children in primary and junior high school. There may have been a more-than-proportionate rise in the number of migrant children in cities (and hence less left at home), as in Beijing the number of school-age migrant children quadrupled between 2000 and 2008 to reach 400 000 (Rozelle *et al.*, 2009). The type of education that these children receive will have a considerable impact on their ability to progress socially and economically.

Progress in providing compulsory education

The provision of free compulsory education to migrant children has much improved over the past decade. The main concerns now are about quality and the scale of the payment made by local authorities to the private schools educating many migrant children. Since 2003, the central government has actively encouraged local authorities to ensure that migrant children receive education in their place of residence at least to the age of 15, when compulsory education finishes. It appears that nearly all migrant children now receive compulsory education at primary school level. At junior high school level, drop-out rates seem to have increased but the overall participation in nine-year education appears to be well over 90%. As far as the left-behind children are concerned, they are educated in state schools in their place of residence. According to official figures 79% of migrant children are now educated in state schools, but it is not clear whether this covers all the children of migrants or just those who accompanied their parents.

The situation varies considerably across regions (Table 11) and from city to city. In Shanghai, all migrant schools in the centre of the city have been closed and children transferred to state schools. Further out of the city, children attend migrant schools funded by different levels of local government (Chen and Feng, 2012). Overall, 70% of migrant children attend state schools in Shanghai. However, the participation rate of migrant children in elite primary schools is probably lower as entry to these schools is dominated by parents in professional occupations and officials (Wu, 2009). These schools, formerly known as "key schools", received extra funding, better teachers and were expected to guide other schools. The system of key primary schools has been abolished in Shanghai and elsewhere (OECD, 2010c) but the best quality primary schools actually continue to set entrance examinations (Yiwen, 2012).

Table 11. Type of school attended by migrant children

	Type of school		
Region	Key schools	Public schools	Private schools
	% of all migrant children		
East	6.3	70.3	23.5
Middle	6.9	63.6	29.5
West	12.9	84.5	2.6

Source: Li (2008).

In Shenzhen and Beijing, however, the situation is reversed and only 30% of migrant children attend state schools. In Shenzhen, the amount the local government spends per child on migrant schools is less than in state schools, implying much larger class sizes and less qualified teachers. In Beijing, policies towards migrants vary. Many migrant schools there are located on collectively-owned land. When either the urban district government expropriates the land, or the village collective redevelops it, migrant schools in that area are closed. Thirty such schools were demolished in 2012 in the Chaoyang, Shijingshan, Changping, Daxing, and Fengtai districts of Beijing (areas where migrants were 44% of the total population in 2010) with no provision for transferring the children to state schools (Beijing News, 2011). As a result, many children had to return to live with their grandparents (Li, 2012).

But quality differences remain

A major concern endures as to the quality of education. The results of migrant children, even when they attend state schools, appear to be worse than those of local children. The district education authorities do not administer standardised tests to children in migrant schools as they are considered outside the system. A private survey by Shanghai University of Finance and Economics has undertaken such tests across a sample of nine-year olds (Chen and Feng, 2012). The results show that the teachers in state schools are much better qualified than those in migrant schools. The performance of migrant children in migrant schools for Chinese tests is almost one standard error lower than for local children in state schools (Table 12). For mathematics, the score is 1¼ standard deviations lower. In PISA test terms, this would put migrant schools in Shanghai on a par with the average results of schools in Chile, Mexico and Turkey. Once control variables were allowed for, the performance gap narrowed but was still significant. Similar results have been found for Beijing (Lai *et al.,* 2012), where the performance of children at migrant schools, allowing for the impact of control variables, was even slightly worse than the performance of children in rural schools.

Table 12. Migrant and State schools in Shanghai compared

	Public schools		Migrant schools
Background of teachers			
Teaching experience (years)			
- Less than 3 years	4		23
- 3 to 10 years	11		49
- More than 10 years	85		28
Teachers' education (in %)			
- High school and below	6		25
- Associate degree	36		59
- Bachelor's degree and above	58		16
Monthly salary			
- Below CNY 3000	1		81
- CNY 3000 to CNY 5000	28		19
- Above CNY 5000	71		0
Test results	local	migrant	migrant children
Chinese	69.1	66.4	55.8
Mathematics	65.3	62.3	46.3

Source: Chen and Feng (2012).

High school education: under the same blue sky?

Access to senior secondary school has improved much less than access to compulsory education. To attend high school it is necessary to take an entrance examination and this must be taken in the locality of registration rather than the locality of residence. In Shanghai, migrant children can only attend vocational high schools. The Shanghai Education Committee justifies local high schools' refusal to admit the children of migrant workers on the grounds that "if we were to open the door to them, it would be difficult to shut it in the future; local education resources should not be freely allocated to immigrant children" (Ren, 2012). As a result, few migrant children attend general high schools and those who do return to their registration locality find it hard to adapt and often fail to complete the course (Ming, forthcoming).

Migrant parents, and all low-income households, urban and rural, face a major financial barrier to send their children to senior secondary schools. Fees are high. In Shaanxi for instance, a three-year course costs the equivalent of 89% of the average annual net income of a rural household (Liu *et al.*, 2009) – three times higher relative to income than in Indonesia and 60% higher than in Mexico. These fee levels affect rural high school attendance (which is most probably only half that of urban registered children) and tend to lower performance in junior high school. Fees may also represent a barrier to achieving the government's target of raising the enrolment rate for senior high school to 90% by 2020. Low educational achievement will undermine the employment prospects of future migrants, all the more so as China progressively becomes a more capital/innovation driven economy.

The need to return to the place of registration is compounded by the regulation that only allows a university entrance examination to be sat in the place of registration rather than the place of residence. In 2012, the Ministry of Education issued a new regulation encouraging provincial governments to allow pupils who are not registered locally to take the examination in the place of residence provided that the parent of the student has a stable job and pays social security contributions. However, the employers of most migrants do not enrol their employees in the social security programme, despite the provisions of the Labour law. Moreover, the Minister of Education has stated that local authorities can adapt the rules to take into account local conditions. This is meant to avoid people moving to a province with better quality universities (such as Beijing or Shanghai) to take the university entrance there so as to benefit from the fact that the acceptance mark for local universities is lower for locally registered students than for those with out-of-town residence. Fujian province, however, has announced that it will allow all migrant children who have been at junior or senior high school to take the entrance exam in Fujian. The Education Commission of this province sees this relaxation of rules as a way to attract more migrant workers to their province given current shortages of migrant labour.

For university entrance, the discrimination against students with registration outside the local district is severe. For example, in the past five years, 97% of the country's poorest counties sent no students to Beijing's prestigious Tsinghua University. In 2011, Peking University enrolled a third of its students from Beijing but less than one student in every 10 000 came from Henan, Shandong or Hubei. In Shanghai, students with a local *hukou* are 53 times more likely than the national average to get a place at the city's prestigious Fudan University. The same entrance marks need to be applied to all pupils from across the country.

Access to health care for the families of migrants

Apart from the persisting problems in education, migrant families also are unable to join the local health insurance scheme for children. Health insurance for employees is provided by the government if the employer joins the social security system, but many do not as penalties for non-compliance are low (OECD, 2010a). Moreover, the scheme covers only employees, not their children. To fill this gap a contributory (but subsidised) scheme has been introduced. But households registered outside the locality cannot join the local scheme and must join the scheme where they are registered, often with lower benefits which cannot be drawn outside the local area. The result is that the health of migrant children is markedly worse than that of local children (Table 13). It is not clear though whether these illness rates are better or worse than those in rural areas.

Table 13. Death rate of children under five in Guangdong Province

Classification	Infant		1-4 years old		Ratio of migrant to local deaths
	Migrant	Local	Migrant	Local	
	Deaths per 100 000				
Malnutrition	10.4	0.0	5.2	0.0	∞
Traffic accident	5.2	0.0	41.7	2.9	16.3
Diarrhoea	36.5	2.9	18.2	1.4	12.7
Diseases of the digestive system	39.1	4.3	18.2	1.4	10.0
Septicaemia	26.1	1.4	13.0	4.3	6.8
Injury and poisoning	59.9	16.7	125.1	11.5	6.6
Infectious and parasitic diseases	31.3	2.9	15.6	4.3	6.5
Meningitis	10.4	4.3	13.0	0.0	5.4
Maternal factor in child birth	783.7	148.8			5.3
Diseases of the respiratory system	93.8	44.6	18.2	15.8	1.9
Diseases of the circulatory system	13.0	10.1	10.4	4.3	1.6
Congenital malformations	130.3	90.6	2.6	10.1	1.3
Neoplasm	13.0	4.3	2.6	14.4	0.8
All above	1 263.1	330.9	289.2	70.5	3.9

Source: Li *et al.* (2006) quoted in Chan (2009).

Furthermore, migrants generally cannot take advantage of the affordable housing programme. As a rule, only locally-registered people are allowed to purchase housing at a 30-40% discount through the economical housing programme, while the public rental programme is often unattractive given the rental levels and the poor locations where the property is built. There are also a number of administrative documents that require local registration: a driver's licence for example or a ticket in the lottery for car licence plates in Beijing.

Financing of improved benefits

The financing of compulsory education is shared between national governments and (in cities) the district-level government. On average, the national government pays for just over half of the cost of this level of education, but the share varies across regions (see Wang and Herd, 2013). While most transfer payments from central to local government are made in proportion to the registered population, the grant for compulsory education is made in proportion to the number of children at both state schools and schools for migrants. As more migrants settle in cities, the cost of education increases by the amount that wages of teachers in destination areas exceed wages in source areas. Moreover, there may be some need to build new schools.

Turning to pension benefits, if employers were forced to enrol all migrant workers in pension schemes, costs would rise due to the redistributive character of the employee pension system. Over the lifetime of a migrant, the extra cost is estimated at CNY 80 000 per person (Development Research Centre, 2011). Depending on the rate of discount that is used in the calculation this is equivalent to an extra public expenditure of around 1% of GDP per year. Half of this cost represents extra pension expenditure that would occur some 40 years into the future. Since 2009, the pension system for migrant workers has been reformed. The employers' contribution has been reduced to 12% from 20% for this type of worker. At the same time, a portability provision has been introduced for people who move form province to province.

Reform of the *hukou* system

The objectives of the government in increasing urbanisation are to boost incomes, create domestic demand, rebalance the economy and create a stable urban society. To achieve these goals, *hukou* reform has been seen as a necessary step. *Hukou* reform is a complex issue, as registration status determines not only the rights of a person in their new urban location but also their rights in the place of origin. At present changing *hukou* status from agricultural to non-agricultural involves surrendering land-use rights in the place of origin and also may result in the loss of permission to have a second child. Thus the issues are far wider than giving rural migrants access to certain public services in urban areas. Full *hukou* reform would require changing the rules governing land-use ownership rights in the countryside and family planning regulations, as well as rights in urban areas. In response to central government pressure, most provinces now have regulations in place that allow people to transfer their household registration from one locality to another and from agricultural to non-agricultural status.

The changes that local governments have put in place set a high hurdle that migrants have to cross. By now, most provinces have begun to allow people without local registration to obtain registration or to merge local rural and urban registrations, but these changes have had limited effects. More than half of the provinces have merged their local rural and urban *hukous*, but not generally on a province-wide basis. Such changes have little impact on migrants as they come from outside local areas. In addition, most cities have reformed the rules for migrants to obtain a local *hukou*. In most provinces the scale of the reforms varies with city size (Table 14). For small and medium-sized cities, the qualifications to change residence status focus on employment stability and having appropriate housing (Table 15). In large cities the most common requirement is for a university education, though poorer provinces only insist on the person having at least a vocational high school certificate (Table 16). In addition, many provinces have a residence or tax payment requirement. As a result, in most of the attractive areas, reforms have had little impact. Even in smaller cities it can be difficult for migrants to meet the conditions as the employers of migrants often avoid affiliating their employees to social security systems and so paying taxation.

Table 14. Extent of *hukou* reform by province

	Year of the most recent reform	Scope of application for *hukou* by size of locality	Unified registration between local urban and local rural *hukou*	Type of province
Anhui	2001	Large, medium, small (town)	No	Central
Beijing	2002	Small (town)	No	Municipality
Chongqing	2003	Large, medium, small (town)	Yes	Municipality
Fujian	2001	Large, medium, small (town)	Yes	Eastern
Gansu	2003	Large, medium, small (town)	No	Western
Guangdong	2001	Large, medium, small (town)	Yes	Eastern
Guizhou	1998	Small (town)	No	Western
Hebei	2003	Large, medium, small (town)	Yes	Eastern
Heilongjiang	2008	Medium city	Yes	Central
Henna	2003	Large, medium, small (town)	Yes	Central
Hubei	2003	Large, medium, small (town)	Yes	Central
Hunan	2003	Large, medium, small (town)	Yes	Central
Inner Mongolia	2000	Small (town)	No	Western
Jiangsu	2002	Large, medium, small (town)	Yes	Eastern
Jiangxi	2002	Large, medium, small (town)	No	Central
Jilin	2001	Large, medium, small (town)	No	Central
Liaoning	2002	Large, medium, small (town)	No	Eastern
Ningxia	1998	Small (town)	No	Western
Shandong	2004	Large, medium, small (town)	Yes	Eastern
Shanghai	2009	Large	No	Municipality
Shaanxi	2005	Large, medium, small (town)	Yes	Western
Shanxi	2007	Small (town)	Yes	Central
Sichuan	2002	Medium and small	Yes	Western
Tibet	2001	Large, medium, small (town)	No	Western
Xinjiang	1998	Small (town)	No	Western
Yunnan	2008	Large, medium, small (town)	Yes	Western
Zhejiang	2002	Large, medium, small (town)	Yes	Eastern

Source: Du (2011).

Table 15. Small and medium-sized cities: criteria for obtaining local urban *hukou*

	Stable source of income	Residence	Years of residence
Municipalities			
Chongqing	Any employment	Ownership/Employer	NA
Beijing	Any employment	Not dormitory	Not specified
Shanghai	Above average	Not specified	7
Eastern			
Hebei	Any employment	Not dormitory	No limit
Liaoning	Any employment	Any form	Not specified
Jiangsu	Any employment	Any form	2
Zhejiang	Any employment	Any form	Not specified
Fujian	Any employment	Any form	Not specified
Shandong	Not specified	Any form	Not specified
Guangdong	Any employment	Any form	Not specified
Central provinces			
Shanxi	Any employment	Ownership	Not specified
Jilin	Any employment	Not dormitory	Not specified
Heilongjiang	Contract or business	Not dormitory	4
Anhui	Any employment	Not dormitory	3
Jiangxi	Any employment	Any form	Not specified
Henan	Contract or business	Ownership/Employer	Not specified
Hunan	Any employment	Any form	Not specified
Hubei	Any employment	Any form	Not specified
Western			
Inner Mongolia	Any employment	Any form	Not specified
Sichuan	Any employment	Ownership/Employer	Not specified
Guizhou	Any employment	Any form	4
Yunnan	Any employment	Ownership/Employer	Not specified
Tibet	Any employment	Any form	No requirement
Shaanxi	Not specified	Any form	Not specified
Gansu	Any employment	Any form	Not specified
Ningxia	Any employment	Any form	2
Xinjiang	Contract or business	Any form	2

Source: Du (2011).

