Growing beyond the Low-Cost Advantage

How the People's Republic of China can Avoid the Middle-Income Trap

Juzhong Zhuang
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Contents

Boxes, Figures, and Tables

Foreword

Some 20 years ago, we began referring to the rapid development of a small group of economies as the "Asian miracle." What these economies had in common were not only very high rates of sustained growth, but underpinning that growth, rapid increases in labor productivity and the import, adoption, use and development of technologically sophisticated processes for generating high-value goods and services. These economies—Hong Kong, China; Japan; the Republic of Korea; Singapore; and Taipei,China—moved to global standards and did so while maintaining macroeconomic, political and social stability, and generating decent, higher wage employment for their people. In contrast, in Latin America the experience since the 1970s has been very different. Macroeconomic, fiscal and financial imbalances, combined with high inequality, significantly constrained innovation, growth, and improvements in social welfare. Many economies in that region have remained in the middle-income stage of development for decades and have become mired in what is now commonly known as "the middle-income trap."

The economic progress of the Chinese economy since the reform process began in the late 1970s can no doubt also be labeled a "miracle." Three decades of 10% annual growth is a miracle by any definition. We might also say, however, that it is a miracle-in-progress. The People's Republic of China (PRC) remains a middle-income country, its productivity gaps with advanced countries remain wide, and technological capabilities are evolving. In addition, the pattern of development has generated significant imbalances, along with high inequality. How the PRC can continue its robust growth, resolve these problems, and avoid the middle-income trap of slowing technological progress, amid rising wages, is the central question that this timely study seeks to address.

This report is the result of close collaboration between the Economics and Research Department of the Asian Development Bank and the China Center for Economic Research (CCER) at Peking University. Bringing the expertise from the two organizations together, along with other experts at institutions in the PRC and globally, has generated much interesting and thought-provoking analysis. It has resulted in this concise, distilled synthesis report of research, thinking and ideas about the challenges facing the PRC and policy options it may consider. It is my hope that the issues raised and policy options proposed will stimulate further debate and promote policy innovations that can assist the PRC in charting a course for further progress now and in the years ahead.

Changyong Rhee
Chief Economist
Asian Development Bank

Preface

The Chinese economy is not easy to decipher, with its complex mix of market activity and government control, developed coastal cities and backward interior areas, world class technology in some industries and lower level productivity in many others. This mix is no doubt due to the fact that the economy continues to undergo a rapid transformation from traditional to modern, from rural to urban, from plan to market, and from domestic to global.

As challenging as it is to understand the current economy, even more challenging—and interesting—is the nature of the Chinese growth process. In the research for this report, we sought to understand the basis for the past success of the People's Republic of China (PRC) and then questioned whether the same factors will continue to be the basis for success in the years and decades ahead. Past success in the PRC has been due to a confluence of factors, including a low-cost advantage especially in labor that has fueled exports and domestic as well as foreign investment. However, this cost advantage is eroding and is likely to contribute much less to competitiveness in the future. Instead, to sustain growth through and beyond the (upper) middle-income phase, the PRC will need to rely more on productivity improvements through innovation and upgrading. The transition "from low cost to high value" is a key imperative for the economy.

What makes this transition particularly challenging is the fact that the PRC's reform process is still far from complete, and, compounded by rapid growth in the past 3 decades, this has generated significant economic imbalances, coupled with rising inequality. These deep issues are becoming more apparent and could stifle economic progress in the years ahead. The Chinese growth machine has also created pressures on energy, water resources and the environment that require attention.

We have attempted to weave these various factors, trends and issues into what we hope is a compelling look at the PRC and its prospects for the future.

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Detailed background studies were provided by scholars at Peking University, including Xiaoyan Shirley Lei, Lixing Li, Guixia Guo, Yiping Huang, Feng Lu, Ho-Mou Wu, Jianguo Xu, Yang Yao, Miaojie Yu, Chuanchuan Zhang, and Yaohui Zhao. Scholars from the Chinese Academy of Social Sciences, Fang Cai and Meiyan Wang, from the People's Bank of China, Zhong Xu, and from the Institute for Fiscal Science Research, Jia Kang and Junmin Liu, contributed thematic papers. International scholars who provided studies on the Chinese economy or on countries that have faced similar challenges include: Loren Brandt, Nora Lustig, Jaime Ros, Ligang Song, and Wing Thye Woo. ADB staff who contributed studies include: Jingmin Huang, Yi Jiang, Donghyun Park, Suphachol Suphachalasai, Paul Vandenberg, Guanghua Wan, and Juzhong Zhuang.

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Abbreviations and Acronyms

ADB	Asian Development Bank
BAU	business-as-usual
EU	European Union
FDI	foreign direct investment
GDP	gross domestic product
GNI	gross national income
IEA	International Energy Agency
Lao PDR	Lao People's Democratic Republic
MSME	micro-, small-, and medium-sized enterprise
NBS	National Bureau of Statistics
OECD	Organisation for Economic Co-operation and Development
PRC	People's Republic of China
PPM	parts per million
PPP	purchasing power parity
R&D	research and development
SOE	state-owned enterprise
TFP	total factor productivity
UK	United Kingdom
US	United States

Symbols and Measures

$	United States dollar
CNY	Chinese yuan
$GtCO_2$	gigaton of carbon dioxide
Mtoe	million tons of oil equivalent
toe	ton of oil equivalent

Executive Summary

Key drivers of the PRC's economic performance in recent decades

Economic performance in the People's Republic of China (PRC) has been spectacular over the last 3 decades. GDP growth has averaged about 10% per year and per capita income increased by a factor of 13. Rapid growth has led to significant improvement in human wellbeing and the quality of life. From the early 1980s to late 2000s, the incidence of poverty at $1.25-a-day declined from 85% to about 13%, life expectancy at birth increased from 67 to 73 years, and child mortality under the age of 5 years declined from 65 to 18 deaths per 1,000. Economic expansion has also led to a sharp rise in the country's influence on the global economy. The PRC is now the world's largest exporter and the second largest economy.

This success can be attributed to three key drivers—market-oriented reform, low-cost advantage, and the role of government—along with other supporting factors. Market-oriented reform has unleashed powerful economic incentives and improved the efficiency of resource allocation and utilization. The liberalization of foreign trade and investment has given PRC firms access to the global market, external capital, advanced technologies and management know-how. The economy's low-cost advantage, due largely to a vast pool of surplus rural labor, has made the manufacturing sector globally competitive. The government's active role in development has helped address problems often associated with market failure—such as information and coordination externalities typical of structural transformation in developing countries. Other supporting factors include high savings and investment, major improvements in infrastructure, a young and educated labor force and the associated demographic dividend, and macroeconomic and social stability.

The PRC's impressive achievements, however, should not make one lose sight of the major challenges it faces. With a per capita gross national income (GNI) of $4,930 in 2011, the PRC has just passed the threshold of upper-middle-income status and it still has a long way to go before becoming a high-income country. But with rising wages and population aging, growth will have to be increasingly driven by productivity improvement through innovation and industrial upgrading—the PRC needs to move from a low-cost to a high-value economy. Moreover, rapid growth has exposed several structural problems, in particular, economic imbalances, rising inequality, resource constraints, and environmental degradation. To some extent these are often associated with rapid structural transformation, but incomplete reform is also a major contributing factor. If not addressed, these problems could hinder PRC's efforts in moving toward a high-value economy and increase the risk of getting caught in what is increasingly known as the "middle-income trap."

Middle-income trap and lessons from international experience

Many countries experience a growth slowdown after achieving middle-income status. Some 18 countries globally have been "middle income" for the past 50 years, including 12 in Latin America and three in Asia—Malaysia, the Philippines, and Thailand. At their current pace of growth, many will remain trapped for years to come. On the other hand, 14 economies have escaped the trap since 1965, including five in Asia—Hong Kong, China; Japan; the Republic of Korea; Singapore; and Taipei,China. These Asian economies completed the transition from low to high income within 3 to 4 decades.

Avoiding the middle-income trap requires continuous industrial upgrading through innovation and moving from a low-cost to a high-value economy. Low-income countries possess a large pool of surplus labor that limits wage increases when urban industrial and service sectors expand. Firms employ low-level, established technologies that are easily imported and mastered locally, and compete on low cost. Upon reaching middle income, the pool of surplus labor shrinks and—as it approaches the Lewis turning point—wages rise rapidly. Countries must upgrade industry and services through innovation to improve labor productivity—moving from a low-cost to a high-value economy. If they fail to do so, the economy becomes trapped: no longer able to compete with low-income countries but unable to compete with high-income countries.

Moving from a low-cost to a high-value economy requires a critical mass of firms with strong incentives for innovation. It also requires the government to create a conducive environment. This environment should have the following key elements: (i) macroeconomic, political, and social stability; (ii) adequate public investment in infrastructure and human capital; (iii) a well-functioning market system that provides price signals, encourages competition, protects investors, and promotes trade; and (iv) a well designed industrial policy. The East Asia miracle economies possessed most of these characteristics during their take-off periods. Conversely, macroeconomic instability, debt crisis, high-income inequality, social tension, and political instability caused many Latin American countries to remain caught in the middle-income trap.

Sustaining the PRC's long-term growth: Challenges and risks

The PRC faces the following critical challenges—which, if not addressed effectively—could hamper its long-term growth and increase the risk of getting caught in the middle-income trap.

Large technology and productivity gaps with advanced countries. Despite significant advances over the past 3 decades, the PRC's productivity and technology gaps with advanced countries remain large. In 2009, its industrial labor productivity was about 10% of the level of the United States. Although the PRC is the world's largest high-tech exporter, a very high proportion of these products are processed—with low domestic value added. While it is considered the world's factory, the PRC is largely an assembler with few internationally known brands. Innovation and industrial upgrading require a critical mass of productive and innovative enterprises. However, its private enterprises, although growing strongly, remain small in size with limited innovation resources. In contrast, state-owned enterprises (SOEs) are far larger with access to more innovative resources—but they are less efficient and have weaker incentives to advance.

Rising wages. The PRC's low-cost advantage is likely to erode gradually in the coming years. Real wage growth in the industrial sector now exceeds labor productivity gains and there are labor shortages in coastal areas in recent years. Many believe the PRC is approaching the so-called "Lewis turning point", in which a decline in rural surplus labor leads to tightening labor markets and rising wages—a process that may occur over a decade or so. Labor supply will also be affected by population aging and an end to the demographic dividend. Rising labor costs mean the PRC's growth needs to be driven increasingly by productivity improvements through innovation and upgrading—moving from a low-cost to a high-value economy.

Imbalances in the sources of growth. On the demand side, growth has relied too much on investment and net exports, with private consumption weak—in 2009, the latter comprised just 35% of gross domestic product (GDP). On the supply side, services remain underdeveloped at about 43% of GDP—compared with an average of 48% for lower-middle-income countries, 60% for upper-middle-income countries, and over 70% for high-income countries. Imbalances are often associated with rapid structural transformation. But in the PRC, incomplete reform is also a major contributing factor. Over-reliance on net exports makes the economy vulnerable to external fluctuations and shocks, especially in the face of weak demand from advanced markets. Over-investment could lead to poor asset quality, which in turn could undermine the performance of banks and the stability of the financial system.

Rising income inequality. The PRC's rapid growth has been accompanied by rising income inequality. The Gini coefficient of per capita consumption expenditure increased from about 30 in the early 1980s to 43.4 in 2008, which is among the highest in Asia. Technical progress, globalization and market-oriented reform are among the key drivers of PRC's rapid growth, but they have also had significant distributional consequences, including a rising skills premium, falling labor income share, and growing spatial inequality. Unequal access to opportunity—due to weaknesses in governance—is also a major contributing factor. High inequality can retard growth as low-income households contribute little to effective demand and are unable to invest in their human capital through improved health and education. Beyond direct economic effects, inequality has the potential to generate social unrest, which can derail the growth process.

Resource constraints and environmental degradation. The PRC's rapid growth has created significant pressure on its natural resources and the environment. Rising demand and pollution are leading to water shortages, projected to reach 10% of water requirements by 2030 if nothing is done. Primary energy consumption could double in 25 years and oil import dependence could reach 85%, making the PRC vulnerable to external shocks if it continues its current energy use pattern. Thus, energy supply and security could also constrain the country's future growth. Furthermore, the PRC's coal-based energy system is damaging the local environment and contributing to global warming and climate change.

A challenging external economic environment. As the world's second largest economy, the PRC exerts an increasingly large impact on many of its key trading partners and the world economy in general. Authorities need to consider these impacts when deciding on economic policy to help create a stable and harmonious external economic environment. In particular, the PRC will continue to face the following issues, among others: (i) with the current slow pace of global recovery and the ongoing eurozone debt crisis, external demand may be unable to contribute to growth as much as in the past; (ii) the PRC's trade balance with its trading partners will continue to generate tension; (iii) pressure on the PRC to reduce its carbon dioxide emissions will only intensify; and (iv) calls to do more to protect intellectual property rights will continue.

Policy options to avoid the middle-income trap

To avoid the middle-income trap, the PRC needs a development strategy that allows it to grow beyond low-cost advantage and move from a low-cost to a high-value economy. This strategy should include the following agenda: (i) stepping up innovation and industrial upgrading by strengthening enterprise incentives for innovation, building an environment conducive for innovation, investing in human capital, and moving toward a knowledge-based economy; (ii) deepening structural reform, in particular reforms of enterprises, labor and land markets, the financial sector, and the fiscal system; (iii) developing services and scaling up urbanization; (iv) reducing income inequality to make growth more inclusive; (v) maintaining macroeconomic and financial stability; (vi) promoting green growth to conserve resources and protect the environment; and (vii) strengthening international and regional economic cooperation.

Stepping up innovation and industrial upgrading. Selected policy measures include (i) strengthening enterprise incentives for innovation through deepening enterprise reform and promoting market competition; (ii) establishing/improving institutions needed for a well-functioning market economy; (iii) strengthening the protection of intellectual property rights; (iv) stepping up public support for basic science and technology research; (v) increasing public spending on education to narrow the gaps with advanced and upper-middle-income countries including those in tertiary education; (vi) expanding vocational and technical education to improve the quality of the labor force; and (vii) developing and implementing a sound strategy for moving toward a knowledge-based economy.

Deepening structural reform. This requires further steps in reforming enterprises, labor and land markets, the financial sector, and the fiscal system.

- *Enterprise reform*. Selected policy measures include (i) further developing the private sector and ensuring private firms and SOEs compete on an equal basis; (ii) strengthening corporate governance of SOEs, including moving toward a system where the arm's length control by the government is supported by robust auditing, monitoring, and performance evaluation; and (iii) strengthening market regulation of natural monopolies including setting up special bodies to regulate pricing and service quality.

- *Labor market reform*. Selected policy measures include (i) reforming the *hukuo* system to reduce barriers to labor mobility especially from rural areas and the agriculture sector to urban areas and nonagriculture sectors; and (ii) developing and expanding the coverage of labor market institutions, such as employment protection legislation, minimum wages, collective bargaining, and unemployment insurance, while ensuring a proper balance between employment security and labor market flexibility.