Table 16. Large cities: criteria for obtaining a local urban *hukou*

	Purchase of housing	Private investment	Tax payment to local government	Education level
Anhui	Minimum area	Not specified	Not specified	College
Beijing	Not specified	Not specified	Not specified	Not specified
Chongqing	Minimum area	Not specified	Not specified	College
Fujian	No minimum	Decided by cities	Not specified	College
Gansu	No minimum	Not specified	Not specified	Vocational high school
Guangdong	Decided by cities	Decided by cities	Not specified	College
Guizhou	No minimum	Not specified	Not specified	Not specified
Hebei	No minimum	Not specified	Not specified	College
Heilongjiang	Not specified	Not specified	Not specified	Not specified
Henan	No minimum	Not specified	Not specified	Vocational high school
Hubei	No minimum	Not specified	Size required	College
Hunan	No minimum	Not specified	Not specified	Not specified
Inner Mongolia	Not specified	Not specified	Not specified	Not specified
Jiangsu	No minimum	Not specified	Not specified	College
Jiangxi	No minimum	Decided by cities	Decided by cities	Vocational high school
Jilin	No minimum	Not specified	Not specified	College
Liaoning	No minimum	Not specified	Not specified	College
Ningxia	No minimum	Not specified	Not specified	Not specified
Shandong	No minimum	Investment required	Amount and years required	College
Shanghai	Not specified	Not specified	Amount and years required	College
Shaanxi	Minimum area	Not specified	Not specified	Vocational high school
Shanxi	Minimum area	Not specified	30 000 yuan	College
Sichuan	No minimum	Not specified	Not specified	Vocational high school
Tibet	No minimum	100 000 yuan	Not specified	Vocational high school
Xinjiang	No minimum	Not specified	Not specified	Not specified
Yunnan	No minimum	Not specified	Not specified	Not specified
Zhejiang	No minimum	Decided by cities	Decided by cities	Decided by cities

Source: Du (2011).

A number of provinces and cities introduced reforms in 2010. Chengdu and Chongqing reformed the *hukou* system as it applied to locals but not to migrants, while Guangdong established a new system for migrants. In both cases, the objective was to abolish the difference between the local agricultural and non-agricultural *hukou*. In Chongqing, the local government aimed to change the status of 3 million people by 2012 and 10 million by 2020. The first stage was to abolish the distinction between rural and non-agricultural *hukous* in each locality. Then people would be allowed to change their place of registration to a city area if they met a similar group of criteria as used in many other provinces (stable employment, owning an apartment). In both Chongqing and Chengdu, part of the system was based on exchanging rural land rights for urban status. In the case of Chongqing, the idea was to free up land near cities and then replace the agricultural land so lost by offering rural people an urban *hukou* in exchange for their residential land. Their house would be demolished and the land turned back into agricultural land. In this way, the Chongqing government would be able to extend its urban land without breaking the limit on conversion of agricultural land to urban land. This part of the reforms has now been stopped as the State Council issued a decision that land rights can no longer be exchanged for an urban *hukou*. The rules for granting a non-agricultural *hukou* in Guangdong are based on a points system that favours highly qualified people who are unlikely to be rural migrants (Table 17).

Table 17. The point system for acquiring an urban *hukou* in Guangdong

Number of points required	
Guangzhou	65
Rest of the province	60
Points awarded	
University graduate	80
Junior high school	5
High school	20
One year social security contributions	5
Charitable contribution per thousand yuan	2
Blood donation	2
Voluntary youth service (per 50 hours)	2
County-level honorary title	10
Prefectural-level honorary title	60
Junior professional employment	10
Mid-level worker	30
Senior worker	50
Technician	60

Source: Guangdong Provincial Government (2010).

Rural migrants are increasingly likely to want to remain in cities but few appear motivated to convert their rural *hukou* to an urban *hukou*. One well-known example of the low perceived value of urban *hukou* in smaller cities is that of Shijiazhuan (capital of Hebei province): in 2001, the local government announced major changes to the *hukou* system which, it stated, would mean that any person who had worked there for two years would be eligible for a local *hukou*. However, of the 300 000 eligible persons, only 75 000 changed their registration status (Zhan, 2011). An official survey found that almost three quarters of younger migrants had no desire to do so, though this proportion was lower in bigger cities (National Bureau of Statistics, 2011). This is perhaps because giving up a rural *hukou* often involves losing a land right. Migration was still seen as a circular process in which people stay in the city for a period and then return nearer to their home. However, very few migrants wish to return to be farmers; most want to move to a county seat or a town near their village (Zhu and Chen, 2010).

Even if the perceived value of sacrificing land holdings were not high, the requirements for obtaining a local *hukou* under the reforms that have been introduced would be difficult for a migrant to satisfy. The criteria to be met in order to obtain a new *hukou* pertain to education, wealth, stable employment and payment of taxes. There is no data on the number of people nationwide who have successfully made changes by fulfilling these criteria. Anecdotal evidence suggests that in the main, those who have changed are well educated and well off and often have a non-agricultural *hukou* from another city.

Migration has been seen more as way to maximise household income and lower risk than as a permanent decision. Moreover, settling in a city seems to be driven more by identity than by legal status (Zheng *et al.,* 2009). Changing *hukou* status is not the key as to whether a person stays in a city or not. Rather the attributes of the person (education and willingness to invest in training) determine the length of time a person stays in a city. The attitude of the new generation of migrants, born between 1980 and 1990, is changing. They have a much weaker attachment to the land. Their physiology, lifestyle and behaviour have become urbanised, and their employment is no longer an additional income for the families but their lifetime career. They do not know how to farm nor do they want to (China Development Reform Foundation, 2013).

What reform path for hukou?

A fundamental difficulty with *hukou* reform is the right to both rural agricultural and residential land given by a rural *hukou*. This right is seen by most migrants as a valuable hedge against the uncertainty associated with earning labour income in cities. Moreover, most migrants still do not seek to settle permanently in one area: if job prospects change, they are prepared to move elsewhere. At the moment, even if the new generation of migrants (born in the 1980s) express a greater desire to stay in cities, most still envisage eventual return, if only on retirement. In this context, the *hukou* reforms introduced so far are mainly designed for highly-educated people moving from one city to another. The appropriate way forward would be to reduce the value of the urban *hukou* by disconnecting the eligibility for urban public services from the *hukou* status. For example the local authority could grant a residence permit giving the same rights to all people who have lived in an area for six months as to those holding a local urban *hukou*. The cost of such a policy to local authorities is rapidly declining as education is now provided for nearly all migrant children.

In 2011, the prefecture of Suzhou, one of the areas with the highest GDP per capita in the country, initiated a new residence permit policy along these lines. It announced that residence permits would replace temporary residence permits for migrant workers. Any migrant worker aged above 16, with a place to live and a stable living condition, can apply for a residence permit free of charge. The residence permit gives the same rights to migrants as permanent residents. These rights include health care for dependents on payment of a premium, education, employment, driving license application, employment security, transportation discounts, access to low-rent housing and other public services. By mid-2012, the prefecture had distributed 6.1 million residence permits by July 2012. As a result, the new residence permit policy now covers almost the entire migrant population.

Reform of the *hukou* system is a necessary step in the creation of an inclusive urban society. The most pressing aspect of reform is to allow all residents in urban areas equal access to local services. Such a reform can be achieved without a full reform of all of the laws that are linked to *hukou* status. The reforms undertaken in Suzhou appear to be a promising route as they enable urban rights to be equalised without the need to change the rights of the migrants in rural areas which requires significant administrative and legal action.

Will migration and urbanisation boost domestic demand and rebalance the economy?

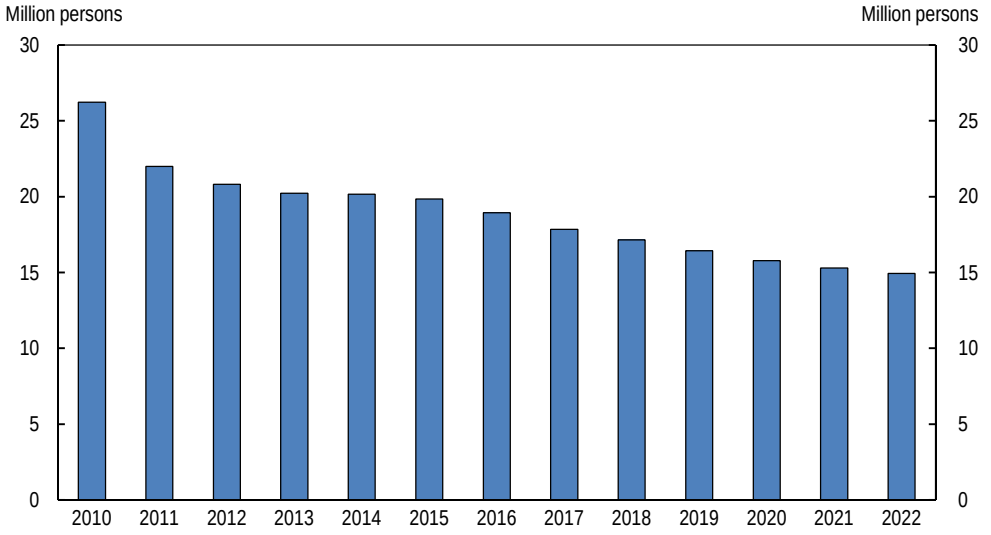
There is international evidence to suggest that urbanisation by itself results in a rebalancing of the economy, through a decrease of household or national saving (Loayza *et al.*, 2000; Hung and Qian, 2010). Usually it is hypothesised that this is because urban income is more secure than rural income and so urban residents save less for precautionary reasons. The magnitude of the impact is small and uncertain. If the urbanisation rate were to rise from 50% to 65% (as is plausible for China over the next one or two decades), then the national saving rate might be expected to drop by only 0.8 percentage points from its 2010 level of over 50%. Moreover, panel regressions fail to explain a high proportion of the Chinese saving rate (Hung and Qian, 2010).

One reason for the failure of panel regressions to explain the level of urban saving may be that the employment situation of migrant workers is not very stable and their social benefits are low relative to urban residents. In the Chinese context, it is possible that at least until a large portion of the migrant population has decided that it is preferable to remain in the city, the saving rate may rise as urbanisation proceeds. Household surveys show the saving rate of migrant households to be extremely high – well above that of local residents and above that of rural households. A number of studies have found that migrants save more than urban households. Chen *et al.* (2012) found the level of consumption of migrant families was 37% lower than for local households. In Guangdong, one study found a saving rate of 60% (Huang, 2010). Amongst migrants living in urban villages in Beijing, the saving rate was estimated at 47% (Zheng *et al.*, 2009).

It is difficult to rationalise such high saving rates in terms of high levels of insecurity or poor social services – the counter-factual is that the migrant remains in the countryside where health and social security benefits are even worse and saving rates lower. The high saving rate may partly reflect transfers to families remaining in the countryside. However, Brugiavini *et al.* (2013) find that even in migrant households with two people present (and hence reduced need for transfers to the countryside) the saving rate is still higher than for urban households. They attribute this to habit persistence on the part of those who move from lower-income areas and suggest that this differential will disappear if migrants stay in cities. As well, self-selection may be one reason why migrants save: they have decided to seek higher incomes at considerable risk. In any case, although each individual has limited consumption ability and does not consume much, the sheer number of rural migrant workers, and of their family members, represents an enormous potential for consumption expansion (China Development Reform Foundation, 2013).

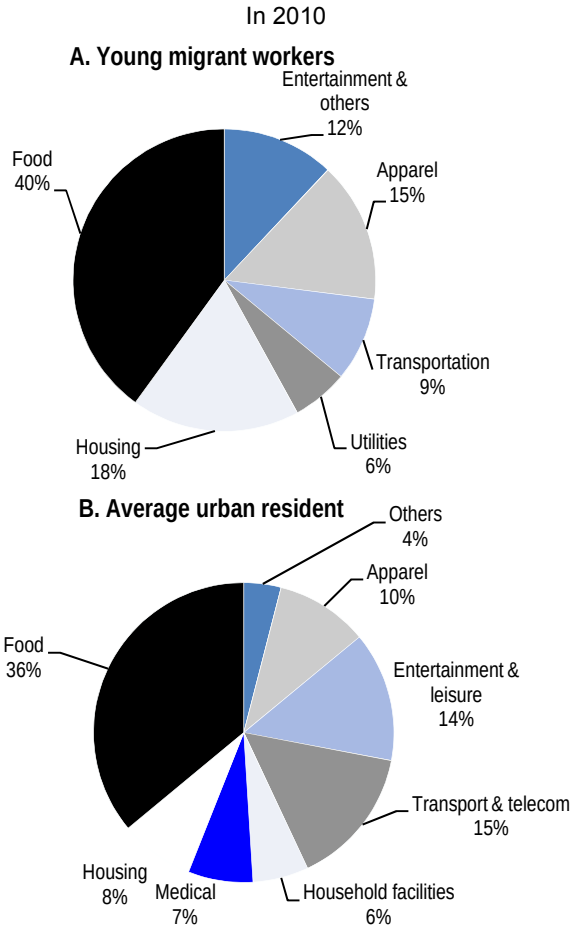
Migrants' high saving rate may decline as they become more settled and as their incomes rise. Since 2009, there has been a turnaround: until then, the wages of migrants had been constantly declining relative to the wages of local workers; since 2009, they have been rising faster, reflecting the marked demographic change that has started to occur in the number of 20-year olds (Figure 13). Besides, migrants' consumption pattern is different: young migrants spend much more on housing and clothing than local residents (Figure 14). The money spent on housing though generally flows back to local "farmers" who are often the landlords.

Figure 13. Cohorts of 20-year olds



Source: US Bureau of the Census (2011).

Figure 14. Consumption patterns of migrants and registered residents



Source: National Population and Family Planning Commission (2011).

Constraints on further urbanisation

Government regulations concerning the conversion of agricultural land to construction land are very strict. The 1994 Basic Farmland Protection Regulation requires the designation of farmland protection districts at the township level and prohibits any conversion of land in those districts to other uses. It also requires that a quota of farmland preservation be determined first and then allocated to lower-level governments in the five-level administrative chain (state, province, city, county and township). The 1999 New Land Administration Law intends to protect agricultural land and coordinate the planning and development of urban land. It stipulates that the government should strictly implement overall plans and annual plans for land utilisation and take measures to ensure that the total amount of cultivated land within their administrative areas is not reduced. Moreover designated basic farmland shall not be less than 80% of total cultivated land. The designation of basic farmland is based primarily on soil productivity rather than location. Because existing urban development has occurred near historically high-productivity areas, that land is likely to be designated as basic farmland whereas land farther away is not. Such restrictions impose a high economic cost and, as shown above, force farmers to develop land within existing townships, creating a leapfrogging development pattern (Ding, 2004).

Conversion of designated cropland into construction land is very difficult. It is only possible for key projects such as energy, transportation, irrigation and military infrastructure and then with the approval of the State Council. Other forms of land can be designated for future construction only through a provincial master land-use plan established once per decade and approved by the State Council. Provinces are allocated conversion quotas based on existing land-use shares. After the provincial land conversion quota has been established, the provincial government reserves some land for itself and then allocates the remainder to prefectural-level cities. First, it allocates conversion quotas for key transportation, irrigation, water-conservancy and energy generation projects. Secondly, the quotas for land to be used for normal transportation, irrigation, water conservancy and rural residential purposes are distributed to each city using the existing share of each land category in the prefecture as a weight. Finally, construction land conversion quotas for urban development are allocated to each city based on weights taking into account the existing land urban land area, the GDP of the city in secondary and tertiary sectors and the predicted city-level land needs (Wang, Tao and Tong, 2009). Each prefecture allocates conversion rights to lower levels of government. The national government also sets an annual land-use conversion quota and the amount used under this quota has to ensure that the designated agricultural land targets are not breached. As the master plan covers a whole decade, the government also sets a limit on the conversion that is possible within the plan period. Finally, a quota has been established for the creation of new agricultural land and this is also distributed down from the province to the prefecture. Such a method for the conversion of land is arbitrary and takes no account of economic factors. A much more market-based system is needed. The province of Zhejiang has introduced a market in conversion quotas so that the areas with surplus quotas can sell them to deficit areas, but this is only a second-best procedure.

The fundamental reason given for the quotas (national security) is mistaken. The government is concerned that, if the country were to face a military blockade or subject to an export embargo (as was the case for the Soviet Union in 1980), there would be food shortages. The authorities are also concerned that a continuing increase in Chinese food imports over the medium term would drive up world prices which would weigh on consumers given the still high share of food in household spending. Such concerns seem largely unjustified. Food supply is surprisingly elastic even in the short term. Crops can be changed and land brought back into cultivation within one year, and less where two crops are possible. The experience of Britain between 1939 and 1945 bears this out. In 1939, imports accounted for over half of demand for cereals and potatoes. As a sea blockade grew in importance, imports fell but in one year domestic production rose a quarter and in three years it had risen by three-quarters (Table 18). Over the three-year period, total demand for cereal and potatoes actually rose, though meat demand fell substantially. It is always possible that the type of substitution that occurred in Britain at the time might not be feasible in China. But in agriculture, national security would seem better served by adequate contingency planning for increased domestic production rather than by preventing an improvement in the living conditions of the population.

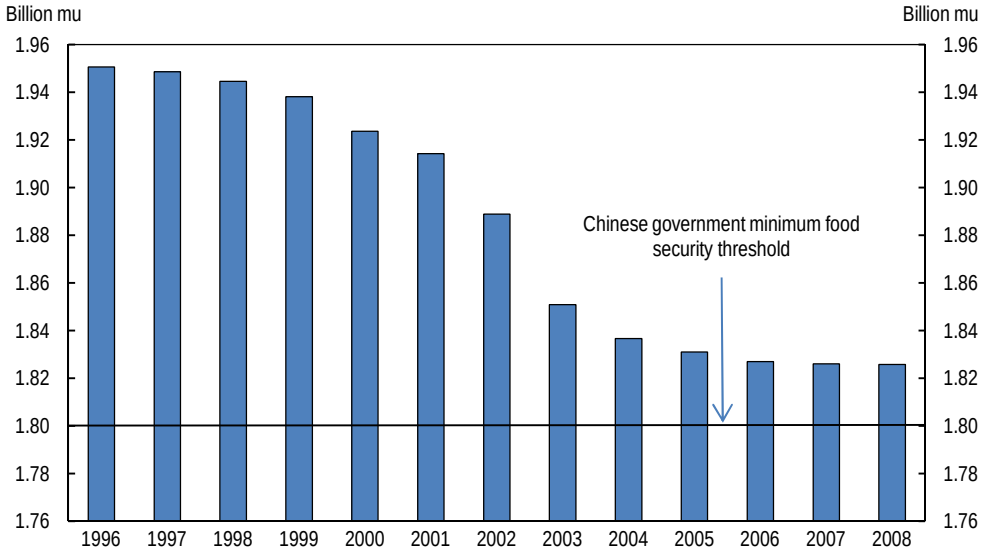
Table 18. National security and food security: the example of Britain during the Second World War

	Supply and demand for cereal, animal feed, potatoes in Britain			
Year	Import	Production	Demand	Import proportion
		Thousands tons		%
1939	10 497	9 758	20 255	51.8
1940	10 225	12 042	22 267	45.9
1941	7 351	14 413	21 764	33.8
1942	4 127	16 959	21 086	19.6
1943	4 249	17 978	22 227	19.1
1944	3 833	16 939	20 772	18.5
1945	4 969	17 320	22 289	22.3

Source: Weir (2009).

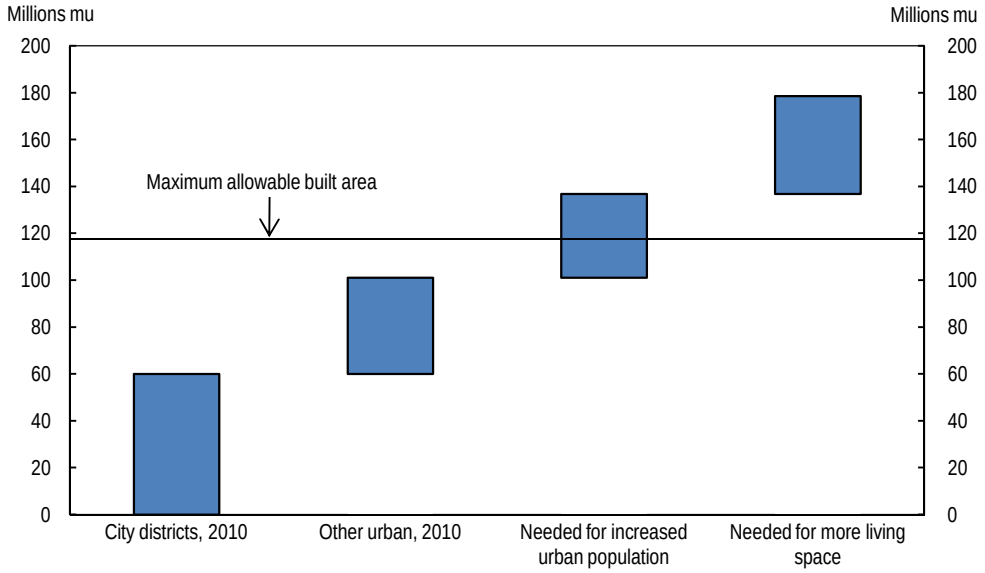
The future growth of urban areas is likely to put further pressure on this central-planning method of allocating land for new construction. Agricultural land has dropped substantially in the past decade. By 2008 (the last year for which data is available), agricultural land had fallen to within 1.1% of the government limit (Figure 15). Between 2010 and 2020, the urban population is likely to increase by over 200 million, if the recent pace of city growth continues with the urbanisation rate rising to above 60% (United Nations, 2012). In addition, rising disposable income will result in households demanding more living space. It is unlikely that migrant workers will be content to live in an area of $8m^2$ per person if they choose to settle in urban areas. If the current average population density in built areas (of just under 10 000 per km^2) is maintained, average living space increases as in the past decade and the plot ratio remains constant, then the demand for building land will soon exceed the available supply, putting upward pressure on prices (Figure 16).

Figure 15. Agricultural land use and the government limit



Source: Ministry of Land and Resources.

Figure 16. Projected increase in built area from 2010 to 2020



Source: OECD projections.

Pressure on land prices in the past decade has led local authorities to take land illegally and then to central government attempts to restrict such land grabs. Moreover, at the local level there has been pressure from farmers for greater, market-based compensation. Farmers are aware that in many areas village collectives have been able to keep a far greater share of the increase in value of land when it switched from agricultural to construction use. The response of the central government has been to centralise the land conversion process by establishing quotas that cascade down through the administrative hierarchy. In an economy that is now market-based in most areas, allocating building land by administrative *fiat* is an anomaly. Moreover, rural land remains essentially a non-marketable asset. A major change in land ownership rules in rural areas is needed to allow famers and their collectives to obtain land-use rights enabling them to change the use of their land to construction. Subjecting sales of land for building to value-added tax would give local authorities a substantial income to replace the profit currently made on land development. Finally, decentralisation of the agricultural protection quotas is needed, as it is very unlikely that central government can judge the needs of each province and similarly that the provinces can judge the needs of each city. Governments might still need to be active in redevelopment, but a freer market in land would ensure a closer matching of supply and demand. In addition, replacing land development profits by a value-added tax on development gains and perhaps a property tax would bring greater transparency to local government finances.

Conclusions

Over the past decade, as labour mobility increased and the housing market opened up to private capital, China has undergone the world's most massive and rapid urbanisation. Population and value-added have risen most in very large cities, but not at the expense of rural areas, where productivity has risen with outmigration. More than 300 million people now live in cities were GDP per capita is on a par with incomes in some OECD member countries. However, the growth of cities has not been without problems. The inherited institutional structure means that as a rule, migrants cannot access all public services in the city where they live. Remaining artificial barriers between migrants and the local population need to be progressively reduced by delinking rights to access public services from the *hukou* system. This system is fundamental to the migrant's continued ownership of the use-right to land in the countryside. As cities

expanded, the value of rural land has increased. Village collectives need to become full owners of their land with restrictions on development removed, so that villagers can sell or develop their land subject to the levy of an appropriate tax. A structured vision for city development is still needed, but the monopoly of land development by the government should be ended. In a number of instances, exclusive reliance on government planning has held back the pace of development, pushed up land prices and created large amounts of illegal construction. Equally, the centralised system of land development quotas needs to be ended. Urbanisation can also generate externalities such as congestion and pollution. These problems are not necessarily linked to city size, but can be dealt with by appropriate policies that internalise externalities and so enable cities to develop more efficiently.

Box 3. Main policy recommendations

Urban planning and transport

- Government policy towards city size should be neutral. Policies that favour small and medium-sized cities should be ended as should those that restrict the growth of large cities.
- The annual quota for the conversion of agricultural land should be abandoned as should the national floor on agricultural land. They should be replaced by a locally-determined master plan that takes into account the need to lower housing prices at the fringes of larger cities.
- In large cities, subway systems are generally still undersized, requiring further investment. In smaller cities, more emphasis should be given to Bus Rapid Transit systems.

Land use

- Plot ratios in urban master plans should take into account public transport availability and the nearness of public facilities, and the district plans should follow master plans more closely.
- The size of residential development sites should be lowered to increase value and allow more competition amongst developers.
- A much higher proportion of the development value of agricultural land should accrue to farmers. Greater legal certainty should be given to the property development undertaken on collectively-owned “village” land located in urban or peri-urban areas. The use of a company structure could help achieve this objective.
- The expenditures funded by land sales should be made more transparent, both as far as the cost of redevelopment is concerned and with respect to the final destination of compensation payments.
- The land-use rights of farmers should be extended to allow – subject to zoning and planning requirements – the sale, renting and mortgaging of their rights which should be extended to 70 years in order to allow the development of larger farms.

Public service provision to migrants

- Disconnect the provision of local services from the possession of a local *hukou*.
- Increase the subsidies to private schools that provide education to migrant children. Allow migrants to enroll in high schools in their place of residence instead of their place of registration.
- Allow the university entrance examination to be taken in the place of residence.
- Abolish local quotas for entrance to university.

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ANNEX A1. DEFINITION OF CITIES USED IN THIS PAPER

In China cities are defined through a hierarchical system of administrative units. The (descending) order of the cities is as follows:

Directly-controlled municipality
Special-plan city
Provincial capital
Prefectural-level city
County-level city

The lowest level of disaggregation considered in this paper is the county-level authority as economic and social statistics are gathered at this level.

The area covered by cities frequently extends well into the countryside surrounding the metropolitan core of the city. Indeed the administrative area of the city has often been extended to include areas that were previously counties.

Outside the directly-controlled municipalities, the national territory is split into areas covered by provincial capital and areas administered by provincial level cities. Each provincial level city is split into an area known as the city proper (*shi*), county-level cities and counties. The city proper is split into country-level areas known as districts (*qu*).

These divisions do not follow from a demographic definition of a city or a metropolitan area. For example, many district areas have very low population densities and extend over large areas. On the other hand there are some counties that are very dense and have large populations but are nonetheless not classified as cities.

This paper uses a definition of a cities (or metropolitan areas) that is based on numerical rather than administrative criteria: here a city is defined as an area with a population of at least 300 000 and where every county-level authority under the city administration has a population density of 500 people per km^2, which is the lowest density of a metropolitan area in the United States.

In the case of Beijing, for example, this means that a number of districts and counties have been excluded from the definition of Beijing metropolitan area, on the grounds that while there may be concentrations of population in the excluded localities, their overall density was less than 500 people per km^2. As Beijing's population has expanded, the population density of the outlying areas has grown. Consequently, the Beijing metropolitan area is shown here as increasing between 2000 and 2010, even though Beijing's administrative area has been unchanged.

It is thus important to bear in mind that the metropolitan areas as defined in this paper can have substantial rural population living in low-density areas. Similarly there are urban areas through out the country that are not included here as metropolitan areas.

Given the complicated nature of the classification of cities, many analysts chose to define cities as being grouped according to tiers. There is no common definition of how to make this ranking. Here metropolitan areas have been ranked by their average ranking in population and GDP. The top five cities in this ranking are called Tier 1 cities and the next 25 Tier 2 cities (Table A1.1). The next 70 cities are classified as Tier 3 cities (Table A1.2). The remaining 400 cities are split into Tier 4 and 5, for which only summary data are shown (Table A1.1).

Selected socio-economic data for the five tiers of cities are shown in Table A1.2. The estimates of average GDP per capita for 2012 have been approximated assuming that the growth rate of GDP and population are the same for the metropolitan areas, as defined above, and the prefectural cities of which they are a part.

Table A1.1. Chinese metropolitan areas grouped by tiers: selected socio-economic data

	Year	Unit	Ranking of city (metropolitan areas)					
			Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	All cities
Number of cities	2010		5	25	70	200	200	500
Population	2000	Millions	48.4	87.9	93.8	186.0	111.1	521.2
Population	2010	Millions	71.2	117.3	115.4	194.0	113.2	604.7
Increase in population	2000-2010	%	47.0	33.5	23.0	4.3	1.9	16.0
Area	2000	km^2	19.6	51.9	89.0	247.2	160	561.1
Area	2010	km^2	24.4	57.8	94.1	247.8	161	576.9
Increase in area	2000-2010	km^2	4.8	5.9	5.1	0.5	0.4	15.8
GDP	2010	Billion yuan	5 862	7 717	6,082	6 317	2 720	28 428
Average population in city	2010	Millions	14.2	4.7	1.6	1.0	0.6	1.2
Average GDP per capita	2010	Yuan	82 382	65 760	52,708	32 560	24, 027	47 016
Average GDP per capita	2010	US Dollar	12 171	9 715	7,787	4 810	3 550	6 946
Average GDP per capita	2010	International dollar	20 777	16 585	13,293	8 212	6 060	11 858
Average GDP per capita	2012	International dollar	25 057	21 233	17,174	n.a.	n.a.	n.a.

Source: 2010 Census Tabulation, Economic and Statistical Communiqués of Prefectural Level Cities.
Note: An international dollar is the result of converting a value in the currency of a country by the PPP exchange rate for that country.