- *Financial sector reform*. Selected policy measures include (i) making the financial sector more market-based by allowing demand and supply to play a greater role in determining interest rates, opening up to private sector participation, and making state-owned banks truly commercial entities; (ii) enhancing financial safety by strengthening regulation and supervision and developing an effective financial safety net, including mechanisms for debt resolution and deposit insurance; (iii) developing capital markets, including interbank lending, corporate bonds, equities, contractual savings, and financial futures and derivatives; (iv) broadening access to finance, especially for micro-, small- and medium-sized enterprises and rural households; (v) making the exchange rate more flexible; and (vi) creating conditions for greater capital account liberalization.

- *Land market reform.* Selected policy measures include (i) developing the rural land market by strengthening and clarifying the legal framework and developing market institutions and services, such as surveyors and valuation, brokerage, land exchanges, and mechanisms for dispute resolution; and (ii) making land acquisition for urban use fairer and more transparent, to protect the interests of the rural population without constraining urban development.

- *Fiscal reform.* Selected policy measures include (i) shifting the composition of fiscal spending more toward providing public goods and services, promoting social equity, and addressing market failures; (ii) strengthening revenue mobilization by bringing off-budget funds into the budget, increasing personal income taxes as a share of GDP, completing the value-added tax reform, reforming property taxes, strengthening asset management of SOEs and increasing dividend payment, raising public awareness of tax payment responsibility, and strengthening tax law and enforcement to reduce tax evasion; (iii) reforming intergovernmental fiscal relations by better aligning expenditure responsibilities and revenue sources at various levels of government, increasing the fiscal transparency and accountability of local governments, and enhancing the effectiveness of fiscal transfers to lagging regions; and (iv) strengthening fiscal management by establishing a comprehensive budget system to cover the government budget, the state-owned asset budget, the social security budget, and off-budget funds.

Expanding services and scaling up urbanization. Selected policy measures to expand services include (i) reducing entry restrictions in services and promoting competition from the private sector; (ii) promoting the development of high-value services such as finance, transport and logistics, marketing, management consulting, computing and information technology, accounting and legal services, and research and development (R&D); and (iii) eliminating policy biases against services. Selected policy measures to scale up urbanization include (i) reforming the *hukuo* system, in particular delinking social services and welfare entitlements from the *hukuo*; (ii) improving the legal system governing the acquisition of rural land for urban development—to ensure both social equity and economic efficiency; (iii) improving city administration, including aligning expenditure and revenue responsibilities of local governments at all levels; and (iv) promoting green and inclusive urbanization.

Reducing income inequality. Selected policy measures include (i) reducing urban/rural income gaps by creating more urban jobs, giving migrant workers equal entitlements to social services and welfare, and increasing rural incomes through investing in rural infrastructure, public services, and agriculture R&D; (ii) reducing regional income gaps by continuing to implement the great western development strategy, promoting industrial migration from coastal to inland provinces, and improving the effectiveness of fiscal transfers to lagging regions; (iii) increasing government spending on and ensuring equal access to public services, including establishing an integrated social security system; (iv) increasing personal income taxes as a share of GDP by broadening the tax base and making the tax system more progressive, including measures such as lowering the income threshold at which the top tax rate is applied and moving toward a system in which taxes are collected on the basis of consolidated incomes; and (v) strengthening governance, eliminating social exclusion, and preventing corruption.

Promoting green growth. Selected policy measures include (i) reducing the resource intensity of growth through structural transformation, industrial upgrading, and the development of services; (ii) improving resource allocation efficiency and reducing waste through sound pricing systems—for energy and water resources in particular—and strong incentive mechanisms, including fiscal and tax

measures; (iii) strengthening government regulation and enforcement to control and reduce pollution, including introducing emission taxes; (iv) introducing emission permit trading to reduce the cost of emission reduction; (v) promoting innovation and investing in renewable and clean energy sources; and (vi) increasing public awareness of the importance of green growth and environmental protection to induce behavioral and cultural change.

Maintaining macroeconomic and financial stability. Selected policy measures include (i) strengthening regulation and supervision of financial institutions and markets; (ii) carefully managing financial sector reform, in particular capital account liberalization; (iii) ensuring fiscal sustainability and stability; and (iv) strengthening fiscal management of local governments by ensuring revenues are aligned with expenditure needs, drawing off-budget funds into budgetary management, and establishing an effective reporting, monitoring, and surveillance system.

Strengthening international and regional economic cooperation. Selected policy measures include (i) taking into account the effects of domestic economic policies beyond its borders in decision making; (ii) actively participating in the Group of Twenty (G20), Asia-Pacific Economic Cooperation (APEC), Association of Southeast Asian Nations Plus Three Countries (ASEAN+3), and other multilateral, regional, and bilateral economic cooperation and policy coordination forums; (iii) further increasing reliance on domestic consumption as well as demand from emerging markets—both within and outside Asia—as sources of growth through deeper structural reform and closer South–South economic cooperation; and (iv) playing an active role in contributing to global public goods, such as addressing climate change.

This development strategy will tilt the balance of the PRC economy from low-cost to high-value production; from relying on the government to relying on markets; from investment to consumption; from external to domestic demand; from growth for its own sake to both growth and distribution; and from development to both development and environmental protection. It will support the PRC's economic transformation toward a society that is technologically more advanced, structurally more balanced, socially more inclusive, and environmentally more sustainable. *Innovation and industrial upgrading, structural reform, expansion of services, and urbanization will be the key drivers of this transformation and growth.*

Outlook of the PRC economy in 2030

Implementing this strategy would greatly increase the likelihood of sustained growth and reaching high-income status before 2030. Scenario analysis shows the PRC has the potential to grow 8% annually from 2010 to 2020 and 6% from 2020 to 2030—if it addresses its challenges effectively. Under this scenario, real GDP per capita in 2010 constant prices would reach $16,500 in 2030. And—like several of its East Asia neighbors—the PRC would complete the transition from a low-income to a high-income country in less than 30 years. It will become the world's largest economy by the mid-2020s at market exchange rates.

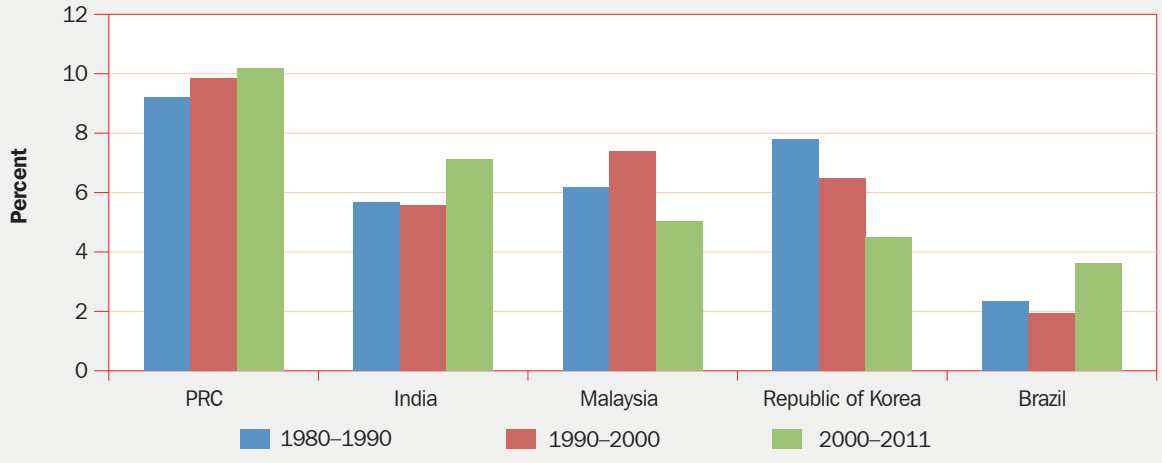
1. Introduction

Economic growth in the People's Republic of China (PRC) has been spectacular since reforms began in the late 1970s. During 1980–2011, gross domestic product (GDP) expanded at an average rate of about 10% per year (Figure 1.1). Per capita income increased by a factor of 13 in constant 2005 purchasing power parity (PPP) dollars (Table 1.1). From a very poor and agriculture-based economy 30 years ago, the PRC has reached upper middle-income status with a large industrial base, and is now often called the "workshop of the world."

Rapid growth and structural transformation have significantly reduced poverty, improved human wellbeing, and created a decent standard of living. When the reforms began, 84% of the population lived below the internationally accepted poverty line of $1.25 per person per day (Table 1.1). By 2008, that proportion had fallen to 13%—an incredible achievement. Longevity increased from 67 years in 1980 to 73 years in 2010, and child mortality under the age of 5 years declined from 65 to 18 deaths per 1,000 during the same period. These impressive achievements have been emulated by very few developing economies, and, in recent years, have become the envy of both emerging and advanced countries.

Rapid economic expansion has also led to a sharp rise in the country's importance globally. The PRC is

Figure 1.1 **Average annual GDP growth, selected economies, 1980–2011**



GDP = gross domestic product, PRC = People's Republic of China.
Source: World Bank, *World Development Indicators Online* (accessed 19 July 2012).

now the world's largest exporter, the largest holder of foreign reserves, and the second largest economy after the United States (US). What happens in the PRC matters greatly to the rest of the world. The Millennium Development Goal (MDG) of reducing global poverty by half will be achieved by 2015 largely because of the PRC. The world economy recovered quickly from the 2008 global financial crisis because the PRC, India, and other emerging economies managed to sustain demand and growth (Figure 1.2). The current century can indeed become an "Asian century" only if the PRC—along with India—continues to make rapid economic progress (ADB 2011a). The PRC's influence on global economic policy and governance is also growing rapidly and will continue to do so.

The PRC's impressive achievement, however, should not make one lose sight of the major challenges it faces.

- First, despite significant gains, PRC's technological and productivity gaps with advanced economies remain large. With a per capita gross national income (GNI) of $4,930 in 2011, it still has a long way to go before becoming a high-income country.

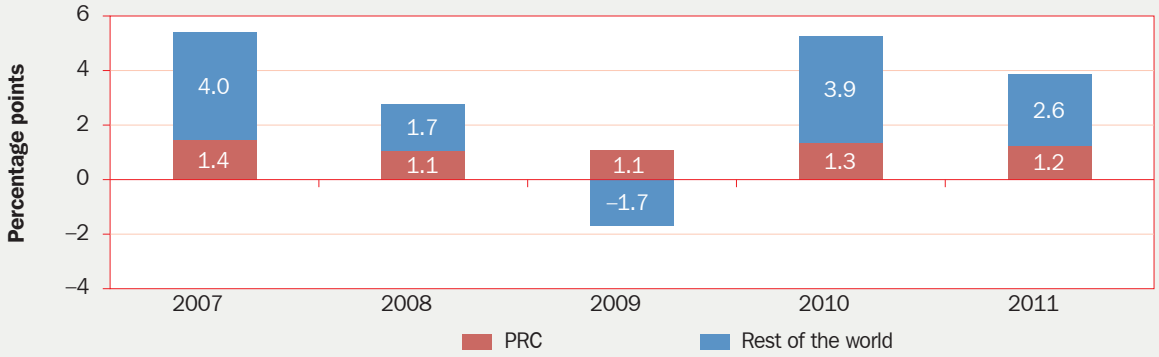
- Second, the country's rapid growth in recent decades has benefited greatly from its low-cost advantage, especially in labor. However, with declining rural surplus labor and rising wages, growth will have to be increasingly driven by productivity improvement through innovation

Table 1.1 **PRC: Per capita income and human development indicators, 1980–2011**

	1980	1985	1990	1995	2000	2005	2011
Per capita GNI, current $	220	280	330	530	930	1,740	4,930
Per capita GNI, current PPP $	250	500	800	1,480	2,340	4,090	8,430
Per capita GDP, 2005 PPP $, % increase from 1980		55	110	253	409	685	1,313
Poverty headcount ratio at $1.25 a day (PPP), % of population	84[a]	69[b]	60	54	36[c]	16	13[e]
Poverty headcount ratio at $2 a day (PPP), % of population	98[a]	93[b]	85	74	61[c]	37	30[e]
Life expectancy at birth, years	67	68	70	70	71	72	73[f]
Under 5 mortality rate, per 1,000	65	54	48	43	33	25	18[f]
Gross secondary enrollment, %	52	38	38	52	62	73[d]	81[f]
Gross tertiary enrollment, %	1	2	3	5	8	19	26[f]

[a] 1981 data. [b] 1984 data. [c] 1999 data. [d] 2006 data. [e] 2008 data. [f] 2010 data.
GDP = gross domestic product, GNI = gross national income, PPP = purchasing power parity, PRC = People's Republic of China.
Note: Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

Figure 1.2 **Contribution of the PRC to global growth, 2007–2011**



PRC = People's Republic of China.
Sources: ADB staff estimates using data from IMF, *World Economic Outlook April 2012*; and ADB, *Asian Development Outlook 2012*.

and industrial upgrading—the PRC needs to move from a low-cost to a high-value economy which is much more challenging.

- Third, rapid growth has exposed several structural problems in the economy, in particular, imbalances in the sources of growth and rising income inequality. While to some extent these are often associated with rapid structural transformation, incomplete reform is a major contributing factor. If not addressed, these problems could hinder the PRC's efforts in moving toward a high-value economy.

- Fourth, rapid growth has also created enormous pressures on resources, such as energy and water, and the environment.

Because of these challenges, a question observers and commentators often ask is: How long can the country's strong growth continue? With the current weak global economy and slowdown in the PRC growth, this question has only gained in relevance.

International experiences show that, in many countries, growth slowed significantly after they attained middle-income status. They find they were caught in what is increasingly known as the "middle-income trap." On one hand, they could no longer compete with low-income countries because of rising wages. On the other, they were unable to compete with high-income countries because they have not shifted into higher-value production through innovation and industrial upgrading. Many Latin American countries and several Southeast Asian economies are often considered caught in the middle-income trap—they became middle-income countries some 40–50 years ago and are likely to languish there for many years to come. While the PRC graduated from low- to middle-income status only in 1998, policy makers are increasingly concerned with the danger of getting caught in the trap.

This report argues that, to avoid the middle-income trap, the PRC needs to tackle its emerging challenges effectively. Doing so requires a development strategy containing the following key agenda:

- Stepping up innovation and industrial upgrading;
- Deepening structural reforms, in particular reforms of enterprises, factor markets, and the fiscal system;
- Expanding services and scaling up urbanization;
- Maintaining macroeconomic and financial stability;
- Reducing income inequality to make growth more inclusive;
- Promoting green growth to conserve resources and protect the environment; and
- Strengthening international and regional economic cooperation.

Effective implementation of this strategy would enable the PRC to continue to grow at a robust pace and grow beyond its low-cost advantage. It would make the PRC technologically more advanced, structurally more balanced, socially more inclusive, and environmentally more sustainable—thereby greatly increasing the likelihood of advancing into high-income status before 2030. The report notes that, encouragingly, the PRC's 12th Five-Year Plan has introduced many policy measures that support these agenda.

The rest of the report is organized as follows. Section 2 discusses the key drivers of the PRC's rapid growth over the past 30 years; Section 3 explains how a country enters the middle-income trap and discusses policy lessons learned from both countries caught in the trap and those that successfully avoided it; Section 4 examines the emerging challenges the PRC faces, which, if not addressed effectively, pose significant risks to its long-term growth; Section 5 discusses policy options to consider in sustaining growth and avoiding the middle-income trap; and finally, Section 6 examines the outlook of the PRC economy up to 2030.

2. Key drivers of the PRC's economic performance in recent decades

The PRC's remarkable achievement in economic transformation and social development was built on three key drivers: (i) market-oriented reform, (ii) low-cost advantage, and (iii) the role of the government. These have been supported by a range of other factors that helped create a virtuous cycle of growth and development.