Table A1.2. Tier 1 and 2 cities

Province	City	Population		Area		GDP	Adminis-trative	Population
		2000	2010	2000	2010	2010	level	change
		2000 definition of borders	2010 definition of borders	2000 definition of borders	2010 definition of borders			%
Tier 1 cities								
Shanghai	Shanghai	15 758 892	22 315 426	5 155	5 155	1 687	dc	42
Beijing	Beijing	10 485 260	17 748 000	4 240	7 537	1 350	dc	69
Guangdong	Guangzhou	7 644 804	10 437 085	2 922	2 922	974	pc	37
Tianjin	Tianjin	7 499 181	11 090 314	5 605	7 128	900	dc	48
Guangdong	Shenzhen	7 008 831	9 567 307	1 669	1 669	951	sp	37
All Tier 1		**48 396 968**	**71 158 132**	**19 591**	**24 411**	**5 862**		**47**
Tier 2 cities								
Hubei	Wuhan	6 013 160	7 735 013	2 825	2 825	552	pc	29
Guangdong	Dongguan	6 445 777	8 220 237	2 465	2 465	425	plc	28
Guangdong	Foshan	5 036 668	6 774 267	2 908	2 908	565	plc	34
Jiangsu	Nanjing	3 180 983	7 165 628	741	4 727	451	pc	125
Zhejiang	Hangzhou	4 502 382	6 242 000	3 068	3 068	474	pc	39
Chongqing	Chongqing	5 272 343	7 457 600	3 643	5 473	360	dc	41
Sichuan	Chengdu	5 267 817	7 123 697	2 129	2 129	378	pc	35
Liaoning	Shenyang	4 998 823	5 210 662	2 612	2 612	418	pc	4
Shaanxi	Xi'an	5 345 777	6 501 189	3 547	3 547	286	pc	22
Shandong	Qingdao	2 720 972	3 718 800	1 400	1 400	307	sp	37
Liaoning	Dalian	3 245 191	3 382 715	2 505	2 505	342	sp	4
Zhejiang	Ningbo	2 422 126	3 491 597	2 560	2 560	302	sp	44
Shandong	Jinan	2 999 934	3 757 200	2 079	2 079	292	pc	25
Heilongjiang	Ha'erbin	3 481 504	4 771 696	2 089	1 353	249	pc	37
Jiangsu	Wuxi	2 304 454	3 005 512	852	1 622	295	plc	30
Henan	Zhengzhou	2 589 387	4 253 627	1 024	1 024	185	pc	64
Hunan	Changsha	2 122 873	3 093 980	556	556	263	pc	46
Jiangsu	Changzhou	2 502 049	3 290 548	1 774	1 774	224	plc	32
Anhui	Hefei	1 659 075	3 352 076	839	839	204	pc	102
Jilin	Changchun	2 865 599	2 904 578	1 953	1 953	232	pc	1
Shanxi	Taiyuan	2 558 382	3 359 508	1 460	1 460	162	pc	31
Shandong	Zibo	2 817 479	2 980 800	2 972	2 972	224	plc	6
Hebei	Tangshan	2 427 146	3 163 439	2 028	2 028	186	plc	30
Guangdong	Zhongshan	2 363 322	3 120 884	1 800	1 800	183	plc	32
Yunnan	Kunming	2 759 842	3 272 586	2 081	2 081	157	pc	19
All Tier 2		**87 903 065**	**117 349 837**	**51 909**	**57 759**	**7 717**		**33**

Note: Administrative level of areas:

dc Directly controlled municipality
sp Special-plan city
pc Provincial capital
plc Prefectural-level city
cc County-level city
co County

Data for Chongqing refers only to the metropolitan area of Chongqing and not to the whole municipality.

Source: 2010 Census, but data for metropolitan areas in Liaoning and Jilin have been estimated on the basis of the growth of prefectural-level cities, as disaggregated data for these provinces were not available.

Table A1.3. Tier 3 cities

Province	City	Population		Area		GDP	administrative	Population
		2000	2010	2000	2010	2010	level	change
		2000 definition of borders	2010 definition of borders	2000 definition of borders	2010 definition of borders			%
Tier 3 cities								
Guangdong	Shantou Shi	4 046 390	3 772 245	1 226	1 226	119	plc	-7
Fujian	Xiamen Shi	1 369 814	2 297 016	1 142	1 142	205	sp	68
Fujian	Fuzhou Shi	2 124 435	2 921 763	1 014	1 014	151	pc	38
Zhejiang	Wenzhou Shi	1 915 548	3 039 500	1 188	1 188	120	plc	59
Jiangxi	Nanchang Shi	1 779 123	2 293 875	333	333	150	pc	29
Xinjiang	Wulumuqi (Urumqi) Shi	1 513 541	2 378 308	828	1 104	128	pc	57
Hebei	Shijiazhuang Shi	1 969 975	2 735 976	455	455	115	pc	39
Guangxi	Nanning Shi	1 832 244	2 264 683	2 377	2 741	123	pc	24
Jiangsu	Kunshan Shi	750 074	1 646 318	927	927	210	cc	119
Inner Mongolia	Huhehaote Shi	961 193	1 980 774	1 088	2 101	133	pc	106
Gansu	Lanzhou Shi	1 947 030	2 492 325	1 088	1 088	95	pc	28
Shandong	Linyi Shi	1 938 510	2 600 200	1 759	1 759	89	plc	34
Jiangsu	Suzhou Shi	1 344 709	1 526 768	342	342	228	plc	14
Jiangsu	Jiangyin Shi	1 315 472	1 594 829	988	988	200	cc	21
Jiangsu	Xuzhou Shi	1 679 626	1 908 524	1 180	1 180	115	plc	14
Jiangsu	Huai'an Shi	2 593 915	2 416 719	3 206	3 206	83	plc	-7
Guangdong	Huizhou Shi	862 822	1 881 563	1 262	2 672	112	plc	118
Fujian	Jinjiang Shi	1 479 259	1 986 447	721	721	91	cc	34
Guizhou	Guiyang Shi	1 717 474	2 300 185	478	478	82	pc	34
Zhejiang	Taizhou Shi	607 660	1 902 500	434	1 538	87	plc	213
Guangdong	Zhuhai Shi	1 235 437	1 598 171	1 277	1 277	120	plc	29
Liaoning	Anshan Shi	1 556 285	1 622 237	622	622	114	plc	4
Jiangsu	Changshu Shi	1 239 637	1 510 103	1 263	1 263	145	cc	22
Guangdong	Jiangmen Shi	1 468 742	1 822 640	1 692	1 692	86	plc	24
Henan	Luoyang Shi	1 491 680	1 932 459	554	554	81	plc	30
Guangdong	Zhanjiang Shi	1 350 665	1 747 231	1 360	1 360	77	plc	29
Fujian	Putian Shi	1 359 558	1 862 421	992	2 284	68	plc	37
Guangxi	Liuzhou Shi	963 662	1 436 599	667	667	86	plc	49
Hainan	Haikou Shi	1 508 341	2 046 189	2 237	2 237	59	pc	36
Shandong	Zaozhuang Shi	1 552 815	1 570 800	2 047	2 047	73	plc	1
Jiangsu	Zhangjiagang Shi	957 223	1 248 414	813	813	160	cc	30
Zhejiang	Cixi Shi	1 214 537	1 462 383	1 154	1 154	76	cc	20
Shandong	Tengzhou Shi	1 548 817	1 603 700	1 485	1 485	63	cc	4

Table A1.3. Tier 3 cities (continued)

Province	City	Population		Area		GDP	Administrative level	Population change
		2000	2010	2000	2010	2010		
		2000 definition of borders	2010 definition of borders	2000 definition of borders	2010 definition of borders			%
Jiangsu	Wujiang Shi	857 104	1 275 090	1 192	1 192	100	cc	49
Liaoning	Fushun Shi	1 434 447	1 495 236	713	713	63	plc	4
Shandong	Tai'an Shi	1 538 211	1 735 500	2 087	2 087	56	plc	13
Jiangsu	Yancheng Shi	1 534 182	1 615 717	1 729	1 729	56	plc	5
Jiangsu	Yangzhou Shi	1 072 496	1 198 866	148	986	95	plc	12
Jiangsu	Yixing Shi	1 164 275	1 235 476	2 039	2 039	81	cc	6
Fujian	Quanzhou Shi	1 032 215	1 211 238	510	510	81	plc	17
Zhejiang	Wenling Shi	1 162 783	1 366 800	836	836	58	cc	18
Shandong	Xintai Shi	1 344 395	1 315 900	1 933	1 933	59	cc	-2
Henan	Nanyang Shi	1 584 715	1 811 732	1 887	1 887	45	plc	14
Zhejiang	Huzhou Shi	1 145 414	1 293 219	1 588	1 588	59	plc	13
Jilin	Jilin Shi	1 146 298	1 151 347	1 576	1 576	97	plc	0
Shandong	Weifang Shi	1 024 355	1 194 100	815	815	76	plc	17
Anhui	Huainan Shi	1 228 189	1 674 334	1 212	1 526	43	plc	36
Shandong	Laiwu Shi	1 233 525	1 298 500	2 246	2 246	55	plc	5
Zhejiang	Yiwu Shi	912 670	1 234 000	1 103	1 103	62	cc	35
Zhejiang	Yueqing Shi	1 162 765	1 389 300	1 174	1 174	50	cc	19
Fujian	Nan'an Shi	1 385 276	1 418 451	2 035	2 035	48	cc	2
Zhejiang	Rui'an Shi	1 207 788	1 424 700	1 278	1 278	46	cc	18
Hubei	Xiangyang Shi	1 871 146	1 120 885	2 920	1 259	81	plc	-40
Guangdong	Maoming Shi	644 301	1 217 715	879	879	57	plc	89
Zhejiang	Jiaxing Shi	881 923	1 201 900	968	968	58	plc	36
Shanxi	Datong Shi	998 312	1 223 171	108	108	53	plc	23
Sichuan	Mianyang Shi	1 162 962	1 355 331	1 570	1 570	45	plc	17
Zhejiang	Zhuji Shi	1 070 675	1 157 900	2 311	2 311	62	cc	8
Shandong	Jimo Shi	1 111 202	1 177 200	1 780	1 780	57	cc	6
Fujian	Fuqing Shi	1 174 540	1 234 838	1 932	1 932	48	cc	5
Anhui	Wuhu Shi	697 197	1 043 876	720	444	79	plc	50
Jiangsu	Rugao Shi	1 362 533	1 267 066	1 531	1 531	43	cc	-7
Zhejiang	Shaoxing Xian	791 797	1 030 800	1 196	1 196	78	co	30
Jiangsu	Xinghua Shi	1 441 659	1 408 711	2 393	2 393	39	cc	-2
Hunan	Zhuzhou Shi	879 996	1 055 373	535	535	65	plc	20
Hebei	Baoding Shi	902 496	1 099 182	137	137	58	plc	22
Sichuan	Zigong Shi	916 687	1 262 062	1 023	1 431	42	plc	38
Jiangsu	Pizhou Shi	1 539 922	1 458 036	2 088	2 088	37	cc	-5
Henan	Luohe Shi	1 131 007	1 294 891	1 020	1 020	40	plc	14
Guangdong	Zengcheng Shi	899 644	1 036 731	1 616	1 616	68	cc	15
All Tier 3		**93 845 315**	**115 389 037**	**89 027**	**94 109**	**6 082**		**23**

Source: 2010 Census, but data for metropolitan areas in Liaoning and Jilin have been estimated on the basis of the growth of prefectural-level cities, as disaggregated data for these provinces were not available.

ANNEX A2. INVESTMENT IN HOUSING

Estimation of gross fixed residential capital formation and of the stock of structures

Casual observation of Chinese cities suggests that the economy is particularly dependent on residential investment as a source of demand. Yet the official national accounts offer little information as to the quantity of this type of investment or of any other type of investment. Indeed they only present data for the contribution of total capital formation, which includes the change in inventories. Once every five years the constant price data is separated into fixed capital formation and the change in inventories.

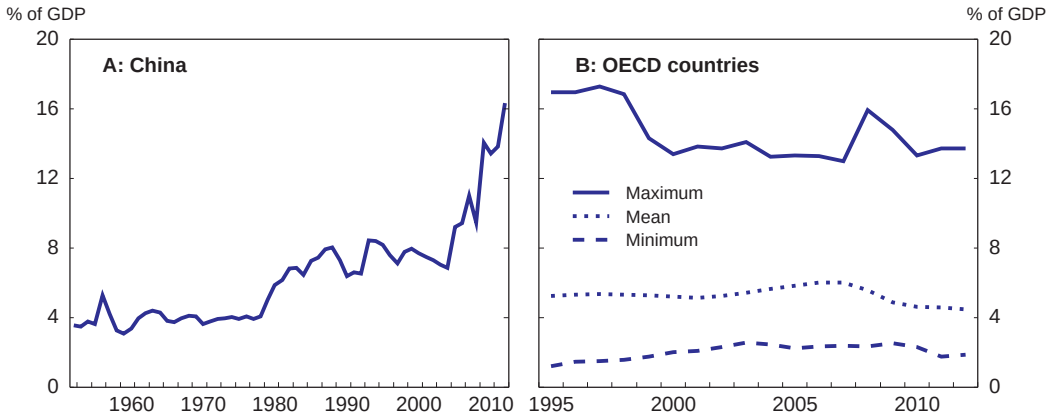
However, fixed capital formation is central to business cycle developments and to long-term growth. The impact of different types of capital formation on the economy is likely to vary in the short and long term. In particular, housing investment can be subject to major swings. This annex attempts to estimate gross fixed capital in the housing sector and the capital of housing structures for the period 1952 to 2012, as well as the contribution of the housing sector to GDP. The estimates of capital formation are then compared to estimates of the housing stock derived from data on floor area of completed housing.

The estimates of capital formation have been made using mainly official data sources and the methodology of the National Bureau of Statistics (NBS) to transform available data on residential investment into gross fixed capital formation (details below).

The development of residential investment

Fixed capital formation in housing has risen considerably since the introduction of a market for residential investment in the late 1990s (Figure A2.1). In the immediate aftermath of liberalisation, investment was quite steady as a share of GDP. Starting in 2005, though, the investment started to surge, especially after the opening of the residential mortgage market and the easing of monetary policy in 2009. Between 2009 and 2011, residential fixed capital formation averaged nearly 14% of GDP. Such a high level of investment has only been sustained in one OECD country (Chile). In other OECD countries, residential investment of over 10% of GDP has been a symptom of over-building and has been followed by abrupt declines in investment. Even during Japan and Korea's economic take-offs, the maximum share of housing investment in GDP in any four-year period was under 8%.

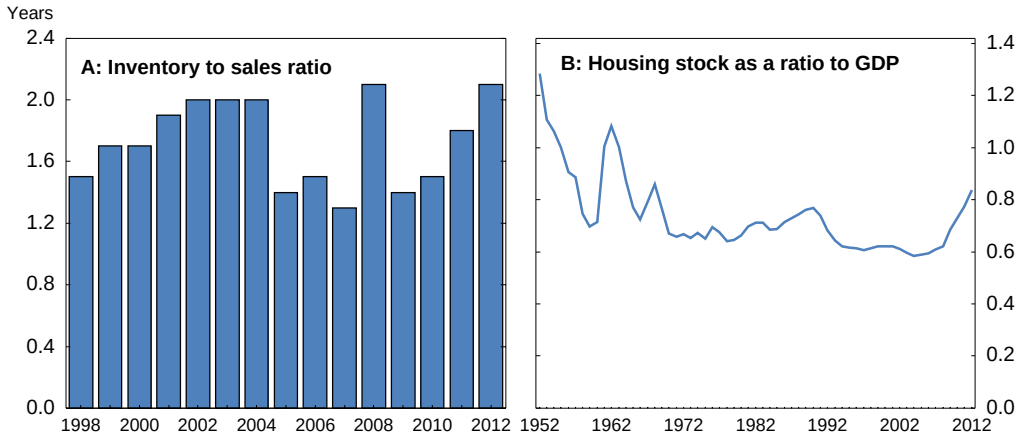
Figure A2.1. Residential gross fixed capital formation: China and OECD countries
% of GDP



Source: China: author estimates; OECD countries: Economic Outlook 93 database.

In 2012, residential fixed capital formation appears to have risen even further, despite slackening sales. This reflected an increase in inventories (Figure A2.2) and in the work in progress of property developers (in China, the residential fixed capital formation is assumed to occur once the property developer makes an investment rather than when the building is transferred to a purchaser).

Figure A2.2. Inventory of residential housing and the stock of housing



Source: See text.

Development of the residential capital stock

Cumulating the net residential capital formation data allows to estimate the capital stock of residential structures, starting from information on the initial capital stock in 1952. Errors in the estimation of the initial capital stock do not have a major impact on the current level of the residential capital stock given the enormous expansion of the Chinese economy over the past 60 years.

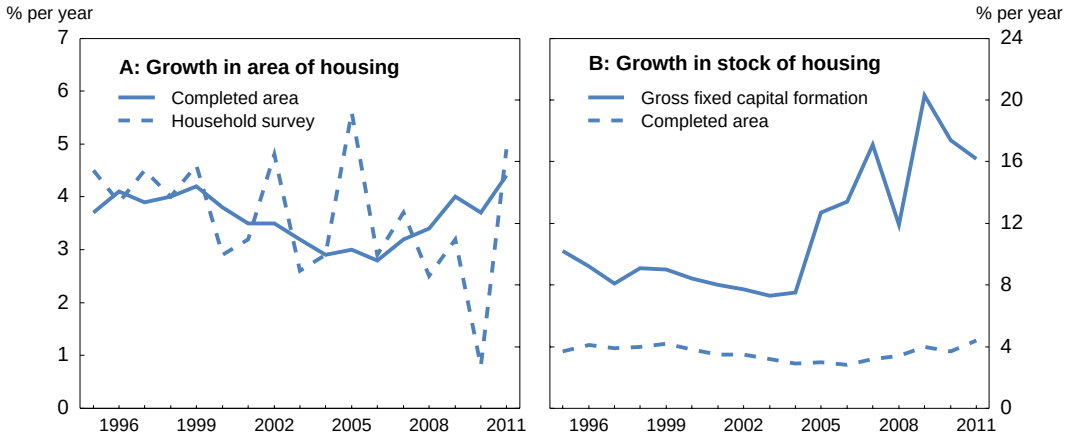
The housing sector was not a priority under the central planning regime and the residential capital stock fell quite markedly relative to GDP between the nationalisation of housing and the start of opening-up and reform in 1978. There was a burst of investment in the second half of the 1980s. The level of the capital stock did not start to rise relative to GDP until around 2003 and has been constantly rising since then. However, the share of the capital stock remains below the levels observed in the 1950s.

Alternative estimates of the housing stock

Another way to measure the housing stock is to use three sets of data for the area of housing in the country. Data on per capita gross floor area (construction space) can be derived from household surveys. These surveys show the average space occupied by urban and rural households was 32 and 34 m^2 per person (Table A2.15). Once allowance is made for the migrant population, which is not counted in the surveys, the average space per person falls to just under 30m^2 per person. This method puts the total floor space occupied by households at 39 billion m^2 in 2010 (Table A2.16). In broad terms, this figure is confirmed by the 6th Census which puts the total area occupied by households as being 41 billion m^2. A second method is to add the area of housing completed each year to an initial stock based on the household survey. Information on the stock of housing that is completed each year can be cumulated to give the current area of the housing stock. An allowance has to be made for the demolition of the existing stock. For the period 1978 to 1994 the series derived from the household survey and the completions data differ markedly. After 1994, the two series can be reconciled by assuming a demolition rate of 1.2% per year. In addition, while the series with a demolition rate of 1.2% agrees with the household survey, there are

significant year-to-year differences, with the standard deviation of the difference being 1.2 percentage points (Figure A2.3). By 2011, such a demolition rate would be equivalent to the loss of 500 million m^2 per year. According to the waste-recycling committee of the State-Owned Assets Supervision and Administration Commission, the actual annual loss of housing area was 600 million m^2 per year (SASAC, 2011). The difference between the rate needed to balance the completion data and the household survey data is thus only 0.2% per year. This figure is, however, difficult to reconcile with the rate of capital consumption the NBS uses for dwellings.

Figure A2.3. Three measures of the housing stock



Source: See text.

A set of anomalies emerge when the capital formation data is compared to the area data from the household survey. The first is that while the investment data suggest that nearly 90% of investment takes place in urban areas, the data for the completed area of housing units suggest that less than half of the area of completed housing is in urban areas. For these two observations to be consistent, the cost of new construction in urban areas would have to be nearly 10 times that in rural areas. While construction costs undoubtedly differ, a tenfold difference seems unlikely. An alternative explanation would be that the two series use different definitions for urban and rural areas. In particular, any collectively owned land is defined as rural, even if it should be classified as urban on the basis of population density. Given these anomalies it is better to compare the investment and area data at a national level.

The capital stock data based on investment show a much more rapid growth than the data based on the completed area of housing (Figure A2.3, Panel B). To some extent, this likely reflects that a given area of housing has become more capital intensive. Construction methods have changed markedly over time: housing units now predominately take the form of multi-story residential towers, whereas four decades ago structures were lower and more basic in style. The quality of housing has also improved markedly (Table A2.1).

Table A2.1. Housing construction and amenities

Per cent of all households

		One floor only	Own kitchen	Own toilet	Average of four facilities	Own toilet (flushing)	Piped water	Heated water	Cooking fuel gas or electricity
Total	2000	63.1	82.5	67.4	26.9	18.0	45.7	16.3	27.5
	2010	47.2	82.0	66.1	49.0	35.4	64.6	44.0	52.0
City	2000	n.a.	85.4	71.3	63.2	50.5	87.5	43.0	71.8
	2010	15.0	88.7	83.0	82.6	69.3	93.2	77.5	90.3
Town	2000	n.a.	83.6	62.0	41.4	26.5	69.3	26.0	43.6
	2010	42.0	84.4	69.3	60.4	40.4	75.9	62.3	62.7
Rural	2000	n.a.	81.1	67.0	9.4	3.4	24.2	3.7	6.6
	2010	70.0	76.8	54.0	28.2	11.6	41.7	36.4	23.2

Source: NBS tabulations of the 2000 and 2010 (in Chinese).

Nonetheless, the large difference between the growth of these two series needs more explanation, especially as it has been widening over time, reaching nearly 11 percentage points in 2011, after averaging 7% in the previous 25 years (Table A2.2). The elasticity of demand for space is quite low but the elasticity for the demand for structures, at slightly above 1 is closer to that found in studies for the demand for housing. Such an elasticity is similar to the income elasticity of demand for housing which was estimated by Chow and Lin (2010) as lying between 0.7 and 1.1. However, a much lower estimate of the income elasticity of demand, at only 0.18 was found by Wang (2011).

Table A2.2. Growth of per capita housing space and various measures of real income

	Housing space per capita	Residential structures per capita	Structures per square metre of housing
	Annual average percentage change, 1986 to 2011		
Housing space per capita	2.9	9.2	7.1
Elasticity with respect to GDP per capita	0.33	1.03	n.a.
Elasticity with respect to consumption per capita	0.38	1.12	n.a.
GDP per capita	8.9	0.33	n.a.
Private consumption per capita	7.6	0.39	n.a.

Source: See table A2.15.

Measurement of the output of the housing sector

In order to estimate the contribution of the housing sector to the measured level of Chinese GDP, a standard measure of GDP should include the gross rent accruing to housing less maintenance expense. Where housing is owner-occupied, a rental income should be imputed to the housing. The Chinese national accounts do not attempt to measure the rent accruing to the owners of housing units, either for actual rented property or owner-occupied property due to the absence of survey information (Xu *et al*., 2000). In any case, in the early part of the period it is likely that the rental income failed to cover maintenance and depreciation, reflecting the high degree of subsidisation of urban housing. Rather they impute just the extent of capital consumption but only for owner-occupied property. These estimates are not released regularly. In the 1990s, for owner-occupied housing alone, the average capital consumption was 1.5% of GDP and 2.4% of the value of the structures (Table A2.3).

Table A2.3. Owner-occupied housing services in GDP

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	100 million yuan										
GDP	18 320	21 280	25 864	34 501	46 691	58 511	68 330	74 894	79 003	82 673	89 113
Owner-occupied dwelling services	205.5	320.6	374.2	540.0	634.0	755.2	978.8	1 196.0	1 213.9	1 640.3	1 944.6
% of GDP	1.1	1.5	1.5	1.6	1.4	1.3	1.4	1.6	1.5	2.0	2.2
% of housing stock value	1.7	2.4	2.2	2.3	2.2	2.3	2.6	2.8	2.6	3.2	3.4

Source: Liu (2009).

By 2012, not only had the proportion of owner-occupied housing risen to 85% from 43% in 1995, but also the rental market had expanded in major cities (Table A2.4). As a result there has been a growing under-counting of the contribution of the housing sector to overall GDP.

Table A2.4. House tenure nationally and by area

In % of all tenure types

	Nationwide	Cities	Towns	Rural
Rental	12.4	25.8	13.6	2.7
Public rental	1.5	2.7	2.1	0.4
Private rental	10.9	23.2	11.4	2.3
Owner-occupied	84.9	69.7	82.9	96.1
Self built	61.0	16.3	55.4	93.9
First owner	11.8	26.1	15.0	0.6
Second or later owner	2.8	5.0	4.1	0.8
Subsidised purchase	2.3	5.1	2.5	0.2
Formerly public sector	7.0	17.2	5.8	0.5
Other forms of tenure	2.7	4.5	3.5	1.2
Total	100.0	100.0	100.0	100.0

Source: Tabulations of the 2010 Census.

The absence of any estimates of actual rents or any imputation of user costs to owner-occupied housing is a major drawback to the national accounts. In order to overcome this problem, the NBS have conducted specific housing cost surveys in major cities. On the basis of these estimates they have recently made new experimental measures of Chinese GDP and private consumption (Xu *et al.*, 2012). These estimates make a substantial difference to both the level of private consumption, its share in GDP and the level of GDP. Private consumption rises by nearly one-fifth and its share in GDP by over 5 percentage points (Table A2.5). Under the existing accounting system the capital consumption charge had risen to 2.5% of GDP by 2010 (Guo *et al.*, 2012), but under the new system the contribution of housing would be over 4 percentage points higher.

Table A2.5. Experimental estimates of housing expenditure and GDP for 2010

	Official national accounts	Experimental estimates
	100 billion yuan	
GDP	39430.8	41173.5
Household consumption	13327.6	16016.5
Market rent	0.0	895.3
Capital consumption	983.4	1830.8
Total	983.4	2726.1
	% private consumption	
Market rent	0.0	5.6
Imputed rent	0.0	11.4
Total rent	0.0	17.0
	% of GDP	
Market rent	0.0	2.2
Imputed rent	0.0	4.4
Total rent	0.0	6.6
	%	
Share of consumption in GDP	33.8	38.9
Share of housing in GDP	2.5	6.6
Increase in private consumption		20.2
Increase in GDP		4.4

Source: Xu *et al.* (2012).

Methodology for residential fixed capital formation

As well as aggregate data for the value of gross fixed capital formation, information on fixed asset investment sector by sector is available. This concept, not used by OECD statistical offices, is not the same as gross fixed capital formation. Purchases of existing equipment and structures are included as investment as are purchases of land-use rights. In addition, investment by the real estate development industry is calculated at the cost to the property developer. The actual amount paid by the purchaser of an apartment is not shown in the fixed asset investment. This contrasts to the treatment of residential investment in the standard system of national accounts, where capital formation in producing residential real estate is counted as work in progress (inventory). It is only when the finished product is sold to a final buyer that the outlay is classified as residential fixed capital formation. Several adjustments have to be made to the fixed asset investment data to arrive at the concept of capital formation.

To overcome the lack of sectoral capital formation data, a common procedure has been to allocate gross fixed capital formation to different sectors according to the proportions of fixed asset investment by industry (Bai *et al.*, 2006). However, for the past decade, the discrepancy between the official estimates of fixed asset investment and gross fixed capital formation has widened. Moreover, while such an approach may be an acceptable first approximation, it unduly assumes that differences between the two concepts are spread equally between all sectors of the economy.

This annex therefore uses a different approach, replicating the exact published definition of residential fixed capital formation used by the NBS. For the period starting in the mid-1990s, the data needed to make such a calculation can be found in official publications. The task is more difficult for earlier years and becomes extremely difficult for the period prior to 1978. Nonetheless, an effort has been made here to extend data back to 1952 in order to create a series for the stock of residential capital excluding land, following the example of Maddison (2007).

The methodology of moving from fixed asset investment to capital formation in the residential sector is laid out in three papers by authors from the NBS. The first outlines the broad definitions of different components of demand in the Chinese national accounts (Xu, 2004). The second gives precise equations (Wu, 2009) while the third gives the methodology for measuring the gross value added of the housing sector and depreciation (Liu, 2009). In broad terms:

Residential gross fixed asset formation = National residential fixed asset investment

+ investment in land improvement

+ the gross profit margin of residential real estate developers

− purchases of land-use rights by residential developers.

Institutional background is necessary to understand this equation. A real estate developer purchases land-use rights (broadly equivalent to long-term leases in common law jurisdictions) with underlying land ready for the addition of residential units. The use-right that is purchased is for land that has been transformed by the addition of network services (roads, water, drainage and utilities) and the demolition of any existing properties. Local authorities carry out this fixed capital formation before auctioning the land use-rights and so this form of investment has to be added to the outlays of developers.

The gross profit margin of developers is not an observed variable, but has to be calculated according to the equation given by Wu (2008):

Gross profit margin of residential real estate developers = Actual sales of residential buildings

− (floor space of residential buildings completed) X (cost per unit of floor space completed).

The information needed to compute this variable is available since 1995.

The value added of the housing sector in the Chinese national accounts consists entirely of an estimate of depreciation. No addition is made for actual or imputed rents of owner occupiers nor is any deduction made for maintenance or management charges in apartment buildings. The NBS has assumed different depreciation rates for residences in urban and rural areas. For the former, the rate has always been 2% per year. In rural areas, the NBS assumed 4% per year up to 2004 and 3% per year from 2005. This methodology resulted in urban housing contributing 2.4% to national GDP in 2010 (Xu *et al.*, 2012). However, if an imputed user cost is considered as the imputed rent of owner-occupiers and actual rents are used for renters, then the share of housing in GDP is estimated to rise to 6.6%. Adding rental costs to the measurement of private consumption pushes up the consumption share of GDP by over 5 percentage points from 33.8 to 38.9%.

Data sources

For 1995-2011, data has been taken from the NBS 2012 Yearbook and in a few cases from the China Premium database of CEIC. For 2012, data has been taken from CEIC. For 1980-94, data has been taken from NBS (2002). For earlier years, data for housing provided by the state-owned sector – the principal provider of housing in urban areas in that period – has been taken from NBS (2004). Little official data is available for rural housing investment in 1952-79. Two sources are a book by Kang (1974) and a report by the Rand Corporation (Liu *et al.*, 1963). Even given the estimates in these books, an assumption has had to be made for the level of rural housing investment between 1958 and 1979, a procedure also adopted by Maddison (*op. cit.*).