2.1. Market-oriented reform

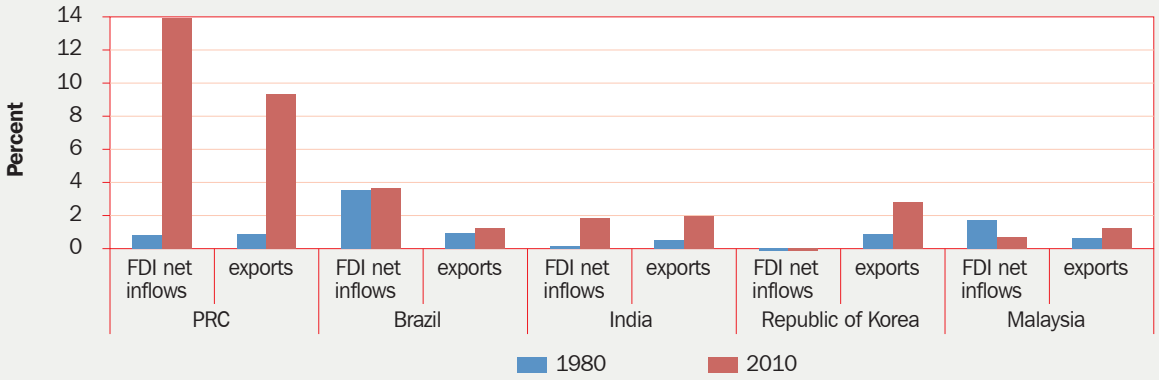
The first and most fundamental success factor was market-oriented reform since the late 1970s. The shift away from central planning allowed market forces to determine prices, enterprises to make production decisions based on demand and supply, and private businesses to compete in the marketplace. These changes unleashed powerful economic incentives and significantly improved the efficiency of resource allocation and utilization. At the same time, the government managed the reform process in a gradual and pragmatic manner. As in the words of former PRC leader Deng Xiaoping, the government sought to "cross the river by feeling the stones." By doing so, the economy reformed while ensuring stability. For example, the PRC avoided the destabilization brought on by the rapid and wholesale privatization that sparked economic crises in other transitional economies.

A key aspect of this reform was the liberalization of foreign trade and investment (Figure 2.1). Increased trade openness—culminating in accession to the World Trade Organization in 2001—exposed the PRC firms to international competition and allowed them to explore this comparative advantage. It also opened doors to vast global markets, while offering economies of scale and access to needed capital goods and other resources. In addition, foreign direct investment (FDI) played an important role in supporting industrial expansion. It helped improve export competitiveness by providing access to advanced technologies, management skills, and external capital. FDI, in turn, was attracted by a low-cost production base and the country's vast and expanding domestic market.

2.2. Low-cost advantage

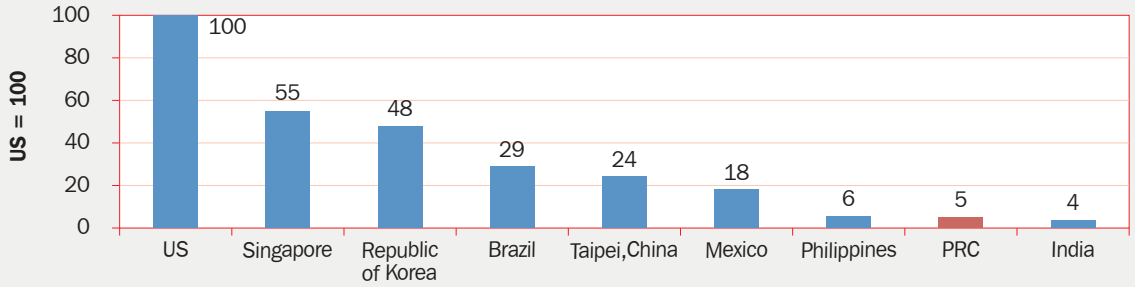
The second key driver of economic success was the PRC's low-cost advantage—largely the result of a vast army of rural surplus labor, typical of a dual economy (Lewis 1954). This ensured a steady supply of low-cost labor for the modern, formal sectors in urban and industrial areas. Labor-intensive manufacturing and services grew rapidly, allowing firms to re-invest retained earnings in a classic pattern of development and structural transformation. For any low-income country, its comparative advantage lies in producing goods that require low technology at low labor costs. As recently as 2010, hourly compensation rates in the PRC remained slightly below the Philippines, and considerably below those of more developed Asian economies such as Taipei,China; the Republic of Korea; and Singapore, along with middle-income countries in Latin America such as Mexico and Brazil (Figure 2.2).

Figure 2.1 **Share of global exports and FDI, selected economies, 1980–2010**



FDI = foreign direct investment, PRC = People's Republic of China.
Note: 1980 FDI for PRC refer to 1982. Exports consist of goods and services.
Source: World Bank, *World Development Indicators Online* (accessed January 2012).

Figure 2.2 **Index of hourly manufacturing labor compensation costs, selected economies, 2010**

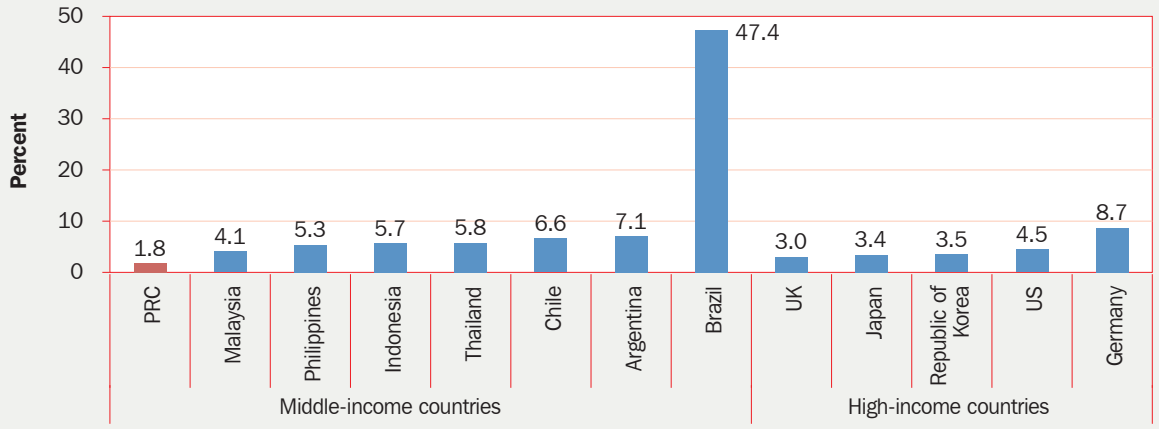


PRC = People's Republic of China, US = United States.
Note: The 2010 manufacturing labor compensation cost for the PRC is estimated from the 2008 figure obtained from the US Bureau of Labor Statistics, adjusted by the average urban wage growth and average percentage appreciation of the Chinese currency against the US dollar between 2008 and 2010. The figure for India refers to 2007.
Source: US Bureau of Labor Statistics at http://www.bls.gov/ilc/http://www.bls.gov/ilc/, *China Statistical Yearbook* at http://www.chinadataonline.org/, and The People's Bank of China at http://www.pbc.gov.cn/publish/english/1140/index.html (all accessed August 2012).

To some extent, the PRC's low-cost advantage also developed out of asymmetric market liberalization—where approximately 90% of product market prices were fully liberalized, while prices in various factor markets remained controlled by the government to varying degrees (Huang 2010). For instance, low deposit interest rates combined with high household savings offered banks a steady flow of cheap funds. These savings were intermediated at low lending rates to enterprises, especially state-owned enterprises (SOEs), enabling them to reap higher profits and thus increase corporate savings for investment. During 1990–2010, the PRC's average annual real lending rate was below 2.0%, among the lowest of 150 countries with available data and well below most high- and middle-income countries (Figure 2.3).[1] Furthermore, government-owned land was often allocated below market value to attract local investment. Energy prices were controlled for an extended period, although they have become more aligned with international prices in recent years (Rosen and Houser 2007).

[1] Notably, the combination of a high savings rate and low returns to savers also characterized other East Asian economies during high-growth periods (World Bank 1993).

Figure 2.3 **Annual average real interest rates (lending), selected economies, 1990–2010**



PRC = People's Republic of China, UK = United Kingdom, US = United States.
Note: Real interest rate is the rate charged by banks on loans to prime customers adjusted for inflation as measured by the GDP deflator.
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

2.3. The role of the government

The third key driver is the role of the government. The government has continued to play an important role in allocating resources as reforms were carried out—in particular key production factors such as capital, labor, land, energy, and raw materials. On one hand, this reflects the PRC's long list of uncompleted reforms and is among the underlying causes of the structural imbalances discussed below. On the other, however, the government's proactive role in economic development has helped address some of the problems often associated with market failure, such as information and coordination externalities, especially in the context of structural transformation in developing countries (Hausmann and Rodrik 2003, Lin 2010). This is particularly true when considering that the PRC was emerging from a long period of central planning and was in the process of establishing effective market institutions.

The PRC government has been effective in mobilizing resources needed for investment in public goods and services, particularly infrastructure, a key condition for rapid growth. In addition, decentralization provided local governments with strong incentives to promote local trade and investment—through making access to credit and land easier, building infrastructure, and providing an environment conducive for business expansion and entrepreneurship (Huang 2010, Xu 2010, Yao 2010).[2] In short, the government followed the path of other high growth East Asian economies—it was committed to development, had a clear vision, possessed adequate tools for implementation, and used pragmatic policies and interventions.[3]

2.4. Other success factors

Beyond these three key drivers, there were a range of other factors—some ingrained in the PRC's pre-reform economic fiber—that also played a critical role in supporting growth:

- High household and corporate savings rates provided the necessary funds for rapid investment. High levels of savings and investment drove rapid economic expansion in other high-growth Asian economies during their take-off periods as well. In the PRC, total savings

[2] Some scholars characterize PRC local governments as "production-oriented," managing local economies like corporations (Huang 2010, Yao 2010). Local government units were in fact production-oriented in the pre-reform period. The difference was—since the late 1970s—combining government direction with market forces.

[3] Many refer to the PRC development model as the "Beijing Consensus," one of the features being the combination of market forces with government planning (see, for example, Li, Brødsgaard, and Jacobsen 2009).

rose from below 36% of GDP in the early 1980s to 53% by 2008, despite the repressed interest rates for savers. In 2008, households and the corporate sector contributed almost equally to savings—22% and 23%, respectively (Table 2.1). While many middle-income countries work to raise savings and investment rates, the concern in the PRC is that the level of investment is too high.

- A young, educated workforce enabled the PRC to benefit from a demographic dividend. While this is changing rapidly as the population ages (ADB 2011b), it was a big boost to growth in the 1980s and 1990s. Education expanded rapidly, providing human capital for more advanced, non-agricultural production. Secondary school gross enrollment rose steadily from below 40% of the age cohort in the early years of reform to 81% by 2010 (see Table 1.1). The expansion of tertiary education has been even more dramatic—from less than 1% of the age cohort when reforms began to 26% in 2010.

- Massive expansion of quality infrastructure is another important factor. The government invested heavily in transport, energy, telecommunications, and urban services. Many middle-income countries have seen infrastructure gaps develop and widen. However, with ample fiscal space and focused national and local governments, the PRC excelled in infrastructure development. From 1980 to 2010, total highway length more than quadrupled and electricity consumption per capita grew by a factor of nine (Figure 2.4).

- There was a reasonably comprehensive industrial and manufacturing base when economic reforms began—the result of pre-reform industrialization. Although it required technical modernization and better management, industry provided a solid base for expansion once reforms were launched. Industry already accounted for over 45% of GDP when reforms began, and—after dropping slightly during the first decade—has remained between 45% and 50% since.

- Prudent macroeconomic management and a cautious approach to financial reform provided a stable investment climate. Also, limited capital account liberalization helped insulate the country from global and regional financial contagion during crises. The effects of the 1997/98 Asian financial crisis and 2008/09 global financial crisis on the PRC were fairly muted—with the government applying effective countercyclical measures. Despite periodic spikes, inflation remained moderate during much of the reform period (Figure 2.5). The PRC avoided the hyperinflation that derailed growth in Latin America and afflicted several other emerging markets.

The PRC's success thus far, however, should not let one lose sight of current and future challenges. Despite decades of rapid growth, 30% of the population still lived below the $2-a-day poverty line in 2008 (see Table 1.1). Despite significant gains, its technological and productivity gaps with advanced economies remain wide, and per capita income would have to triple to reach the World Bank's

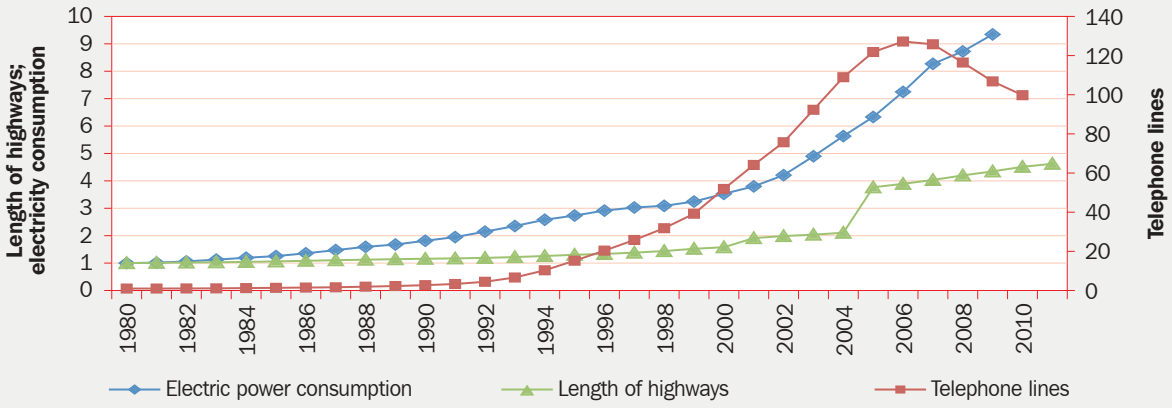
Table 2.1 **Savings rate, selected economies, 2008–2009 (% of GDP)**

	PRC	India	Republic of Korea	Japan	Mexico	US	Germany
Total domestic savings	53.2	33.7	16.7	3.6	12.4	–2.5	6.2
Household savings	22.9	23.5	2.0	1.4	7.3	4.7	7.4
Corporate savings	22.0	8.1	10.2	6.0	4.8	2.0	1.0
Government savings	8.4	2.1	4.5	–3.8	0.3	–9.2	–2.1

GDP = gross domestic product, PRC = People's Republic of China, US = United States.
Note: Data for PRC and Japan are for 2008 while data for India, the Republic of Korea, Mexico, the US, and Germany are for 2009.
Sources: CEIC; NBS, *China Statistical Yearbook* (accessed May 2011); and ADB staff estimates using GDP and savings data from *OECD.Stat* (accessed June 2011).