The precise sources used for each variable are presented in Table A2.16.

Results

Urban investment

A series for urban residential fixed asset investment has been constructed for 1952-2012 (Table A1.7). Two elements of the series had to be estimated. *First*, as residential real estate developers only emerged during the 1980s, official sources do not present data for this sector until 1995. However, between 1986 and 1995 information is available on both the value of total real estate development and the area developed both in total and for residential purposes (Table A2.8). Residential investment has been estimated on the assumption that the cost per square metre of residential and non-residential construction is the same. *Second*, prior to 1980, no data is available for investment in urban areas by collectives or individuals. It has been assumed that over 1952-79 investment moves in line with urban household consumption.

Rural investment

A series for rural residential fixed asset investment has been developed for 1952-2012 (Table A2.9). Up to 1980, no official data is available but estimates based on official surveys have been made by Kang (1974). Between 1958 and 1980, investment has been assumed to move in line with rural household consumption.

Gross margin of developers

A series for the profit margin of residential property developers is presented in Table A2.10. All the data needed to construct the series is available from 1995 from official sources. Prior to that date, no data is available for the sale price of residential property. Between 1987 and 1994, the residential price has been assumed to be equal to the price per square metre of all property sold by real estate developers. Between 1980 and 1987 the margin has been assumed to be zero.

Land purchases

The value of land purchases by residential property developers has been estimated from data published by the Ministry of Land and is shown in column 6 of Table A2.11. There is, however, some uncertainty about the units in which the land price is expressed. The price is usually stated to be measured in yuan per square metre of land. However, according to Deng *et al*. (2012), the price is calculated as yuan per square metre of allowed floor space in official data from the Ministry of Land and Natural Resources. However, in the calculations here, land prices have been assumed to be measured on a physical space basis. Consistent published data for residential land prices is only available since 2008, though data on local government auction sales has been gathered since 2003. For the period prior to 2003, land price data is available in the Chinese Statistical Yearbook but covers sales of land for all purposes (Dong, 2010). There is a major difference in the level of the two prices from 2008 to 2012, but nonetheless it has been assumed that the two series can be spliced to form a continuous series. Data for the area of land purchased for residential development is available since 1996. Data for land improvement expenditure is available from 1995 to 2010. The series has been extended forwards to 2012 by assuming such outlays are a constant portion of GDP and backwards by assuming a constant real expenditure on land improvement per square metre of residential property sold. Obtaining a consistent data series for land prices requires further investigation.

Stock of residential structures

With the above series and the relationships between them, the level of residential gross fixed capital formation can be estimated in current prices (Tables A2.11) and 2005 prices (Table A2.12). The information for fixed capital formation can then be transformed into an estimate of the residential capital stock. This requires an estimate of the stock of fixed residential capital in 1952. Construction costs appear to have been of the order of 15 yuan per m^2 in rural areas and five times higher in urban areas according to Kang (1974). It is generally accepted that the average per capita living space in urban areas in China was 4.5 m^2, equivalent to 10 m^2 of construction area. These estimates have been used to create an initial capital stock for residential structures in 1952, assuming that the structures had been depreciated by 50%.

In addition to the initial stock of capital, an estimate of the depreciation rate in subsequent years is required. The NBS assumes a 2% annual depreciation rate for urban residences. Such depreciation rates seem reasonable for houses that are well maintained, at least in the United States (Harding *et al.*, 2007). In rural areas, it assumes a depreciation rate of 4% between 1952 and 2004 and then a rate of 3% (Liu, 2009). However, the analysis here requires an estimate of the depreciation rate of the structures only. This depreciation rate will be higher than the depreciation rate for houses because land does not depreciate. It will be higher in countries where the share of land in the overall price is high, as in China, than in countries where the share of land is low. This is due to the incentive to demolish a building once its overall value is less than the value of the land used for the construction (Nomura and Momose, 2008). Here a depreciation rate of 6% has been used for urban and rural structures as an alternative to the official assumptions. If land is one-third the cost of a new housing unit, then such a deprecation rate assumes that houses are demolished after a life of 18 years. The official depreciation rate in contrast assumes that buildings are demolished after 55 years. The results of the calculations are shown in Table A2.13.

Estimating residential construction inventory changes

The definition of capital formation used in China does not correspond to standard international practice. Work undertaken on a building before it is sold is counted as capital formation while in international practice it would be counted as work in progress. Buildings that have been completed, but not sold, would be counted as inventory internationally but are counted as fixed capital formation in China. However using the information laid out above, it is possible to separate inventory and working in progress from the basic fixed asset investment data.

Capital formation should be measured from sales data using selling prices. However fixed asset investment is estimated at building costs. The developers' margin can removed from data measuring sales, so that sales are valued on the same basis as fixed asset investment. At that point, the difference between the flow of sales at cost and fixed asset investment at cost represents the sum of the increase in inventory of completed (but unsold) buildings and work in progress. No official data is available for the stock on inventory and work in progress. However, the level of inventory can be calculated if an assumption is made as to its level in a base year. Here it has been assumed that inventory and work in progress represent 1.5 years of sales in 2000. Continuous series for changes in inventory and work in progress are shown in Table A2.14.

Area of housing

Survey data

Estimates of the living space per person in rural and urban areas have been published annually since 1978 and for intermittent years prior to 1978. The coverage of the data series has varied considerably over time as has the definition of the series. Three measures of living space have been used at different points in time.

The first one (*useable space*) excludes bathroom, toilets and storage space.

The second measure (*living space*) includes the areas which are omitted in the first measure and are referred to as "auxiliary" spaces in statistical publications. In total, these two areas are known as living space.

Finally, there is a measure known as *construction space*. This measure includes walls and, in the case of apartments, also includes common areas such as corridors, stairwells, lift shafts and a pro-rata share of all other common facilities.

A common rule of thumb is that living space is 75% of construction space and useable space 75% of living space.

The earliest data is based on the concept of *useable space*, no doubt due to the prevalence of housing units without private sanitary arrangements. The Statistical Yearbook has published this data from 1952 to 2000, but with a gap between 1953 and 1977. The Ministry of Construction published data for *living space* from 1986 to 2001 and for construction space from 1986 to 2006.

Starting in 2002, the NBS has published data for the per capita living area in urban areas drawn from its urban household survey. Prior to 2007 various combinations of these three measures were published in the Statistical Yearbook. Since 2007, only the living space data based on answers to the urban household survey is published in the Statistical Yearbook. The drawback to this latter data source is that while rural migrants live in urban areas, accounting for 37% of the urban population by 2011, they are not included in the sample for the urban household survey. Consequently, the estimates of living space per person are biased upwards given the low living area of such migrants.

In order to obtain a long time series for urban housing the series for living space from the Ministry of Construction have been spliced to the survey based data in 2002. Then the useable space series has been spliced to the resulting series in 1986.

For rural areas, the data for living space has always been taken from the NBS rural household survey and so is more comparable over time than the urban data. However, data is only available from 1978.

The final series for living space per capita is shown in Table A2.15. The two series then have to be aggregated to create a national series while taking into account the housing space of rural migrants in urban areas. This has been achieved by using the NBS data for rural and urban residents and then splitting the urban population into local residents and rural migrants. The living space of migrants has been assumed constant at 10 m^2 per capita. In the quarter century between 1986 and 2011, the average increase in housing space per person was just 2.9% annually. Given the population of urban and rural residents and migrants an overall housing stock can be computed (Table A2.16).

Housing completion data

Besides household surveys, data on the amount housing built in urban and rural areas is also collected directly from administrative returns by construction companies and individuals. The figures for the area of housing can be calculated from the flow data if there is information on demolition rates and the initial housing area. A number of statements from officials at the Construction Ministry put the service life of housing in China at 20 to 30 years. In order to measure the housing stock a measure of scrapping rather than depreciation is needed, as the area of the house continues to exist until it is scrapped, even though it is providing no economic services.

Nationwide, a committee suggested that 0.6 billion m^2 were demolished annually between 2008 and 2010 (SASAC, 2011). This figure, if it is just for urban areas, is extremely high. It would imply that there was little net addition to the urban housing stock between 2000 and 2009. Other isolated information suggests that 160 million m^2 was demolished in 2003 (Tong, 2005). This figure suggests a service life of 20 years for urban housing built before privatisation. However, it would be wrong to assume that all housing built in a given year was scrapped 20 years later. More likely, there is a distribution of service lives around the mean. Rather than use a fixed life, it has therefore been assumed that 3.3% of the existing stock is scrapped each year, so 50% is scrapped within 20 years and 75% within 40 years. The empirical backing for this assumption is weak.

Later information has suggested that this estimate of scrapping may be slightly too high. Between 2000 and 2010 the average scrapping rate of all housing built before 1989 was 2.9% according to a comparison of the 2000 and 2010 census. Moreover, the rate may tend to fall over time as scrapping rates are markedly higher for property built before 1970 (Table A2.6).

Table A2.6.Scrapping rate of housing by date of construction

Year of construction	Gross floor area of housing		Annual demolition rate
	Million m^2		% per year
	2000	2010	2000-2010
Before 1949	71.8	32.3	-7.7
1949-1959	45.2	24.9	-5.8
1960-1969	98.9	67.7	-3.7
1970-1979	282.3	217.8	-2.6
1980-1989	919.5	715.9	-2.5
Before 1989	1 417.7	1 058.5	-2.9
1990-1999	1 286.2	1 338.3	0.4
After 2000	0.0	1 527.6	n.a.
All housing	2 703.8	3 924.4	3.8

Source: NBS, tabulations of the 2000 and 2010 Census (in Chinese).

The results for this calculation of the housing stock are shown in Table A2.17. They imply a stock of 10.4 billion m^2 in urban areas and 17.3 billion m^2 in rural areas. These estimates are about one quarter lower than the estimates based on the household survey. However since 1985, the difference between the two estimates has been constant with the completions data showing a stock that is 70% lower than that from the survey data. The growth rates are similar, but survey data is more volatile.

Table A2.7. Residential fixed asset investment in urban areas

100 million yuan, current prices

	Total	Total	State-owned enterprises	Real estate developers	Collectives	Individual	Collectives	individual
	Actual and estimated	Actual	Actual	Actual and estimated	Actual	Actual	Constant share GDP	
1952	8		4.48				3.71	
1953	16		11.27				4.53	
1954	14		9.23				4.61	
1955	11		6.64				4.77	
1956	18		13.36				5.11	
1957	19		13.29				5.35	
1958	13		8.16				5.11	
1959	19		13.67				5.40	
1960	22		15.89				5.69	
1961	14		7.67				5.98	
1962	10		4.17				5.98	
1963	13		7.59				5.79	
1964	18		11.59				6.10	
1965	16		9.91				6.24	
1966	16		9.21				6.32	
1967	12		5.33				6.46	
1968	12		5.66				6.41	
1969	18		11.04				6.56	
1970	15		8.05				6.78	
1971	21		14.53				6.92	
1972	26		18.84				7.59	
1973	29		20.89				7.84	
1974	31		22.51				8.05	
1975	32		23.97				8.41	
1976	32		22.84				8.80	
1977	36		26.3				9.40	
1978	49		39.21				9.76	
1979	88		77.28				10.25	
1980	132		120.09	0.0	3.28	8.51	11.79	
1981	146		129.00	0.0	6.04	11.43		
1982	191		169.91	0.0	9.22	11.78		
1983	185		158.67	0.0	11.04	15.65		
1984	208		158.42	10.0	12.23	27.09		
1985	327		240.43	20.0	16.71	49.39		
1986	364		232.45	46.8	18.84	65.42		
1987	427		246.32	69.5	21.28	89.96		
1988	569		283.16	119.2	26.23	140.11		
1989	526		252.14	126.4	21.05	126.02		
1990	475		229.29	117.4	17.81	110.33		
1991	604		301.89	155.9	20.97	125.09		
1992	970		411.17	339.0	30.33	189.77		
1993	1 982		640.05	898.3	162.98	280.42		
1994	2 756		943.13	1 184.2	241.25	387.00		
1995	3 278		973.07	1 460.0	368.12	477.03		
1996	3 326	3 326.2		1 699.2				
1997	3 320	3 319.7		1 539.4				
1998	4 311	4 310.8		2 081.6				
1999	5 051	5 050.9		2 638.5				
2000	5 435	5 435.3		3 312.0				
2001	6 262	6 261.5		4 216.7				
2002	7 249	7 248.9		5 227.8				
2003	8 625	8 624.8		6 776.7				
2004	11 010	11 010.1		8 837.0				
2005	12 826	12 825.8		10 860.9				
2006	16 306	16 305.5		13 638.4				
2007	21 238	21 238.3		18 005.4				
2008	26 516	26 516.0		22 440.9				
2009	30 513	30 512.7		25 613.7				
2010	39 763	39 763.1		34 026.2				
2011	51 773	51 773.4		44 319.5				
2012	58 184	58 183.5		49 374.2				

Source: See table A2.18.

Table A2.8. Real estate development in urban areas: 1986 to 1995

100 million yuan

	Total	Residential
	Actual	Estimated
1986	101.0	46.8
1987	149.9	69.5
1988	257.2	119.2
1989	272.7	126.4
1990	253.3	117.4
1991	336.2	155.9
1992	731.2	339.0
1993	1 937.5	898.3
1994	2 554.1	1 184.2
1995	3 149.0	1 460.0

Source: See Table A2.18.

Table A2.9. Residential fixed asset investment: rural areas

100 million yuan, current prices

	Total	Total	Collective and individual	Collective	Individual
	Actual and estimated	Actual	Estimated	Actual	Actual
1952	15.75	15.75			
1953	12.87	12.87			
1954	18.36	18.36			
1955	21.69	21.69			
1956	35.82	35.82			
1957	26.46	26.46			
1958	29		29		
1959	25		25		
1960	28		28		
1961	35		35		
1962	39		39		
1963	41		41		
1964	45		45		
1965	49		49		
1966	54		54		
1967	58		58		
1968	59		59		
1969			62		
1970	67		67		
1971	71		71		
1972	73		73		
1973	79		79		
1974	82		82		
1975	85		85		
1976	89		89		
1977	90		90		
1978	98		98		
1979	116		116		
1980	134		134		
1981	154.58			148.81	5.77
1982	171.37			162.00	9.37
1983	222.35			214.54	7.81
1984	257.42			239.38	18.04
1985	326.82			313.15	13.67
1986	402.24			388.56	13.68
1987	503.85			487.21	16.64
1988	608.35			580.97	27.38
1989	663.28			641.68	21.6
1990	666.15			649.78	16.37
1991	776.59			759.25	17.34
1992	703.38			678.53	24.85
1993	821.66			760.26	61.4
1994	1 102.14			1 002.73	99.41
1995	1 458.51	1 458.5		1 349.85	108.66
1996	1872.3	1 872.3			
1997	2051.0	2 051.0			
1998	2083.0	2 083.0			
1999	2007.9	2 007.9			
2000	2158.9	2 158.9			
2001	2077.6	2 077.6			
2002	2158.2	2 158.2			
2003	2167.5	2 167.5			
2004	2454.0	2 454.0			
2005	2601.5	2 601.5			
2006	3027.5	3 027.5			
2007	3766.7	3 766.7			
2008	4365.2	4 365.2			
2009	5915.5	5 915.5			
2010	5263.9	5 263.9			
2011	6051.1	6 051.1			

Source: See Table A2.18.

Table A2.10. Operating margin of real estate developers and land purchases

	Sale price	Construction cost	Margin	Area sold	Absolute value of margin	Quantity of land purchased	Land price	Land purchases
	Yuan per m^2	Yuan per m^2	Yuan per m^2	10 000 m^2	100 million yuan	10 000 m^2	Yuan per m^2	100 million yuan
1987	408	245	163	2 377	39			49
1988	503	302	201	2 549	51			65
1989	573	344	229	2 491	57			72
1990	704	423	282	2 545	72			90
1991	786	471	314	2 745	86			109
1992	995	597	398	3 812	152			191
1993	1 291	775	517	6 035	312			392
1994	1 409	845	563	6 118	345			434
1995	1 509	911	598	6 787	406			511
1996	1 605	1 111	494	6 898	341	7 172.3		429
1997	1 790	1 175	615	7 864	484	6 641.7		609
1998	1 854	1 218	636	10 827	689	10 109.3	857	867
1999	1 857	1 152	705	12 998	916	11 958.9	965	1 154
2000	1 948	1 139	809	16 570	1 341	16 905.2	1 002	1 694
2001	2 017	1 128	889	19 939	1 772	23 409.0	1 025	2 398
2002	2 092	1 184	908	23 702	2 152	31 356.8	1 065	3 338
2003	2 197	1 273	924	29 779	2 750	35 696.5	1 329	4 745
2004	2 608	1 402	1 206	33 820	4 079	48 894.6	1 494	7 305
2005	2 937	1 451	1 486	49 588	7 367	38 253.7	1 753	6 705
2006	3 119	1 564	1 556	55 423	8 622	36 573.6	2 408	8 807
2007	3 645	1 657	1 989	70 136	13 947	40 245.8	2 796	11 251
2008	3 576	1 795	1 781	59 280	10 558	39 353.4	3 517	13 842
2009	4 459	2 021	2 438	86 185	21 012	31 909.5	3 539	11 293
2010	4 725	2 228	2 497	93 377	23 316	39 953.1	4 069	16 255
2011	4 993	2 373	2 620	96 528	25 295	44 327.4	4 457	19 757
2012	5 430	2 411	3 019	98 468	29 730	35 666.8	4 556	16 248

Source: Table A2.18.

Table A2.11. Residential gross fixed capital formation

	Urban fixed asset investment	Rural fixed asset investment	Nationwide fixed asset investment	*Plus* Margin real estate developers	*Plus* land improvement outlays	*Less* Land purchases for residential development	*Equals* Gross fixed capital formation	GDP
	100 million yuan							%
1952	8	16	24				24	3.5
1953	16	13	29				29	3.5
1954	14	18	32				32	3.7
1955	11	22	33				33	3.6
1956	18	36	54				54	5.3
1957	19	26	45				45	4.2
1958	13	29	43				43	3.3
1959	19	25	44				44	3.1
1960	22	28	49				49	3.4
1961	14	35	48				48	3.9
1962	10	39	49				49	4.2
1963	13	41	54				54	4.4
1964	18	45	63				63	4.3
1965	16	49	65				65	3.8
1966	16	54	70				70	3.7
1967	12	58	70				70	3.9
1968	12	59	71				71	4.1
1969	18	62	79				79	4.1
1970	15	67	82				82	3.6
1971	21	71	92				92	3.8
1972	26	73	99				99	3.9
1973	29	79	108				108	4.0
1974	31	82	112				112	4.0
1975	32	85	118				118	3.9
1976	32	89	120				120	4.1
1977	36	90	126				126	3.9
1978	49	98	147				147	4.0
1979	88	116	204				204	5.0
1980	132	134	265				265	5.8
1981	146	155	301				301	6.2
1982	191	171	362				362	6.8
1983	185	222	408				408	6.8
1984	208	257	465				465	6.5
1985	327	327	653				653	7.2
1986	364	402	766				766	7.5
1987	427	504	931	39	43	58	955	7.9
1988	569	608	1 177	51	53	76	1 205	8.0
1989	526	663	1 189	57	75	85	1 236	7.3
1990	475	666	1 141	72	82	107	1 187	6.4
1991	604	777	1 380	86	96	129	1 435	6.6
1992	970	703	1 674	152	157	226	1 756	6.5
1993	1 982	822	2 803	312	325	465	2 976	8.4
1994	2 756	1 102	3 858	345	364	514	4 053	8.4
1995	3 278	1 459	4 737	406	423	605	4 960	8.2
1996	3 326	1 872	5 199	341	369	517	5 391	7.6
1997	3 320	2 051	5 371	484	395	624	5 626	7.1
1998	4 311	2 083	6 394	689	338	867	6 553	7.8
1999	5 051	2 008	7 059	916	319	1 154	7 139	8.0
2000	5 435	2 159	7 594	1 341	403	1 694	7 643	7.7
2001	6 262	2 078	8 339	1 772	496	2 398	8 209	7.5
2002	7 249	2 158	9 407	2 152	559	3 338	8 780	7.3
2003	8 625	2 167	10 792	2 750	746	4 745	9 544	7.0
2004	11 010	2 454	13 464	4 079	715	7 305	10 953	6.9
2005	12 826	2 601	15 427	7 367	941	6 705	17 030	9.2
2006	16 306	3 028	19 333	8 622	1 219	8 807	20 368	9.4
2007	21 238	3 767	25 005	13 947	1 501	11 251	29 203	11.0
2008	26 516	4 365	30 881	10 558	2 122	13 842	29 719	9.5
2009	30 513	5 915	36 428	21 012	1 680	11 293	47 827	14.0
2010	39 763	5 264	45 027	23 316	1 729	16 255	53 817	13.4
2011	51 773	6 051	57 824	25 295	2 037	19 757	65 399	13.8
2012	58 184	6 898	65082	29 730	2 237	16 248	80 800	15.6

Source: See Table A2.18.

Table A2.12. Residential gross fixed capital formation in constant prices

100 million yuan or as specified

	Residential gross fixed capital formation in current prices			Price index construction and installation	Residential gross fixed capital formation at 2005 prices		
	Residential GFCF	rural	urban	2005 = 1	Residential GFCF	rural	urban
1952	24	16	8	0.156	153.6	101.0	52.6
1953	29	13	16	0.154	186.2	83.6	102.6
1954	32	18	14	0.153	210.4	120.0	90.4
1955	33	22	11	0.146	226.0	148.1	77.9
1956	54	36	18	0.146	371.9	245.4	126.5
1957	45	26	19	0.140	322.5	189.2	133.3
1958	43	41	1	0.140	303.6	294.5	9.1
1959	44	46	-1	0.152	290.9	299.1	-8.2
1960	49	46	3	0.152	324.4	303.6	20.8
1961	48	39	10	0.149	323.5	259.0	64.5
1962	49	36	12	0.160	305.4	227.6	77.7
1963	54	39	15	0.168	323.5	233.2	90.3
1964	63	46	17	0.164	381.1	280.4	100.7
1965	65	54	11	0.159	410.8	342.0	68.8
1966	70	59	11	0.156	449.4	380.5	69.0
1967	70	56	14	0.156	450.2	360.4	89.9
1968	71	55	16	0.151	468.1	362.5	105.6
1969	79	61	18	0.147	537.9	417.2	120.7
1970	82	71	11	0.147	556.5	485.0	71.5
1971	92	77	15	0.149	617.9	516.8	101.0
1972	99	80	19	0.151	658.3	530.4	127.9
1973	108	86	22	0.151	716.4	572.3	144.1
1974	112	89	24	0.151	743.2	586.1	157.0
1975	118	95	23	0.153	770.6	622.6	148.0
1976	120	94	27	0.154	780.5	607.7	172.8
1977	126	102	24	0.156	806.4	651.4	155.0
1978	147	115	32	0.157	938.0	733.1	205.0
1979	204	128	76	0.161	1 270.0	799.7	470.3
1980	265	144	122	0.165	1 604.7	868.4	736.4
1981	301	155	146	0.171	1 762.8	905.1	857.6
1982	362	171	191	0.175	2 073.3	980.8	1 092.6
1983	408	222	185	0.179	2 277.5	1 242.1	1 035.4
1984	465	257	208	0.186	2 496.5	1 381.6	1 114.9
1985	653	327	327	0.200	3 271.2	1 636.3	1 634.9
1986	766	402	364	0.213	3 602.3	1 892.2	1 710.1
1987	955	504	451	0.224	4 271.6	2 252.8	2 018.8
1988	1 205	608	597	0.254	4 744.1	2 395.4	2 348.8
1989	1 236	663	572	0.367	3 370.2	1 809.2	1 561.0
1990	1 187	666	521	0.392	3 029.7	1 699.8	1 330.0
1991	1 435	777	658	0.430	3 336.8	1 806.4	1 530.5
1992	1 756	703	1 052	0.502	3 496.5	1 400.7	2 095.7
1993	2 976	822	2 154	0.659	4 513.4	1 246.2	3 267.2
1994	4 053	1 102	2 951	0.728	5 567.7	1 514.2	4 053.5
1995	4 960	1 459	3 502	0.762	6 508.9	1 913.8	4 595.1
1996	5 391	1 872	3 519	0.801	6 731.0	2 337.6	4 393.5
1997	5 626	2 051	3 575	0.824	6 825.5	2 488.5	4 337.0
1998	6 553	2 083	4 470	0.828	7 911.6	2 514.7	5 396.9
1999	7 139	2 008	5 131	0.831	8 592.9	2 416.8	6 176.1
2000	7 643	2 159	5 484	0.851	8 984.1	2 537.6	6 446.4
2001	8 209	2 078	6 131	0.863	9 516.0	2 408.4	7 107.6
2002	8 780	2 158	6 622	0.871	10 077.3	2 477.0	7 600.3
2003	9 544	2 167	7 377	0.908	10 512.7	2 387.4	8 125.3
2004	10 953	2 454	8 499	0.982	11 150.4	2 498.1	8 652.2
2005	17 030	2 601	14 429	1.000	17 030.3	2 601.5	14 428.8
2006	20 368	3 028	17 340	1.013	20 106.2	2 988.7	17 117.6
2007	29 203	3 767	25 436	1.065	27 428.9	3 537.9	23 891.0
2008	29 719	4 365	25 353	1.202	24 724.2	3 631.6	21 092.6
2009	47 827	5 915	41 912	1.157	41 339.7	5 113.1	36 226.6
2010	53 817	5 264	48 554	1.214	44 331.9	4 336.1	39 995.8
2011	65 399	6 051	59 348	1.325	49 351.8	4 566.3	44 785.6
2012	80 800	6 801	73 999	1.347	60 001.6	5050.7	54 950.9

Source: See Table A2.18.

Table A2.13. Capital stock of residential structures

100 million yuan except where specified

	Stock of residential structures at 2005 prices				Ratio of residential structures to GDP	
	Rural	Urban	National		National	
	Official depreciation rate 4% per year	Official depreciation rate 2% per year	Mixed depreciation rates	Unique depreciation rate of 6% per year	Mixed depreciation rates	Unique depreciation rate
1952	2 420.0	1 744.0	4 164.0	4 164.0	1.28	1.28
1953	2 406.8	1 742.0	4 148.7	4 100.3	1.11	1.09
1954	2 430.5	1 727.9	4 158.3	4 064.7	1.06	1.04
1955	2 481.4	1 702.1	4 183.5	4 046.8	1.00	0.97
1956	2 627.4	1 726.5	4 354.0	4 175.9	0.91	0.87
1957	2 711.6	1 756.2	4 467.8	4 247.9	0.89	0.84
1958	2 897.6	1 660.0	4 557.6	4 296.6	0.74	0.70
1959	3 080.8	1 552.1	4 632.9	4 329.7	0.70	0.65
1960	3 261.2	1 479.8	4 741.0	4 394.3	0.71	0.66
1961	3 389.8	1 455.5	4 845.3	4 454.2	1.00	0.92
1962	3 481.8	1 445.9	4 927.7	4 492.3	1.08	0.99
1963	3 575.7	1 449.4	5 025.1	4 546.2	1.00	0.91
1964	3 713.0	1 463.2	5 176.2	4 654.5	0.87	0.78
1965	3 906.5	1 444.3	5 350.8	4 786.1	0.77	0.69
1966	4 130.7	1 426.6	5 557.3	4 948.4	0.72	0.64
1967	4 325.8	1 430.9	5 756.7	5 101.7	0.79	0.70
1968	4 515.3	1 450.6	5 965.9	5 263.7	0.86	0.76
1969	4 751.9	1 484.3	6 236.2	5 485.8	0.77	0.67
1970	5 046.9	1 466.7	6 513.6	5 713.2	0.67	0.59
1971	5 361.8	1 479.7	6 841.6	5 988.2	0.66	0.58
1972	5 677.7	1 518.8	7 196.6	6 287.2	0.67	0.58
1973	6 023.0	1 571.8	7 594.7	6 626.4	0.65	0.57
1974	6 368.2	1 634.5	8 002.7	6 971.9	0.67	0.59
1975	6 736.0	1 684.4	8 420.4	7 324.2	0.65	0.57
1976	7 074.3	1 756.2	8 830.5	7 665.3	0.69	0.60
1977	7 442.8	1 805.8	9 248.6	8 011.8	0.68	0.59
1978	7 878.1	1 902.4	9 780.5	8 469.1	0.64	0.55
1979	8 362.7	2 258.6	10 621.3	9 231.0	0.65	0.56
1980	8 896.5	2 859.5	11 756.0	10 281.9	0.66	0.58
1981	9 445.8	3 545.6	12 991.3	11 427.8	0.70	0.61
1982	10 048.7	4 425.4	14 474.1	12 815.4	0.71	0.63
1983	10 888.8	5 195.3	16 084.2	14 324.0	0.71	0.63
1994	11 834.9	5 998.6	17 833.4	15 961.1	0.69	0.61
1985	12 997.8	7 273.5	20 271.3	18 274.6	0.69	0.62
1986	14 370.1	8 547.2	22 917.3	20 780.5	0.71	0.65
1987	16 048.1	10 053.2	26 101.3	23 805.3	0.73	0.66
1988	17 801.6	11 798.7	29 600.3	27 121.1	0.74	0.68
1989	18 898.7	12 651.8	31 550.5	28 864.0	0.76	0.70
1990	19 842.5	13 222.7	33 065.2	30 161.9	0.77	0.70
1991	20 855.2	13 959.8	34 815.0	31 689.1	0.74	0.67
1992	21 421.7	15 218.0	36 639.7	33 284.2	0.68	0.62
1993	21 811.1	17 572.0	39 383.1	35 800.5	0.64	0.58
1994	22 452.8	20 571.2	43 024.0	39 220.1	0.62	0.57
1995	23 468.5	23 932.1	47 400.5	43 375.9	0.62	0.56
1996	24 867.3	26 889.6	51 756.9	47 504.3	0.61	0.56
1997	26 361.1	29 613.3	55 974.4	51 479.6	0.61	0.56
1998	27 821.4	33 233.3	61 054.7	56 302.4	0.61	0.57
1999	29 125.4	37 415.4	66 540.8	61 517.2	0.62	0.57
2000	30 498.0	41 617.0	72 114.9	66 810.2	0.62	0.58
2001	31 686.4	46 227.6	77 914.0	72 317.6	0.62	0.58
2002	32 896.0	51 054.2	83 950.2	78 055.9	0.61	0.57
2003	33 967.6	56 116.2	90 083.8	83 885.2	0.60	0.56
2004	35 446.7	61 401.5	96 848.2	90 002.5	0.58	0.54
2005	36 984.7	72 146.3	109 131.0	101 632.7	0.59	0.55
2006	38 863.9	84 935.0	123 798.9	115 640.9	0.59	0.55
2007	41 235.9	103 729.9	144 965.8	136 131.4	0.61	0.57
2008	43 630.4	118 598.7	162 229.1	152 687.7	0.62	0.59
2009	47 434.6	147 709.4	195 144.0	184 866.1	0.68	0.65
2010	50 347.7	178 842.6	229 190.3	218 106.1	0.73	0.69
2011	53 403.5	212 897.6	266 301.1	254 371.5	0.77	0.74
2012	56 852.1	255 074.7	311 926.8	299 110.8	0.84	0.81

Source: See Table A2.18.