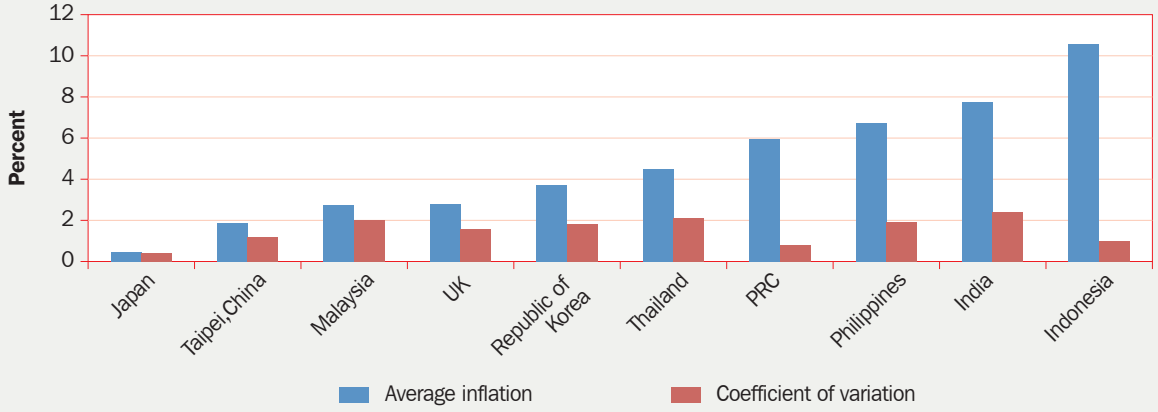
high-income country threshold. With rising labor costs, growth would have to be increasingly driven by productivity improvements through innovation and industrial upgrading and transition toward high-value production. Moreover, rapid growth has exposed several structural problems. These include, among others, imbalances in the sources of growth, growing income inequality, resource constraints and environmental degradation, and a more challenging external economic environment. These problems, if not addressed effectively, could become binding constrains to the PRC's long-term growth, and increase the risk of getting caught in the middle-income trap.

Figure 2.4 **PRC: Infrastructure development, 1980–2011 (1980 = 1)**



PRC = People's Republic of China
Sources: World Bank, *World Development Indicators Online* and NBS, *China Statistical Yearbook* (accessed July 2012).

Figure 2.5 **Average annual inflation rates, selected economies, 1987–2011**



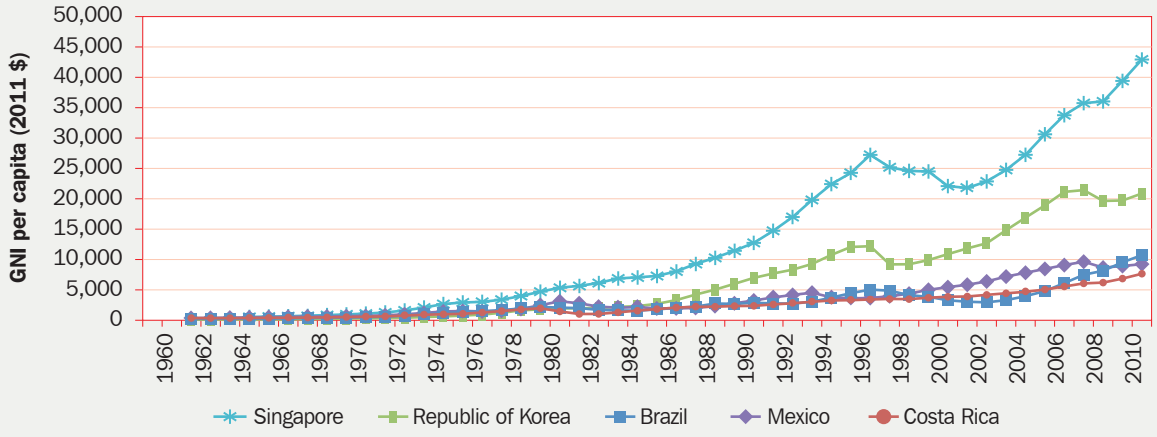
PRC = People's Republic of China, UK = United Kingdom.
Note: Data for UK cover 1989–2011.
Sources: World Bank, *World Development Indicators Online* (accessed July 2012) and Asian Development Bank, *Statistical Database System* (accessed July 2012).

3. The middle-income trap and policy lessons

3.1. Defining the middle-income trap

Many countries—after reaching middle-income status—experience a significant moderation in economic growth and find it difficult to graduate to high-income status,[4] currently defined as GNI per capita of $12,476 or more in 2011 prices.[5] These countries may be caught in what is commonly referred to as the "middle-income trap" (Figure 3.1). An analysis of growth performance shows that 28 out of 125 countries globally have been at middle-income levels since 1987, the year country income classifications were first introduced.[6] An extrapolation of the classification thresholds to earlier years indicates that 18 of those countries were middle income as early as 1962, meaning that they have been stuck at the middle-income stage for at least 50 years.[7] On a regional basis, 12 of the 18 are in Latin America, three in Asia—Malaysia, the Philippines, and Thailand—with the remaining

Figure 3.1 **Middle-income trap: Selected Asian and Latin American economies, 1960–2010**



GNI = gross national income.
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

4 For a recent account of cross-country experiences of growth slowdowns, see Eichengreen, Park, and Shin (2011). Also see ADB (2011c).

5 The latest income thresholds (GNI per capita) used by the World Bank in classifying economies are in 2011 dollars, calculated using the Atlas method. The thresholds are; low income, $1,025 or below; lower middle income, $1,026–$4,035; upper middle income, $4,036–$12,475; and high income, $12,476 or above. Felipe (2012a, 2012b) classifies countries into low-, middle-, and high-income groups using 1990 purchasing power parity dollars.

6 The 125 countries/territories, covered in the World Bank's *World Development Indicators Online* database, exclude OPEC members and those with populations below 3 million in 2008.

7 The other 10 countries may have been middle income in 1962; but reliable, comparable data on current GNI per capita (Atlas method) are unavailable.

three in Africa and the Middle East. Only a few of these 18 appear on their way to becoming high income in the years ahead—including Brazil, Chile, and Uruguay. However, most of the others will remain at the middle-income stage for years to come (Vandenberg, Poot, and Zhuang 2011).

The number of high-income countries globally is slightly larger—31, based on the same criteria of having a population above 3 million (Table 3.1). Among these, 14 moved from middle- to high-income after 1965, suggesting it has been possible in recent decades to avoid the perils of middle income, structurally transform an economy and grow above the high-income threshold. Nine of these countries are in the European periphery, with the remaining five from East Asia.

The most rapid transitions through the middle-income stage were in Asia. Japan emerged from the devastation of World War II to reach high-income status in 1968—a period of just 23 years. The Republic of Korea moved from low to middle income just before 1962 and became high-income by 1994, a period of about 32 years. Hong Kong, China; Singapore; and Taipei,China were firmly middle-income in 1962 and became high-income economies in the 1970s and 1980s. Most of these five economies lacked significant natural resources, but made a rapid transition to high-value manufacturing and services, and grew rapidly and consistently over many years. Singapore grew at an average annual rate of 11.9% in the 10 years up to its graduation. Japan grew by 9.9% per year in the 7 years prior to attaining high-income status (Vandenberg, Poot, and Zhuang 2011).

Although there is still no widely-accepted definition of the middle-income trap, it is useful to link it to the dual-economy model of Arthur Lewis (1954).

Table 3.1 **High- and middle-income country groups**

High income		**Middle income**	
Group 1	**Group 2**	**Group 3**	
High income before/in 1965	High income after 1965	Middle income continuously during 1987–2009	
n=17	n=14	n=28	
Europe	**Europe**	**Europe**	**Latin America**
Austria	Croatia	Belarus	Argentina
Belgium	Czech Republic	Lithuania	Bolivia
Denmark	Hungary	Romania	Brazil
Finland	Poland	Russian Federation	Chile
France	Slovakia		Colombia
Germany		**Asia**	Costa Rica
Italy	Greece	Malaysia	Dominican Republic
Netherlands, The	Ireland	Philippines	El Salvador
Norway	Portugal	Thailand	Guatemala
Sweden	Spain		Mexico
Switzerland		**Africa/Near East**	Panama
United Kingdom	**Asia**	Jordan	Paraguay
	Hong Kong, China	Lebanon	Peru
North America/Oceania	Japan	Morocco	Uruguay
Australia	Republic of Korea	South Africa	
Canada	Singapore	Syria	
New Zealand	Taipei,China	Tunisia	
United States		Turkey	
Near East			
Israel			

Note: Includes only countries with a population of above 3 million; excludes members of the Organization of the Petroleum Exporting Countries.
Source: Vandenberg, Poot, and Zhuang (2011).

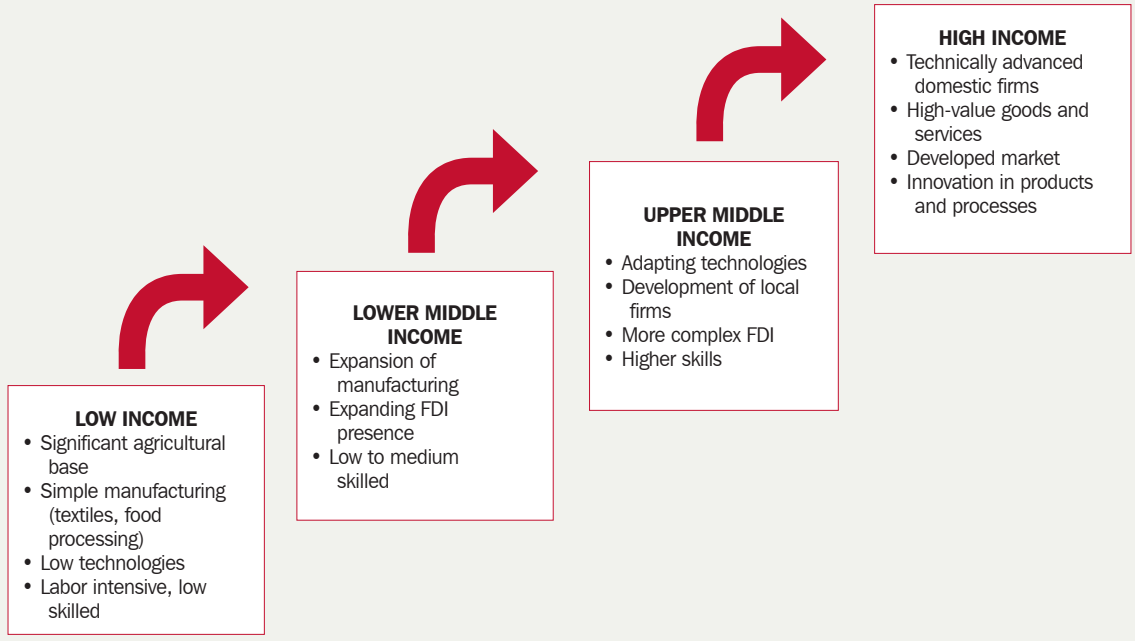
According to this model, economic development is about structural transformation that entails shifting investment and labor from primary activities—notably farming—into urban-based manufacturing and services over time. With a large supply of underutilized labor—"unlimited" in Lewis' words—wages remain low as urban production expands, and business stays competitive at low cost. This productive structure employs low-level, established technologies easily imported and mastered locally. Simple machinery and processes produce simple, low-cost goods. Expanding the urban economy—with no decrease in farm output—allows total output to rise. As output rises faster than the population, per capita income increases. An economy enters the middle-income stage as production expands in such labor-intensive manufacturing (and services) (Figure 3.2).

The trap develops when surplus labor is replaced by a tightening labor market and higher wages. To boost output, the quality and value of production must rise with business catering to higher-value market segments and growth relying more on productivity improvement through innovation and industrial upgrading. If a country fails to do so, it will get caught in the middle: on one hand it cannot compete against low-income countries at low wages; while on the other it cannot compete with high-income countries on innovation and higher-value production. It is trapped between the two.

3.2. How to avoid the trap: Policy lessons

Fundamental to avoiding the middle-income trap is a country's ability to constantly innovate and upgrade production, raise productivity, and climb the value chain. This requires a critical mass of firms that are dynamic and with strong incentives to invest in and develop new and more advanced machinery, production processes, and products through research and development (R&D) and innovation. Experiences from a range of countries over the past 5 decades suggest that supporting

Figure 3.2 **The path to high income**



FDI = foreign direct investment.
Source: Authors.

innovation, upgrading, and transition toward a high-value economy also require the government to create a conducive environment with the following key elements.

The first is macroeconomic, political, and social stability. Instability will disrupt investment decisions, production planning, and market demand. Asian countries that grew rapidly and achieved high income created such stability (World Bank 1993), as did the 13 countries that sustained high-growth over at least 25 years as identified by the Commission on Growth and Development (2009). In contrast, hyperinflation, macroeconomic instability, debt crises, high income inequality, and political instability disrupted the growth performance of many Latin American countries and prevented them from moving beyond the middle-income stage (Lustig and Ros 2011). Among the three Southeast Asian economies that have been trapped since the early 1960s, the Philippines suffered from similar problems during the past 3 decades (ADB 2008).

The second is adequate key public investments, notably in infrastructure and human capital. Firms need efficient transport systems to get inputs to factories and goods to markets, a reliable power supply for production, and good telecommunications to interact. Without these, firms will find it hard to boost productivity and compete globally. Countries also require a skilled labor force to operate machines, manage production, and design better technologies. As an economy becomes more developed and seeks higher value production, these public investments become more critical and need to be more sophisticated—more reliable and efficient infrastructure and more highly skilled professionals, managers and technical workers. East Asian countries ramped up education and training and improved infrastructure significantly in their run up to high-income status.

The third is a well functioning market system to allocate resources, organize production and trade, and provide price signals and incentives for producers and consumers. Experiences have shown that a system of firms, predominately private, and market competition is most effective at organizing economic activity. This organization includes the necessary institutions to reassure investors and promote reliable and efficient transactions, notably the rule of law and protection of physical and intellectual property rights. Furthermore, an efficient financial system is needed to lubricate the wheels of investment, production, and trade. As with public investments, middle-income countries climbing the value chain require a more diversified and complex financial system—including a broadening of the sources of finance from financial institutions to financial markets—to manage risk and support investments in innovation.

The fourth is a focused industrial policy, although this remains contentious. Experiences of some high-income countries, in particular the so-called miracle economies in East Asia, suggest that industrial policy has an important role to play in successfully transforming an economy and avoiding the middle-income trap (World Bank 1993; Amsden 1989a, 1989b; Wade 1990). These policies involve sector- and industry-specific interventions to support innovation and upgrading. A broad range of industrial policy measures have been used by various countries, centering on areas including targeting priority industries, provision of subsidized credit, trade policy, support for R&D, state ownership, and information sharing. These instruments are designed to overcome market failures—in particular, information and coordination externalities—inherent in the development process and particularly acute in innovation, upgrading, and structural transformation (Hausmann and Rodrik 2003, Rodrik 2004, Lin 2010).

However, for a long time, industrial policy was discredited, in part due to poor design and implementation in many countries, but also by the Washington Consensus ideology under which privatization, liberalization, the free market and minimal state intervention were the norm. Industrial policy has received renewed attention lately, partly because policies based solely on free

markets and liberalization were not effective in achieving high growth in many countries in the 1980s and 1990s, especially in Latin America. The PRC's economic success also shows that government can play an important role, especially in urging structural transformation where the market alone is not sufficient (Rodrik 2004, Lin 2010). Further, many believe that the excessive reliance on unfettered markets helped cause the recent global financial crisis (Stiglitz 2010). While the Washington Consensus has grown out of fashion, the debate on the merits and scope of industrial policy continues. However, the focus of the debate appears to have shifted from *whether or not* industrial policy should be used to *how* it can be better designed and implemented (Box 3.1).[8]

The above discussion highlights some of the broad policy lessons drawn from country experiences. However, in designing policies for avoiding the

Box 3.1 **How to design industrial policy**

Industrial policy has received renewed attention in recent years, and many economists and policy makers now believe that it has an important role to play in addressing market failures, especially related to information and coordination externalities that are particularly pervasive in the development or adoption of new technologies, new products, and new markets. While the debate on industrial policy is likely to continue, the focus of the debate is now shifting from *whether or not* it is needed, to *how* it should be designed and implemented.