Table A2.14. Residential fixed asset investment: reconciliation with sales data

100 million yuan, except where stated

	Sales	Developers margin	FAI based on sales	FAI	Implied inventory change in FAI	Level of inventory	Constant price inventory change	Inventory level relative to sales	Contribution of residential inventory to GDP growth
	100 million yuan						100 million yuan 2005 prices	Years	Percentage points
1995	1 024	406	618	1 560.0	942	520	1 235.8	0.5	
1996	1 107	341	766	1 699.2	933	1 461	1 164.9	1.3	-0.1
1997	1 408	484	924	1 539.4	615	2 395	746.8	1.7	-0.5
1998	2 007	689	1 318	2 081.6	763	3 010	921.5	1.5	0.2
1999	2 414	916	1 498	2 638.5	1 140	4 150	1 372.7	1.7	0.5
2000	3 229	1 341	1 888	3 312.0	1 424	5 574	1 673.8	1.7	0.3
2001	4 021	1 772	2 249	4 216.7	1 968	7 542	2 281.1	1.9	0.5
2002	4 958	2 152	2 806	5 227.8	2 422	9 964	2 779.5	2.0	0.4
2003	6 543	2 750	3 793	6 776.7	2 984	12 948	3 286.4	2.0	0.4
2004	8 619	4 079	4 541	8 837.0	4 296	17 244	4 373.6	2.0	0.7
2005	14 564	7 367	7 197	10 860.9	3 664	20 908	3 664.4	1.4	-0.4
2006	17 288	8 622	8 666	13 638.4	4 973	25 881	4 909.0	1.5	0.7
2007	25 566	13 947	11 618	18 005.4	6 387	32 268	5 999.0	1.3	0.5
2008	21 196	10 558	10 638	22 440.9	11 803	44 071	9 819.2	2.1	1.6
2009	38 433	21 012	17 421	25 613.7	8 193	52 263	7081.4	1.4	-1.0
2010	44 121	23 316	20 805	34 026.2	13 222	65 485	10 891.3	1.5	1.3
2011	48 198	25 295	22 903	44 319.5	21 416	86 901	16 161.2	1.8	1.7
2012	53 467	29 730	23 737	49 374.2	25 637	112 538	19 037.8	2.1	0.8

Source: See Table A2.18.

Table A2.15. Different measures of living space per capita

	Urban				Rural		Urban	Rural
	Usuable	Living	Construction		Construction		Construction space spliced	
			MoC	NBS				
1952	4.5						10.0	10.1
1953	4.3						9.6	9.7
1954	4.2						9.3	9.4
1955	4.0						8.9	9.0
1956	3.9						8.5	8.6
1957	3.7						8.2	8.3
1958	3.5						7.8	7.9
1959	3.4						7.5	7.6
1960	3.2						7.0	7.1
1961	3.2						7.0	7.1
1962	3.2						7.1	7.2
1963	3.2						7.1	7.2
1964	3.2						7.2	7.3
1965	3.3						7.2	7.3
1966	3.3						7.3	7.4
1967	3.3						7.3	7.4
1968	3.3						7.4	7.5
1969	3.4						7.4	7.5
1970	3.4						7.5	7.6
1971	3.4						7.5	7.6
1972	3.4						7.6	7.7
1973	3.4						7.6	7.7
1974	3.5						7.7	7.8
1975	3.5						7.7	7.8
1976	3.5						7.8	7.9
1977	3.5						7.8	7.9
1978	3.60				8.1		8.0	8.1
1979	3.75				8.4		8.3	8.4
1980	3.90				9.4		8.7	9.4
1981	4.15				10.2		9.2	10.2
1982	4.40				10.7		9.8	10.7
1983	4.30				11.6		9.5	11.6
1984	4.90				13.6		10.9	13.6
1985	5.20				14.7		11.5	14.7
1986	6.00	8.8	12.4		15.3		13.3	15.3
1987	6.10	9.0	12.7		16.0		13.6	16.0
1988	6.30	9.3	13.0		16.6		14.0	16.6
1989	6.60	9.7	13.5		17.2		14.5	17.2
1990	6.70	9.9	13.7		17.8		14.7	17.8
1991	6.90	10.3	14.2		18.5		15.3	18.5
1992	7.10	10.7	14.8		18.9		15.9	18.9
1993	7.50	11.0	15.2		20.7		16.3	19.6
1994	7.80	11.4	15.7		20.2		16.9	20.2
1995	8.10	11.8	16.3		21.0		17.5	21.0
1996	8.50	12.3	17.0		21.7		18.3	21.7
1997	8.80	13.0	17.8		22.5		19.1	22.5
1998	9.30	13.6	18.7		23.3		20.1	23.3
1999	9.8	14.2	19.4		24.2		20.8	24.2
2000	10.3	14.9	20.3		24.8		21.8	24.8
2001		15.5	20.8		25.7		22.4	25.7
2002			22.8	24.5	26.5		24.5	26.5
2003			23.7	25.3	27.2		25.3	27.2
2004			25.0	26.4	27.9		26.4	27.9
2005			26.1	27.8	29.7		27.8	29.7
2006			27.1	28.5	30.7		28.5	30.7
2007				30.1	31.6		30.1	31.6
2008				30.6	32.4		30.6	32.4
2009				31.3	33.6		31.3	33.6
2010				31.6	34.1		31.6	34.1
2011				32.7	36.2		32.7	36.2
2012				32.9	37.1		32.9	37.1

Source: See Table A2.18.

Table A2.16. Housing stock estimated from survey data

	Population				Total construction space			
	Rural	Urban	Urban		Rural	Local urban	Migrants	Total
			Migrants	Residents				
	Millions of people				Billion square metres			
1952	503.2	71.6	0.0	71.6	5.1	0.7	0.0	5.8
1953	509.7	78.3	0.0	78.3	5.0	0.8	0.0	5.7
1954	520.2	82.5	0.0	82.5	4.9	0.8	0.0	5.6
1955	531.8	82.9	0.0	82.9	4.8	0.7	0.0	5.5
195	536.4	91.9	0.0	91.9	4.6	0.8	0.0	5.4
1957	547.0	99.5	0.0	99.5	4.5	0.8	0.0	5.3
1958	552.7	107.2	0.0	107.2	4.4	0.8	0.0	5.2
1959	548.4	123.7	0.0	123.7	4.1	0.9	0.0	5.1
1960	531.3	130.7	0.0	130.7	3.8	0.9	0.0	4.7
1961	531.5	127.1	0.0	127.1	3.8	0.9	0.0	4.7
1962	556.4	116.6	0.0	116.6	4.0	0.8	0.0	4.8
1963	575.3	116.5	0.0	116.5	4.2	0.8	0.0	5.0
1964	575.5	129.5	0.0	129.5	4.2	0.9	0.0	5.1
1965	594.9	130.5	0.0	130.5	4.4	0.9	0.0	5.3
1966	612.3	133.1	0.0	133.1	4.5	1.0	0.0	5.5
1967	628.2	135.5	0.0	135.5	4.7	1.0	0.0	5.7
1968	647.0	138.4	0.0	138.4	4.8	1.0	0.0	5.9
1969	665.5	141.2	0.0	141.2	5.0	1.1	0.0	6.1
1970	685.7	144.2	0.0	144.2	5.2	1.1	0.0	6.3
1971	705.2	147.1	0.0	147.1	5.4	1.1	0.0	6.5
1972	722.4	149.4	0.0	149.4	5.6	1.1	0.0	6.7
1973	738.7	153.5	0.0	153.5	5.7	1.2	0.0	6.9
1974	752.6	156.0	0.0	156.0	5.9	1.2	0.0	7.1
1975	763.9	160.3	0.0	160.3	6.0	1.2	0.0	7.2
1976	773.8	163.4	0.0	163.4	6.1	1.3	0.0	7.4
1977	783.1	166.7	0.0	166.7	6.2	1.3	0.0	7.5
1978	790.1	172.5	0.0	172.5	6.4	1.4	0.0	7.8
1979	790.5	185.0	0.0	185.0	6.6	1.5	0.0	8.2
1980	795.7	191.4	0.0	191.4	7.5	1.7	0.0	9.1
1981	799.0	201.7	13.4	188.3	8.1	1.7	0.1	10.0
1982	801.7	214.8	26.8	188.0	8.6	1.8	0.3	10.7
1983	807.3	222.7	40.2	182.5	9.4	1.7	0.4	11.5
1984	803.4	240.2	53.6	186.6	10.9	2.0	0.5	13.5
1985	807.6	250.9	67.1	183.8	11.9	2.1	0.7	14.7
1986	811.4	263.7	75.2	188.4	12.4	2.5	0.8	15.7
1987	816.3	276.7	81.3	195.4	13.1	2.7	0.8	16.5
1988	823.7	286.6	86.1	200.5	13.7	2.8	0.9	17.3
1989	831.6	295.4	85.0	210.4	14.3	3.1	0.8	18.2
1990	841.4	302.0	86.7	215.2	15.0	3.2	0.9	19.0
1991	846.2	312.0	89.1	223.0	15.7	3.4	0.9	19.9
1992	850.0	321.8	97.7	224.1	16.1	3.6	1.0	20.6
1993	853.4	331.7	110.0	221.8	16.7	3.6	1.1	21.4
1994	856.8	341.7	119.6	222.1	17.3	3.7	1.2	22.3
1995	859.5	351.7	127.1	224.7	18.0	3.9	1.3	23.3
1996	850.9	373.0	130.3	242.8	18.5	4.4	1.3	24.2
1997	841.8	394.5	135.3	259.2	18.9	5.0	1.4	25.3
1998	831.5	416.1	138.1	278.0	19.4	5.6	1.4	26.3
1999	820.4	437.5	139.9	297.6	19.9	6.2	1.4	27.5
2000	808.4	459.1	149.7	309.4	20.0	6.7	1.5	28.3
2001	795.6	480.6	157.8	322.9	20.4	7.2	1.6	29.2
2002	782.4	502.1	165.4	336.8	20.7	8.3	1.7	30.6
2003	768.5	523.8	177.1	346.7	20.9	8.8	1.8	31.4
2004	757.1	542.8	191.0	351.8	21.1	9.3	1.9	32.3
2005	745.4	562.1	204.1	358.0	22.1	10.0	2.0	34.1
2006	731.6	582.9	215.6	367.3	22.5	10.5	2.2	35.1
2007	715.0	606.3	220.5	385.8	22.6	11.6	2.2	36.4
2008	704.0	624.0	225.4	398.6	22.8	12.2	2.3	37.3
2009	689.4	645.1	229.8	415.3	23.2	13.0	2.3	38.5
2010	671.1	669.8	242.0	427.8	22.9	13.5	2.4	38.8
2011	656.6	690.8	251.0	439.8	23.8	14.4	2.5	40.7
2012	642.22	711.82	262.6	449.2	23.8	14.8	2.6	41.2

Source: Table A2.18.

Table A2.17. Stock of housing estimated from flow of newly completed houses

	Newly completed housing			Stock of housing		
	Urban	Rural	Total	Urban	Rural	Total
	Million m^2			Million m^2		
1994				3 700	18 500	22 200
1995	375	699	1 074	3 700	18 500	22 200
1996	395	828	1 223	4 032	18 983	23 015
1997	406	806	1 212	4 380	19 590	23 970
1998	476	800	1 276	4 735	20 168	24 903
1999	559	834	1 393	5 156	20 733	25 889
2000	549	797	1 346	5 655	21 326	26 980
2001	575	729	1 304	6 138	21 874	28 012
2002	598	742	1 340	6 641	22 348	28 990
2003	550	752	1 302	7 162	22 830	29 992
2004	569	680	1 249	7 629	23 316	30 945
2005	661	667	1 328	8 109	23 725	31 833
2006	630	684	1 314	8 676	24 115	32 791
2007	688	775	1 463	9 205	24 518	33 723
2008	760	834	1 594	9 785	25 007	34 793
2009	821	1 021	1 842	10 431	25 550	35 981
2010	869	963	1 832	11 131	26 274	37 404
2011	1 022	1 127	2 148	11 870	26 931	38 800

Source: Table A2.18.

Table A2.18. Data sources

Urban residential fixed investment			
Total	1995-2011	2012 Statistical Yearbook	Table 5.6
SOE residential capital construction	1980-2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 108
SOE residential technical transformation	1980-2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 258
Individuals, residential	1981-2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 482
Individuals, residential	1981	Statistics of Investment in Fixed Assets, 1950-2001	p. 469
Collectives, residential	1980-2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 420
SOE residential capital construction	1950-1979	Statistics of Investment in Fixed Assets, 1950-2000	p. 108
Individuals and collectives, residential	1950-1979	Estimated at 3.2% of GDP based on 1980 data	
Collectives, residential	1950-1979	Estimated at x% of GDP based on 1980 data	
Real estate development	1996-2011	2012 Statistical Yearbook	Table 5.6
Real estate development	1986-1995	Statistics of Investment in Fixed Assets, 1950-2000	pp. 369-70
Margin of residential real estate developers			
Cost per square metre	1995-2011	2012 Statistical Yearbook	Table 5.34
Sale price	1995-2011	2013 Statistical Yearbook	Table 5.38
Sales volume	1995-2011	2013 Statistical Yearbook	Table 5.36
Cost per square metre	1986-1994	Estimated at 60% of sale price	
Sale price	1986-1994	Statistics of Investment in Fixed Assets, 1950-2000	p. 370
Sales volume	1986-1994	Statistics of Investment in Fixed Assets, 1950-2000	p. 370
Rural residential fixed investment			
Total	1995-2011	2012 Statistical Yearbook	Table 5.26
Individuals	1982-2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 501
Collective	1980 to 2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 455
Total	1952 to 1957	Capital Formation in Mainland China, 1952-65	p. 105
Total	1958 to 1979	Estimated at 2.5% of GDP	
Urban floor space completed			
SOEs	1953 to 2000	Statistics of Investment in Fixed Assets, 1950-2000	p. 238
Land improvement for real estate			
	1995 to 2010	Surveys conducted by the Department of Investment and Construction Statistics of the NBS published by CEIC	CRKACOF
	1987 to 1994	Backcast	
	2011 to 2012	Extrapolated on the basis of outlays and per square metre and residential land sales	
Residential land prices			
	2008 to 2012	Residential land prices in 105 cities, Ministry of Land via CEIC	CRKAMRB
	1998 to 2007	Chain linked with NBS land price derived from area and value	Table 5.30
Floor area newly completed dwellings	1978 to 2012	China Statistical Yearbook	Table 10.35

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