Rodrik (2007) argues that industrial policy is not about subsidies, but about public–private collaboration to address market failures—what are the missing public inputs the private sector needs to function effectively. What is needed is a change in the framework for formulating industrial policy to "maximize its potential to contribute to economic growth while minimizing the risks that it will generate waste and rent-seeking." The emphasis should be on self-discovery of the potential to enter into high technology and higher value industries and on assisting in addressing coordination failures inherent in structural transformation.

Rodrik argues that the standard instruments of industry policy (credit and fiscal support, infrastructure provision, among others) can be improved if they are deployed in a "more productive manner." To do this, he proposes ten design principles for industrial policy:

- incentives should be provided only to "new" activities;
- there should be clear benchmarks/criteria for success and failure;
- there must be a built-in sunset clause;
- public support must target activities, not sectors;
- activities that are subsidized must have clear potential of providing spillover and demonstration effects;
- the authority for carrying out industrial policy must be vested in agencies with demonstrated competence;
- implementing agencies must be monitored closely by a principal with a clear stake in the outcome and who holds political authority at the highest level;
- the agencies carrying out promotions must maintain channels of communication with the private sector;
- the objective should not be to minimize chances that mistakes will occur—which would result in no self-discovery at all—but to minimize the costs of the mistakes when they do occur; and
- promotion needs to be renewable, so the cycle of discovery continues.

While these provide broad principles to guide the implementation of industrial policy, the exact policy mix will differ by circumstances and country. Any effective strategy is likely to be country-specific—there is no "one-size-fits-all" solution.

Source: Rodrik (2004, 2007).

[8] Even developed countries such as the UK and the US are looking to industrial policy as a way to revive and boost manufacturing capacity (The Economist 2011).

middle-income trap, it is important to note that countries have different circumstances and confront a unique set of challenges and risks. Therefore, the needed policy options are likely to be country-specific. In the case of the PRC, its large productivity and technology gaps with the advanced countries and rising wages mean that the danger of getting caught in the middle-income trap is real. At the same time, incomplete reforms, which contribute to low-cost advantage, have created various forms of economic imbalance, led to inefficiencies and the misallocation of resources, and contributed to rising inequality. One way or another, these could potentially weaken firms' incentives to innovate and upgrade, hinder the development of the country's innovation capabilities, affect economic and social stability, and undermine the sustainability of growth, and these have to be addressed if the PRC is to avoid the middle-income trap. In addition, sustaining growth requires the PRC to effectively respond to resource constraints, environmental challenges, and a more complex external economic environment.

4. Sustaining the PRC's long-term growth: Challenges and risks

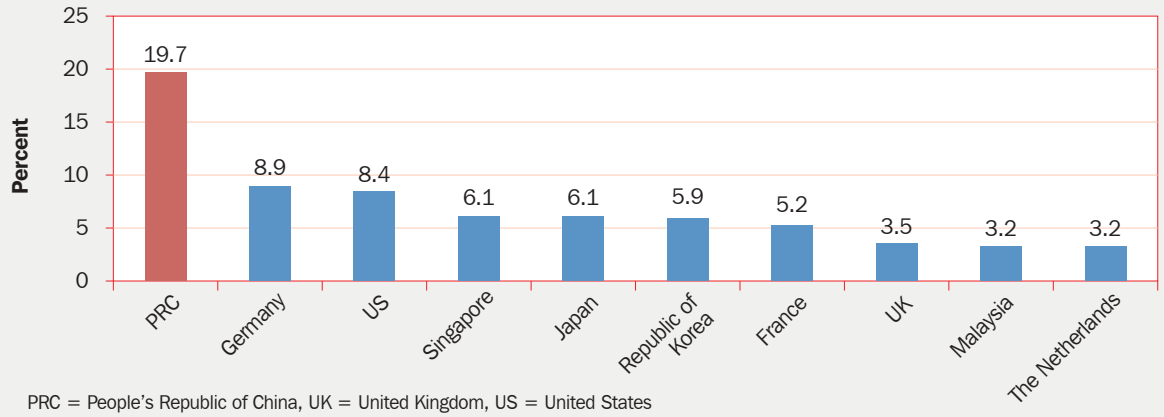
The PRC faces a number of challenges, which, if not addressed effectively, could hinder its long-term growth and increase its risk of getting caught in the middle-income trap.[9]

4.1. Large productivity and technology gaps

The PRC has progressed far in building manufacturing capability, advancing technologies, and improving productivity over the past three decades. It is the third country to send astronauts into space on its own, after the US and the Russian Federation. It has produced some of the world's fastest supercomputers (BBC News 2010); built some of the world's fastest trains; and is the world's largest car manufacturer. In other high-value sectors, the PRC also ranks high globally. It is the largest high-tech exporter in the world, accounted for close to 20% of the global total in 2009, ahead of Germany (8.9%), the US (8.4%), and Japan (6.1%) (Figure 4.1). The World Economic Forum's *Global Competitiveness Index 2011–2012* ranked the PRC 26th out of 146 countries, higher than several advanced economies (Figure 4.2).

More broadly, there has been greater technological sophistication in the PRC's manufactured products over the past 2 decades. As late as 1995, the PRC's largest manufacturing subsector by gross output was textiles—more associated with low-income

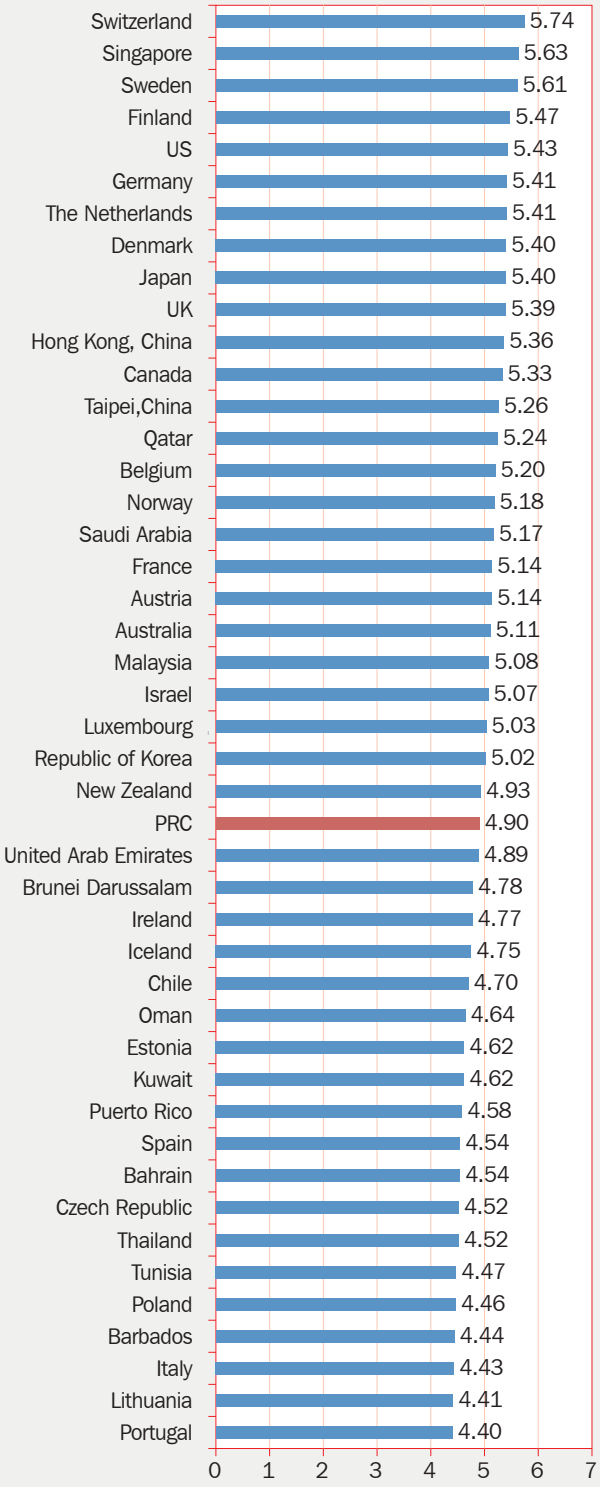
Figure 4.1 **Share of global high-tech exports, top 10 economies, 2009**



PRC = People's Republic of China, UK = United Kingdom, US = United States
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

9 The authors wish to acknowledge contributions to the analysis in this section from Yi Jiang and Suphachol Suphachalasai on resource and environmental constraints, Donghyun Park on population aging, and Guanghua Wan on income inequality contribution.

Figure 4.2 **Global competitiveness index, top 45 economies, 2011–2012**



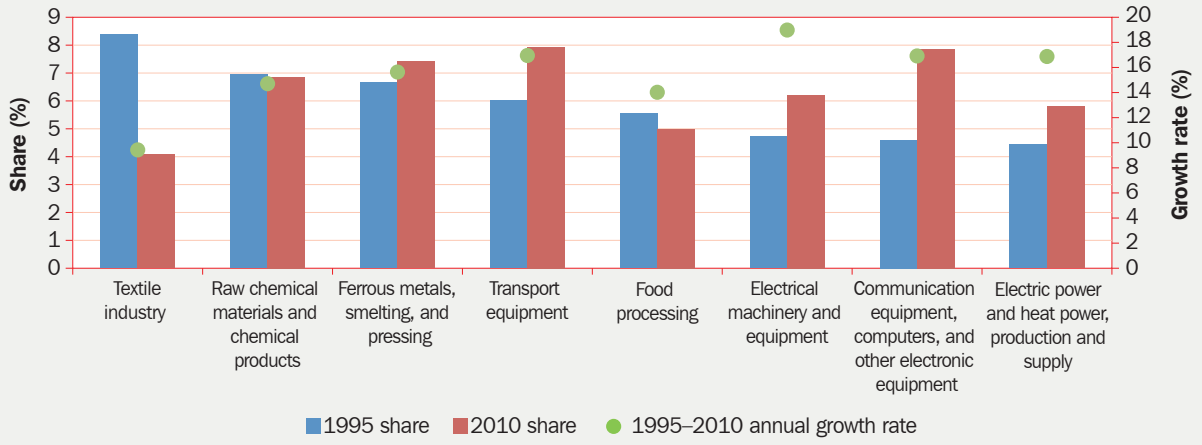
PRC = People's Republic of China, UK = United Kingdom, US = United States.
Source: World Economic Forum, *The Global Competitiveness Report 2011–2012*.

countries. Other major manufacturing subsectors at the time were chemicals and metals, the legacy of pre-reform heavy industrial development. Food processing, which, like textiles, is generally low value and low technology, was also prominent. By 2010, textiles and food processing had dropped out of the top five, overtaken by two higher-value subsectors—electronic equipment and electrical machinery and equipment (Figure 4.3). In 2010, about 17% of all PRC's manufactured goods were exported, accounting for 14% of the world total (Figure 4.4). In short, the PRC has truly become the world's factory.

The PRC's progress in developing technological capabilities is also reflected in the rapid growth of its manufacturing productivity. During 2000–2009, industrial labor productivity grew in real terms at 8.0% per year, considerably higher than other developing Asian countries such as Indonesia (2%), Thailand (2.5%), the Philippines (2.6%), and Malaysia (2.9%) (Figure 4.5). Strong labor productivity growth has been driven by high levels of investment in manufacturing and high total factor productivity (TFP) growth. Estimates of TFP growth for PRC manufacturing vary greatly and have been the subject of great controversy (Jefferson, Rawski, and Zhang 2008). However, a recent study of more than 300,000 PRC manufacturing firms shows that, during 1998–2007, TFP grew by 8% each year on a value-added basis (Brandt, van Biesebroeck, and Zhang 2011). This firm-level result is consistent with the estimates of aggregate TFP growth for the entire PRC economy generated for this report (see Section 6). During 2000–2009, the PRC's aggregate annual TFP growth reached about 6%, compared with Malaysia (1.7%), the Republic of Korea (1.8%), and Thailand (2.4%) (Figure 4.6).

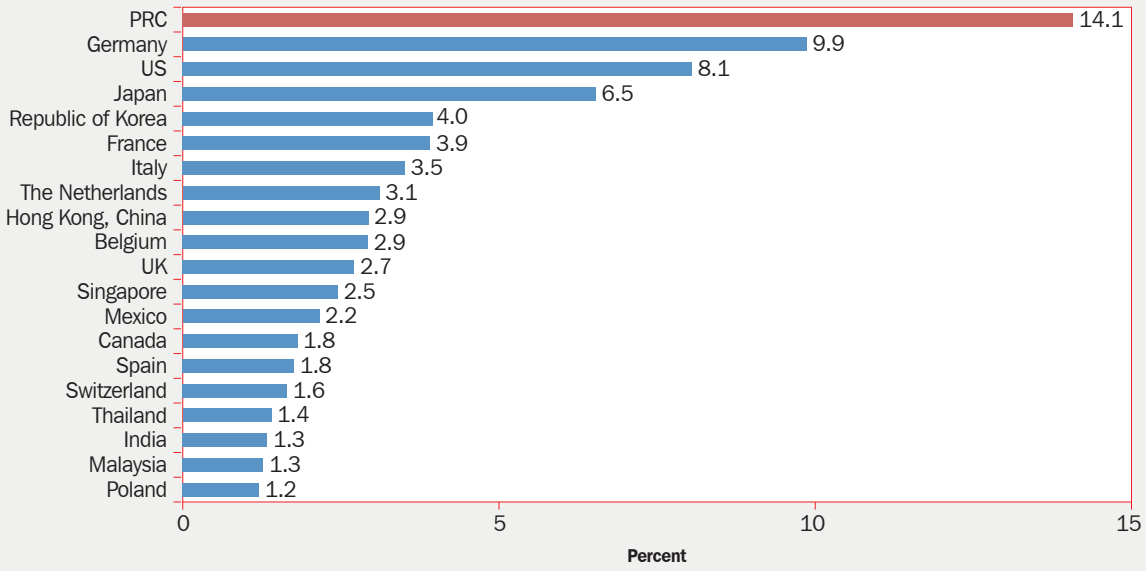
All these indicators suggest the PRC has significantly increased its technological sophistication over a relatively short span. These positive trends should not lead to complacency, however. As argued below, manufacturing in the PRC continues to rely largely on labor intensive technology and competes globally on its low-cost advantage. The country still faces the major challenge of narrowing productivity and technological gaps with advanced economies.

Figure 4.3 **PRC: Top five industrial subsectors, 1995–2010**



Note: Data are deflated using PRC GDP deflator 2000 base year.
Source: NBS, *China Statistical Yearbook* (accessed July 2012).

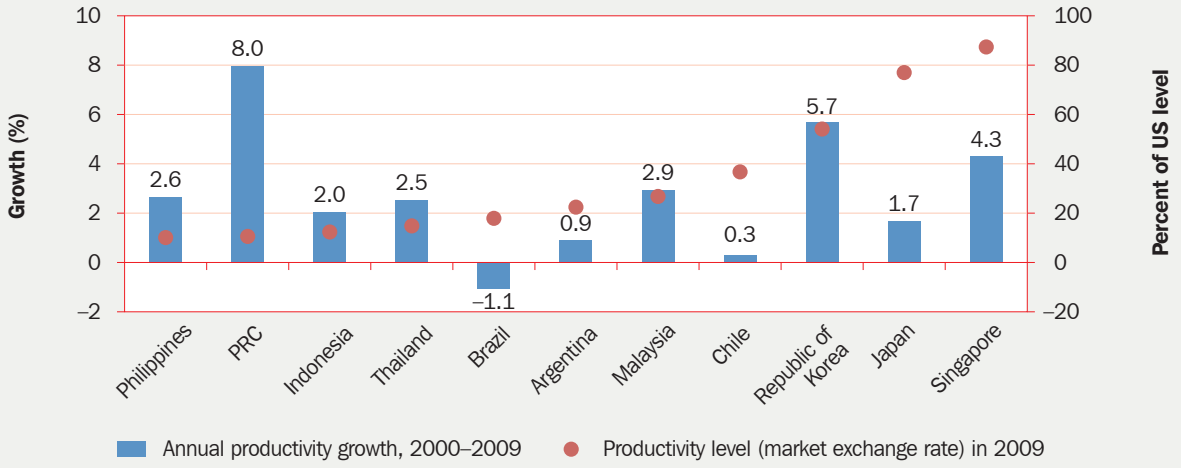
Figure 4.4 **Share of global manufactured exports, top 20 economies, 2010**



PRC = People's Republic of China, UK = United Kingdom, US = United States.
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

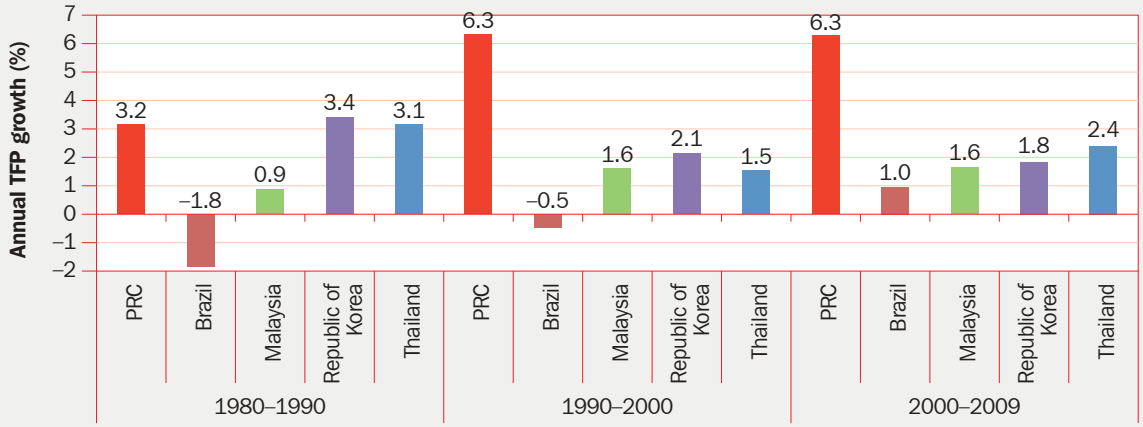
First, while "change" has been impressive, the "level" of the PRC's technological gap with advanced economies remains large. An aggregate indicator of the gap is the level of industrial labor productivity. In 2009, the PRC's industrial labor productivity was only 10.6% of the US (Figure 4.6). Within Asia, the PRC's industrial labor productivity also lags considerably behind the region's developed countries, including the Republic of Korea (54% of the US in 2008). It is also below the two Southeast Asian countries that are sometimes considered caught in the middle-income trap—Thailand (15%) and Malaysia (27%). The PRC level of industrial labor productivity is similar to that of the Philippines and Indonesia. It is below most Latin American countries, including Brazil (18%), Argentina (22%), and Chile (37%).

Figure 4.5 **Industrial labor productivity, selected economies, 2000–2009**



PRC = People's Republic of China, US = United States.
Note: Labor productivity = value added/employment. Data for the Republic of Korea refer to 2000–2008.
Sources: ADB staff estimates using data from *World Development Indicators Online* (accessed July 2012) and NBS, *China Statistical Yearbook* (accessed August 2012).

Figure 4.6 **Aggregate total factor productivity growth, selected economies, 1980–2009**



PRC = People's Republic of China, TFP = total factor productivity.
Note: TFP growth rates are estimated using Cobb-Douglas production functions which link output with labor, capital, and TFP.
Source: ADB staff estimates.

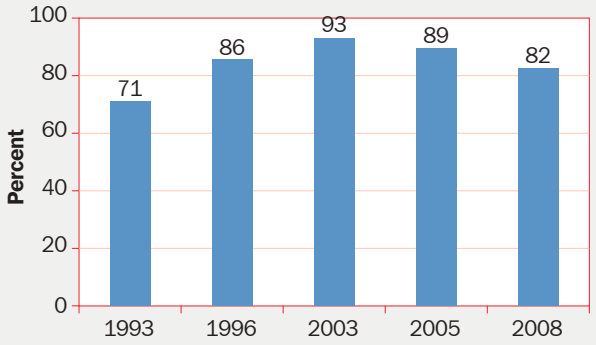
Second, although the PRC is now the world's largest high-tech exporter—notably of electrical and electronic goods—its value added remains low. A large share of PRC's manufacturing exports involves "processing trade", with imported components from high-income economies (such as Japan; the Republic of Korea; and Taipei,China) assembled into final goods for export—thus with limited domestic value added. Well-publicized examples are the Apple iPod, iPad, and iPhone—with estimates that only about $5 of iPod's $150 export value (3%), $8 of iPad's $499[10] worldwide retail price (1.6%), and $10 of iPhone's $549[11] worldwide retail price (1.8%) derive from the PRC

[10] 16-GB Wi-Fi iPad in 2010.
[11] iPhone 4 in 2010.

assembly in terms of labor costs (Linden, Kraemer, and Dedrick 2007; Kraemer, Linden, and Dedrick 2011). In 2008, about 82% of the country's high-tech exports involved processing trade (Figure 4.7).

Using product-level input-output data, Koopman, Wang, and Wei (2008) examined domestic value-added in exports by firm ownership and found that wholly-owned foreign invested enterprises (FIEs) tend to generate relatively low value added, relying on high-value imported components as part of global supply chains. Value added by FIEs is just over a quarter of the final value on average, whereas these firms account for 40% of the PRC's total exports (Table 4.1). Another 18% came from joint ventures, with higher but still not very high value added (45%). By contrast, value added by domestic firms ranged from 70% to 82%. The relatively low value added in processing trade also becomes apparent comparing export product sophistication with component imports. The PRC import sophistication is much higher than its export sophistication—although the difference has narrowed in recent years (Box 4.1).

Figure 4.7 **PRC: Share of processing trade in high-tech exports, 1993–2008**



PRC = People's Republic of China.
Source: Xing (2010).

Third, the PRC holds few global brands in manufacturing—despite being billed as the "workshop of the world." In 2010, there were 61 PRC firms on the Fortune Global 500 list, ranking third after the US and Japan (Fortune 2011). However, an analysis of the top 20 firms in the list for each country shows that only three of the PRC's top 20 were manufacturers. The other PRC firms in the top 20 were in resources, construction, and finance, with a primarily domestic market focus. The three manufacturing firms (all automobile producers) have combined annual revenues equal to 3% of PRC GDP in that year, slightly below those of the US and UK manufacturing firms in the top 20 (5% each) and well below those of the Republic of Korea and Japan, with combined revenues of manufacturing firms in the top 20 at 18% and 52% of GDP, respectively (Figure 4.8).

Fourth, PRC patents in per capita terms are low, although they have grown rapidly in recent years. The PRC had the third highest number of new patent registrations in the world in 2010, at 135,110—ranking only after Japan and the US (Table 4.2). On a per capita basis, however, the number of new

Table 4.1 **PRC: Share of domestic value added in exports by firm ownership, 2006**

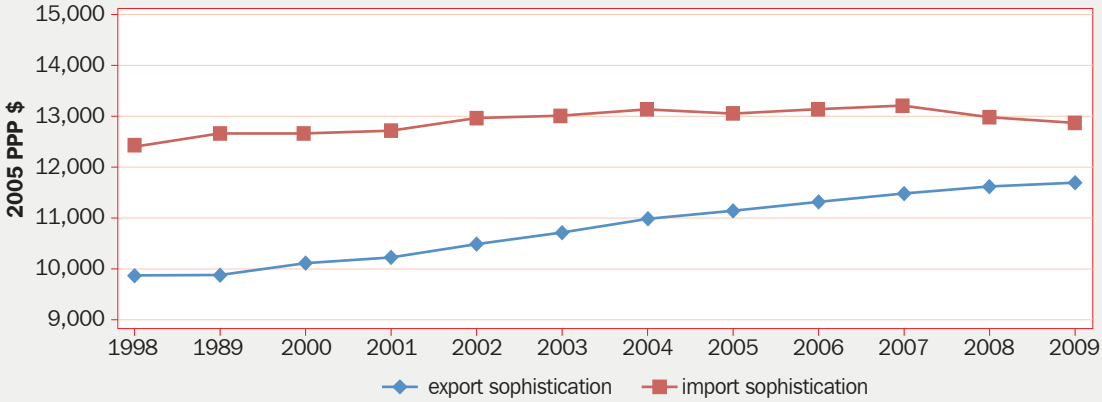
	Share of total domestic value added (%)	**Share of processing exports in total exports** (%)	**Share of exports by firm ownership in total exports** (%)
Wholly foreign owned	27.8	85.3	39.3
Joint venture firms	44.8	63.1	18.6
State-owned firms	70.0	27.1	19.8
Collectively-owned firms	70.9	24.7	4.3
Private firms	82.0	10.3	18.0
All firms	50.9	53.6	100.0

PRC = People's Republic of China.
Note: Estimates for 2006 are preliminary as they use trade statistics in 2006.
Source: Koopman, Wang, and Wei (2008).

Box 4.1 **Calculating product sophistication in exports and imports**

Figure B4.1-1 shows the level of export sophistication (EXPY) and import sophistication (IMPY) in the People's Republic of China (PRC) during 1998–2009. EXPY is constructed as a weighted average of the level of sophistication of the products exported—a higher EXPY implies the country exports products more similar to those exported by advanced countries. Analogously, IMPY is constructed as a weighted average of the level of sophistication of products imported. Therefore, a higher IMPY implies the country imports products more similar to those exported by advanced countries. The PRC's IMPY is significantly higher than its EXPY. This means the import basket is more technologically sophisticated than its export basket. However, the gap is narrowing. EXPY showed a 1.6% average annual growth rate during 1998–2009, while IMPY stagnated, indicating that PRC exports are becoming more sophisticated.

Figure B4.1-1 **PRC: Export and import sophistication, 1998–2009**



PPP = purchasing power parity, PRC = People's Republic of China.
Source: ADB staff estimates.

EXPY is calculated as the weighted average of the sophistication of the products (*PRODY*) a country exports:

$$EXPY_c = \sum_i \left(\frac{xval_{ci}}{\sum_i xval_{ci}} \cdot PRODY_c \right)$$

where $xval_{ci}$ is the value of country *c*'s export of commodity *i*, and $PRODY_c$ is the weighted average of the GDP per capita of the exporting countries:

$$PRODY_c = \sum_c \left[\frac{xval_{ci} \Big/ \sum_i xval_{ci}}{\sum_c \left(xval_{ci} \Big/ \sum_i xval_{ci} \right)} \right] \cdot GDPPC_c$$

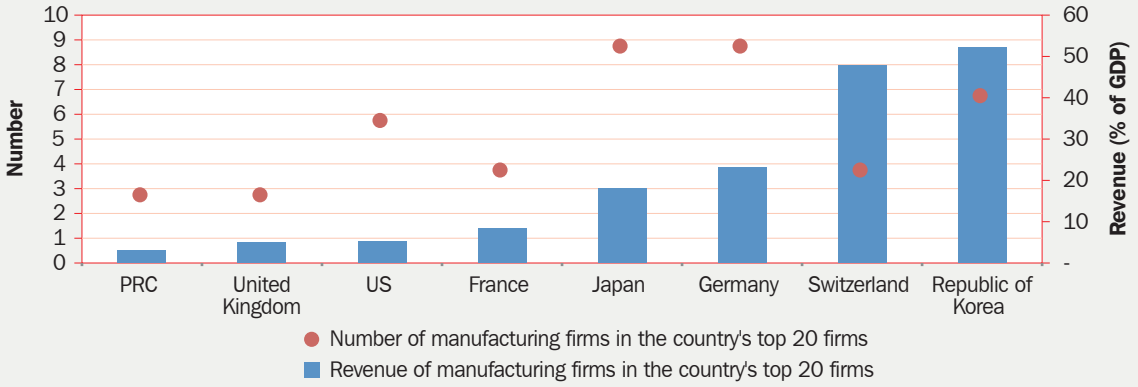
$PRODY_c$ is measured in 2005 purchasing power parity (PPP) $. The average *PRODY*s are calculated for 5,111 products. $GDPPC_c$ is country c's per capita gross domestic product. Similarly, the sophistication level of the import basket ($IMPY_c$) of a country is calculated as the weighted average of the sophistication of the products ($PRODY_i$) a country imports:

$$IMPY_c = \sum_i \left(\frac{mval_{ci}}{\sum_i mval_{ci}} \cdot PRODY_i \right)$$

where $mval_{ci}$ is the value of country *c*'s import of commodity *i*.

The calculations are based on the Base pour l'Analyse du Commerce International (BACI) trade database, classified under the Harmonized System 1996 and the gross domestic product per capita (measured in 2005 PPP $) from the World Bank's *World Development Indicators* Online database.

Figure 4.8 **Manufacturers in each country's top 20 firms listed in Fortune Global 500, 2010**



PRC = People's Republic of China, UK = United Kingdom, US = United States.
Note: Switzerland (15) and the Republic of Korea (14) have fewer than 20 firms in Fortune Global 500.
Source: *Fortune Global 500 Database*.

Table 4.2 **Patent grants, 2010**

Top 6 countries	Total	Percent share by residents	Per 1 million population	Rank in per 1 million population
Japan	222,693	84	1,747	1
US	219,614	49	710	6
PRC	135,110	59	101	28
Republic of Korea	68,843	75	1,393	2
Russian Federation	30,322	71	214	15
Canada	19,120	10	560	8

PRC = People's Republic of China, US = United States.
Sources: World Intellectual Property Organization (accessed August 2012) and World Bank, *World Development Indicators Online* (accessed August 2012).

registrations is low, at 101 per one million population, ranking 28th worldwide. Residents registered 59% of PRC patents, much lower than Japan, the Republic of Korea, and the Russian Federation. The distinction between resident and nonresident registrations is important—as the latter may be less likely to result in commercially viable products being produced within that country.

4.2. Rising wages

Low-cost advantage has played a critical role in driving the PRC's rapid growth over the past 30 years. In the next 2 decades, however, its importance will diminish. Factor prices—notably labor and land—are rising rapidly and will undermine the low-cost, high-investment strategy that worked very well during the past 3 decades. This will require producing more sophisticated and higher-value goods and services to absorb the added costs and retain competitiveness.

Rising wages is the most serious threat to the low-cost advantage. Wages are rising due to fundamental structural and demographic factors that will be difficult to change. In the early years of reform, the economy benefited from a large pool of surplus labor—estimated at 30% of rural labor in the 1980s (Zhuang 1996). As industry expanded, workers migrated to take up new urban jobs. Because productive work was hard to find in rural areas, urban migrants eagerly accepted low wages. These in turn allowed businesses to operate at low cost, generating high profits that could be reinvested into further expansion. This structural labor reallocation kept costs low, closely following the concept of development through surplus labor as elucidated by Arthur Lewis (1954).

There are indications, however, that the PRC is approaching the so-called "Lewis turning point"—in which the large supply of surplus labor shrinks and wages begin to rise (Cai 2011, Ranis 2012), although this may be more likely a phase extending over the next decade or so. Wages have risen rapidly in recent years, compared with the second half of the 1990s and the early 2000s (Figure 4.9). Over 1996–2005, real industrial wages rose at a modest average rate of 3.5% per year, a rate less than half of labor productivity growth (7.9% per year). Between 2006 and 2010, however, wages grew much higher at 7.7% per year and outstripped productivity growth (which dipped slightly to 6.4% per year). The story in services is similar. Wages grew 3.5% on average in the 10 years to 2005, considerably below average productivity growth (7.9% per year). Wages then rose 10.9% on average per year over the subsequent 5 years, whereas productivity increased at a slightly slower pace (10.1%). Indeed, annual wage growth in services outstripped productivity growth for the first time in 2008 and has remained higher since. The wage increases in industry and services are a positive sign for income distribution and consumption, but a worrying one for competitiveness.

General wage increases have been bolstered by rises in official minimum wages—which are set at the provincial level. Fast-growing coastal provinces, in particular, have raised wages to attract remaining countryside workers and to keep those already migrated. The real minimum wage in 12 coastal provinces grew on average 8.8% annually in 2005–2011, with three provinces—Fujian, Shandong, and Liaoning—raising the minimum wage more than 10% annually (Figure 4.10). Several coastal cities began experiencing labor shortages as early as 2003. Thus, businesses that were competitive based

Figure 4.9 **PRC: Real wage and labor productivity growth, 1995–2010**

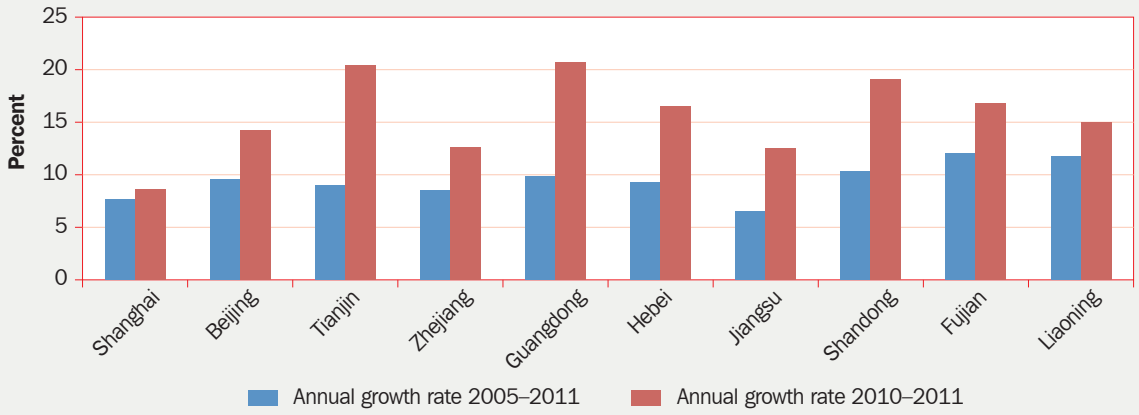
PRC = People's Republic of China.
Note: Wage growth is based on total real wage bill per worker employed. Labor productivity growth is based on real value added per worker employed. Wages and value added are deflated by the GDP deflator.
Sources: ADB staff estimates using wage and employment data from *China Statistical Yearbook*; GDP and GDP deflator from World Bank, *World Development Indicators Online* (accessed September 2012).

on low-cost labor are moving factories inland in search of workers willing to work at lower wages.

The rapid rise in urban wages exacerbates earning differentials between rural farmers and urban workers, and naturally promotes rural to urban migration as people seek higher wages in the city. Urban/rural earning differentials continue to be massive—with urban wages more than three times higher (Table 4.3). During 2000–2009, nominal earnings per worker tripled for urban retail and wholesale trade, and hotel and catering, and they nearly tripled for manufacturing. Over the same period, agricultural earnings increased by a more modest factor of 1.5, suggesting the urban/rural earnings divide continued to widen.

Knight, Quheng, and Shi (2011) estimate that about 169 million migrant workers were working in urban areas in 2010, with this expected to increase to 225 million by 2015, and 292 million by 2020—as migrants are lured by higher wages (Table 4.4). Meanwhile, the number of urban resident workers is expected to decline from 151 million in 2010 to 147 million in 2015, and 139 million in 2020. Correspondingly, total rural labor is expected to decline from 468 million in 2010 to 409 million in 2015 and 334 million in 2020. Given these figures,

Figure 4.10 **PRC: Growth of real minimum wages in coastal provinces, 2005–2011**



CPI = consumer price index, PRC = People's Republic of China.
Note: Minimum wages are simple averages of low and high minimum wage range in the province. Real minimum wage is estimated using provincial general CPI (2005 = 100).
Source: ADB staff estimates using minimum wage data from Ministry of Labor and Social Security; consumer price index data from NBS, *Provincial Statistical Yearbooks*.

Table 4.3 **PRC: Labor earnings, urban and rural, 2000 and 2009 (current $)**

	2000	2009	Percent increase
Urban			
Manufacturing	1,033	3,925	280
Construction	1,149	3,537	208
Retail and wholesale trade, hotel and catering	895	3,660	309
Rural			
Agriculture	424	1,056	149

PRC = People's Republic of China.
Note: Rural per labor earnings calculated as per capita rural household net income adjusted by the dependence ratio. Figures converted into $ using official exchange rates.
Source: NBS, *China Statistical Yearbook* (accessed July 2011).

more than 43% of the labor force would remain in rural areas by 2020, mostly in agriculture.

Labor market segmentation explains the co-existence of rapidly rising urban wages against the still large pool of potential migrant rural workers. This can be attributed to the *hukuo* system under which urban residents enjoy social welfare entitlements that migrant workers lack.[12] These differential entitlements make migration costly, as migrant workers must pay these expenses from wages and savings. This is likely one of the causes of labor shortages in coastal cities in recent years. To continue to attract rural migrant workers, firms will have to pay higher wages and provide entitlements—adding costs that can only be absorbed if productivity increases and output is upgraded.

The supply of labor in the PRC will also be affected by rapid population aging (Fernandez-Lommen 2010, Park 2011). Since reforms began, the PRC benefited greatly from the demographic dividend associated with a rise in the share of the working-age population to total population—an important support for economic growth. However, due to the declining fertility rate and rising life expectancy, the demographic dividend is waning. Economically inactive retirees account for a high and growing share of the total population. The ratio of those at or over age 65 relative to the working age population (aged 15–64) will increase from 11% to 24% over 2010–2030 (Figure 4.11). The working age population is projected to peak in 2015 at slightly below 1 billion and begin shrinking afterward (Figure 4.12). The demographic dividend could become a demographic tax—where workers must support the elderly through higher taxes and contributions to social programs (ADB 2011b).

Many high-income countries—such as Japan and many in Europe—must also deal with aging populations. As living standards and health care improve, people tend to live longer. Also, fertility rates tend to decline as incomes rise. However, PRC has transitioned at a much more rapid pace than most countries, in part due to the one-child policy initiated in the 1970s. The PRC now faces the unusual prospect of growing old before it grows rich. This has significant economic implications in reduced labor supply, rising wages, and growing social protection needs—most notably health care and pensions, which can be costly for the government, the tax-paying public, and on personal savings.

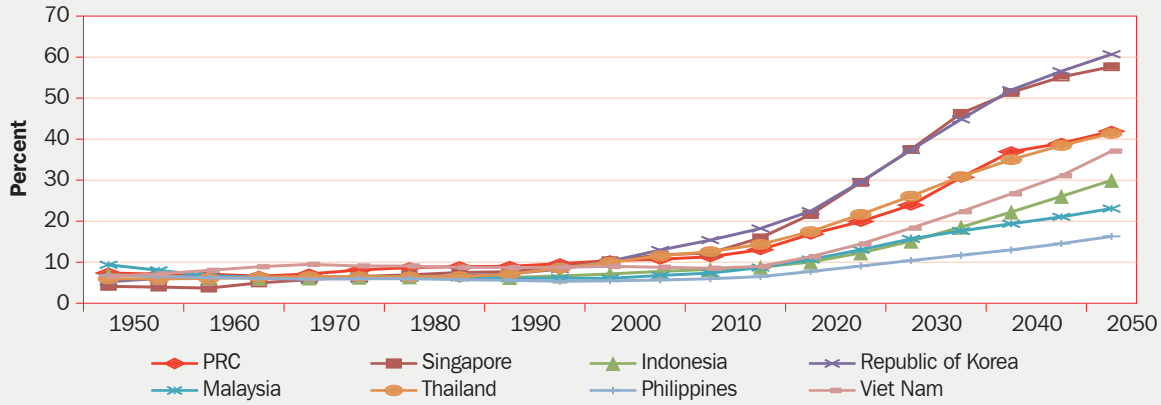
Table 4.4 **PRC: Urban and rural labor force and migration, millions, 2005–2020**

	Urban labor (1)	**Rural migrants working in urban areas** (2)	**Increase in migrants**	**Rural labor** (3)	**Decrease in rural labor**	**Total Labor force** (1+2+3)
2005	148	125	–	485	–	758
2010	151	169	44	468	–17	788
2015	147	225	56	409	–59	781
2020	139	292	67	334	–75	765

"–" means data not available, PRC = People's Republic of China.
Note: "Rural labor" denotes rural workers working in the rural areas.
Source: Knight, Quheng, and Shi (2011), adapted.

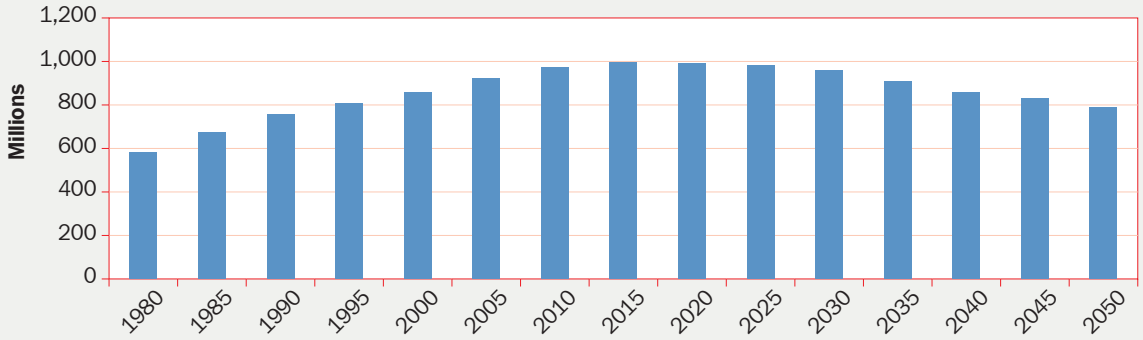
[12] Social welfare entitlements that migrant workers lack include unemployment insurance, pensions, maternal care, and health insurance, among others.

Figure 4.11 **Ratio of population aged ≥65 to population aged 15–64, selected economies, 1950–2050**



PRC = People's Republic of China.
Source: United Nations, *World Population Prospects: The 2010 Revision* (accessed July 2011).

Figure 4.12 **PRC: Working-age population, aged 15–64, 1980–2050**



PRC = People's Republic of China.
Source: United Nations, *World Population Prospects: The 2010 Revision* (accessed May 2011).

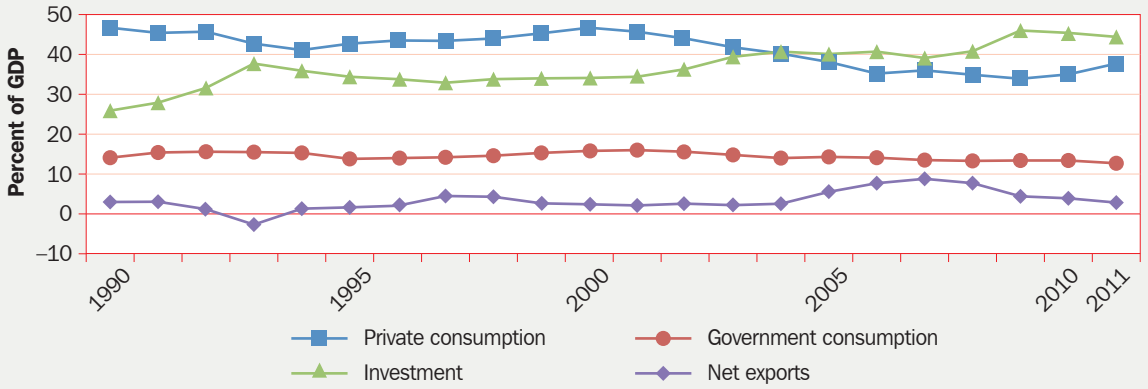
4.3. Imbalances in the sources of growth

The PRC's rapid economic growth has been accompanied by increasing imbalances in the sources of growth, especially since 2000. On the demand side, two imbalances have attracted particular attention: one between private consumption and investment and the other between external and domestic demand. On the supply side, imbalances exist between manufacturing and services.

(a) Imbalance between private consumption and investment

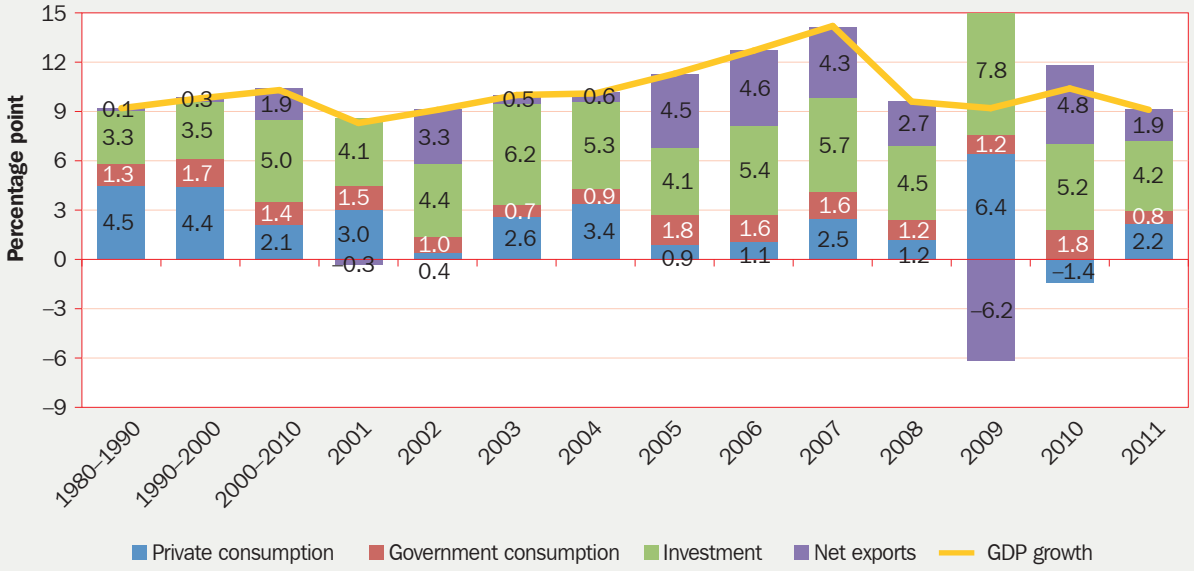
Private consumption as a share of GDP declined from about 47% in 1990 to 34% in 2009, although it increased to 38% in 2011. This has been mirrored by an increase in the investment rate, from 26% of GDP to 46% during 1990–2009, before it declined to 44.4% in 2011 (Figure 4.13). A decomposition analysis suggests that, during 2000–2010, the 10.3% average annual GDP growth consisted of 2.1 percentage points contributed by private consumption, 5.0 percentage points by fixed investment, 1.4 percentage points by government consumption, and 1.9 percentage points by net exports (Figure 4.14). Rapidly industrializing economies often have high investment rates—but the PRC appears to be exceptional. Hong Kong, China; Japan; the Republic of Korea; and Taipei,China all had significantly lower rates of investment when they were at the PRC's current level of development (Figure 4.15).

Figure 4.13 **PRC: Share in GDP, demand components, 1990–2011**



GDP = gross domestic product, PRC = People's Republic of China.
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

Figure 4.14 **PRC: Contribution to GDP growth, demand components, 1980–2011**

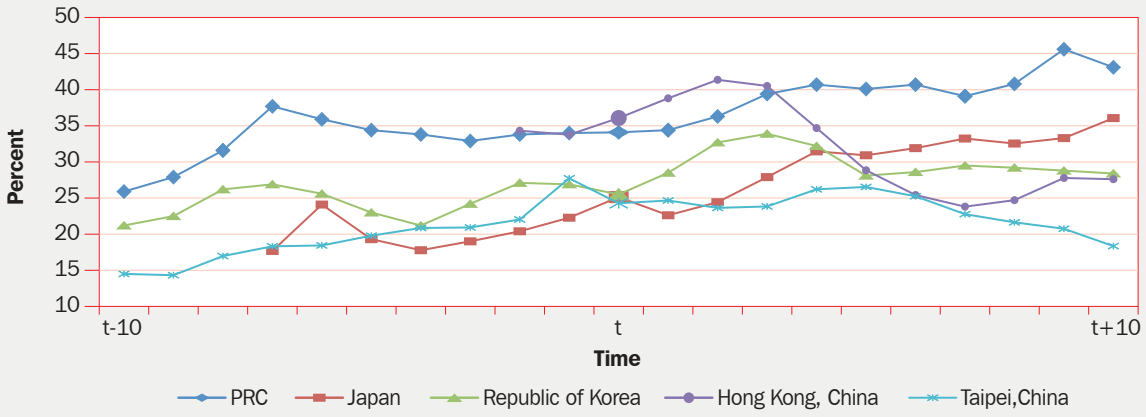


GDP=gross domestic product, PRC = People's Republic of China.
Source: World Bank, *World Development Indicators Online* (accessed July 2012).

Both a decline in household income and an increase in household savings contributed to the decline in private consumption—all as a share of GDP. The share of household income in GDP declined from 64% in 1995 to 58% in 2009, caused by a decline in the share of labor income in GDP, which, according to Bei and Qian (2009), fell by 10 percentage points during 2000–2007 (Figure 4.16). To a large part, the decline in the share of labor income was due to the PRC's structural shift from agriculture (where labor income share is higher) to nonagriculture sectors (where labor income share is lower).[13] In 2010, an estimated 169 million migrants were working in urban areas, with most of the migration taking place in the past 10 years. By 2015, the figure is expected to reach 225 million (Knight, Quheng, and Shi 2011).

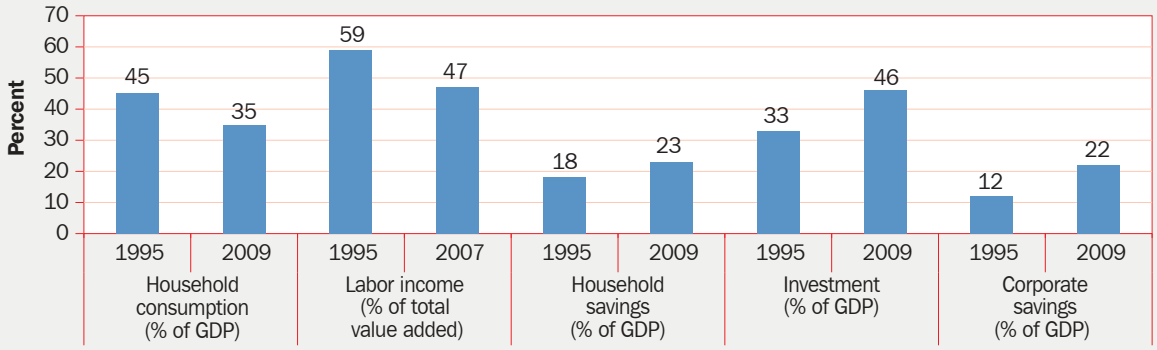
[13] Part of the decline in the share of labor income was due to changes in the national income accounting method introduced in 2003–2004 (see Bei and Qian 2009).

Figure 4.15 **Investment share in GDP, selected Asian economies**



GDP = gross domestic product, PRC = People's Republic of China, t = time.
Note: Investment data for the PRC and the Republic of Korea are from *World Development Indicators Online*, and for Japan; Hong Kong, China; and Taipei,China from *Penn World Tables*. Time t represents the year an economy's GDP per capita in 2005 purchasing power parity dollars reached about $4,400 (2000 for the PRC; 1957 for Japan; 1962 for Hong Kong, China; 1976 for the Republic of Korea. Year t-10 is the 10 years prior to year t and t+10 is the 10 years after year t.
Sources: World Bank, *World Development Indicators Online* and Heston et al. (2009), *Penn World Tables 6.3* (all accessed June 2011).

Figure 4.16 **PRC: Consumption, labor income, savings and investment, 1995 and 2009**



GDP = gross domestic product, PRC = People's Republic of China.
Note: Data on labor income as % of total value-added for more recent years are unavailable.
Sources: Bei and Qian 2009; CEIC; NBS, *China Statistical Yearbook* (accessed May 2011).

In addition, the share of labor income in industrial value added has also declined, partly due to the shrinking state-owned enterprise (SOE) sector, which pays higher wages than private firms (Bei and Qian 2009). The decline in the share of labor income in GDP also reflects the fact that a large supply of rural migrant workers has constrained wage rate growth in urban labor markets.

A declining share of labor income implies a rising share of returns to capital in GDP. If capital is owned by households, the impact of these changes on household income and hence consumption may not be that significant—as decreasing labor income would be compensated by increasing non-labor income for households. In the PRC, however, a large part of productive assets in nonagriculture sectors is owned by SOEs—50% in the industrial sector in 2008. An increasing share of capital income implies a transfer of factor income from households to the state in the form of retained SOE profits, a large part of which was channeled into corporate savings and new investment. During 1995–2009, the share of corporate savings in GDP increased from 12%

to 24% (Figure 4.16). The PRC's current level of corporate savings as a share of GDP is more than twice that of India, the Philippines, and Taipei,China.

The PRC's aggregate household savings stood at around 18% of GDP in 1995, declined to 15% in 2001, but rose to 23% in 2009. In 2009, the PRC household savings rate was at par with that of India, but 10 times higher than the Republic of Korea and more than 4 times as high as the US (see Table 2.1). The lack of effective social protection systems has often been cited as a key driver for high household savings. More recent studies (Chamon and Prasad 2010; Chamon, Liu, and Prasad 2010) find that motives of savings for precautionary purposes due to rising income uncertainty (a result of market-oriented reforms) and for housing purchases explain rising household saving rates of young adults, and pension reforms and rising own-pocket medical expenditures account for much of the rise in savings rates of households headed by older adults. All these motives are amplified by the lack of instruments for borrowing against future income and limited opportunities for portfolio diversification (Chamon and Prasad 2010).

Other factors, to varying degrees, have also contributed to the PRC's low levels of private consumption and high investment. First, as discussed earlier, the PRC deposit interest rates were controlled by the government and ranked lowest in real terms among high- and middle-income countries in the last 20 years—a sign of financial repression. Low deposit interest rates imply a transfer of income from net savers (households) to net borrowers (SOEs). Second, a large number of SOEs are now listed on the stock exchanges, and they are known for paying little dividends (Business China 2010), which increases corporate savings and to some extent could be explained by corporate governance weakness. Third, SOEs, faced with low credit costs and often supported by local governments, have strong incentives to invest.

In sum, a combination of factors contributed to the low and declining share of private consumption in GDP and the imbalances between private consumption and investment. To some extent, these are inherent in the structural transformation and economic transition processes that the PRC is currently undergoing. In this regard, rapid growth in urban wages in recent years is a welcome development—as it suggests the country is approaching a turning point where the share of household income in GDP may soon reverse recent trends. However, to eliminate the imbalance and increase private consumption, the PRC will also have to address various institutional weaknesses in social protection, provision of public goods and services, financial sector development, and factor market and enterprise reform. Supply-side measures, such as service sector development, will also play an important role in stimulating private consumption.

Persistent imbalances between private consumption and investment could undermine growth sustainability. While high investment is generally good for developing countries, excessive investment can lead to overcapacity, poor asset quality, increased vulnerability of banking and the financial sector, and economic inefficiency. This could, in turn, increase the risk of financial crises developing. During 2000–2009, industrial SOE average annual profitability (rate of return on assets) was 4.5%, while that of industrial non-SOEs was 7.4%, indicating significant room for SOEs to improve investment efficiency. Weak household consumption is not conducive to improving quality of life—a fundamental goal of development. It also increases the PRC economy's reliance on external demand and vulnerability to external shocks.

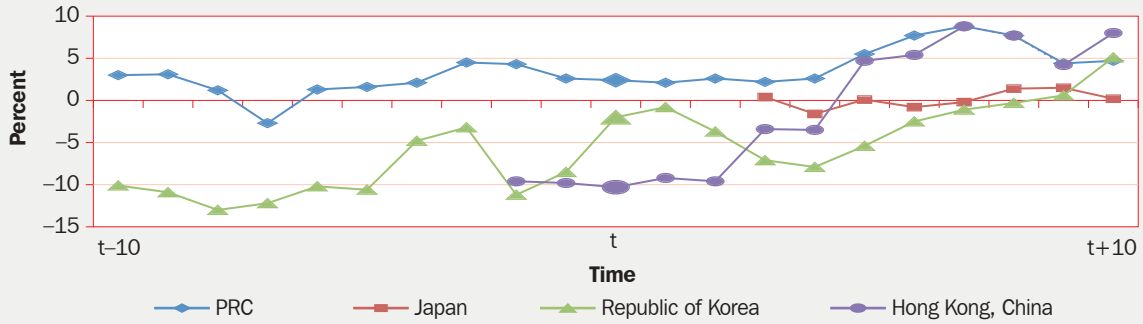
(b) Imbalance between domestic and external demand

The imbalance between external and domestic demand is indicated by the PRC's share of net exports in GDP, which increased from 2.4% in 2000 to 8.8% in 2007, before moderating to 2.8% in 2011 (Figure 4.13). A consequence of this has been large trade surpluses and a rapid—often "controversial"—accumulation of foreign reserves—$3.18 trillion at the end of 2011 (People's

Bank of China 2012), the highest in the world. Export-led growth has been critical to the "East Asian Miracle" (World Bank 1993). For example, the Republic of Korea's average exports/GDP ratio was 33.9% in 1980s, 30.8% in 1990s, and 41.8% in 2000s. While these are comparable to the PRC average of 31.0% during 2000–2010, the Republic of Korea's net exports were not as significant when it was at a similar development stage. During the 10 years before and after reaching $4,000 per capita—close to the current PRC level—net exports in the Republic of Korea were in fact negative during most of the period (Figure 4.17). In Japan, net exports were insignificant as a share of GDP.

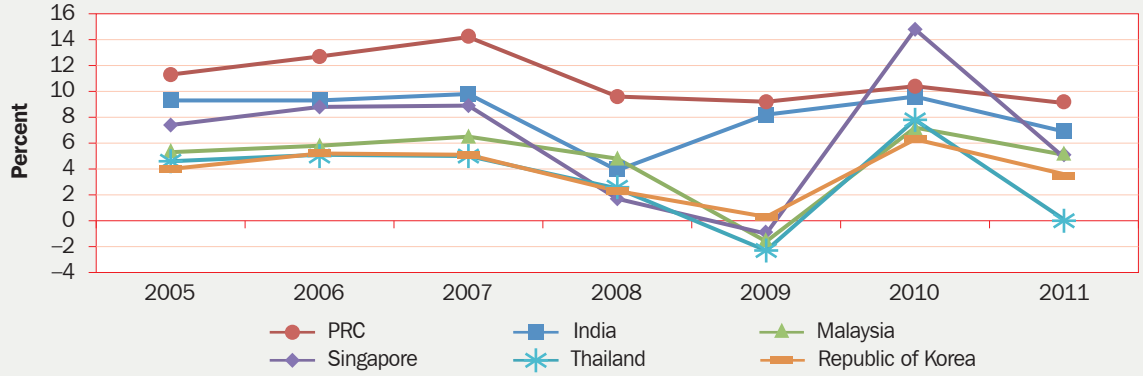
Over-reliance on exports as a source of demand increases vulnerability to external economic shocks, as occurred in many emerging Asian economies during the 2008–2009 global financial crisis (Figure 4.18). For large economies like the PRC, persistently large trade surpluses also contribute to global imbalances and can lead to protectionism by trading partners—which hurt both. It has been argued that the PRC's large trade surplus is the result of an export-oriented growth model based on low factor prices, incentives to manufacturing and heavy foreign investment (Yao and Yu 2009, Yao 2011). Strong export performance has also been supported by a competitive exchange rate,

Figure 4.17 **Net exports share in GDP, selected Asian economies**



GDP = gross domestic product, PRC = People's Republic of China, t = time.
Note: Time t represents the year an economy's GDP per capita in 2005 purchasing power parity dollars reached about $4,400 (2000 for PRC; 1957 for Japan; 1962 for Hong Kong, China; 1976 for the Republic of Korea. Year t-10 is the 10 years prior to year t and t+10 is the 10 years after year t.
Sources: Heston, Summers, and Aten (2009), *Penn World Tables* 6.3; and World Bank, *World Development Indicators Online* (all accessed June 2011).

Figure 4.18 **Growth slowdown during the recent global economic crisis, selected Asian economies, 2005–2011**



PRC = People's Republic of China.
Source: World Bank, *World Development Indicators Online* (accessed August 2012).

while weak domestic consumption, along with the exchange rate, has tended to limit imports. Therefore, addressing this imbalance requires policy actions in all these areas. While low factor prices and a competitive exchange rate make exports competitive, they weaken incentives or pressures for innovation and upgrading industry.

(c) Imbalance between manufacturing and services

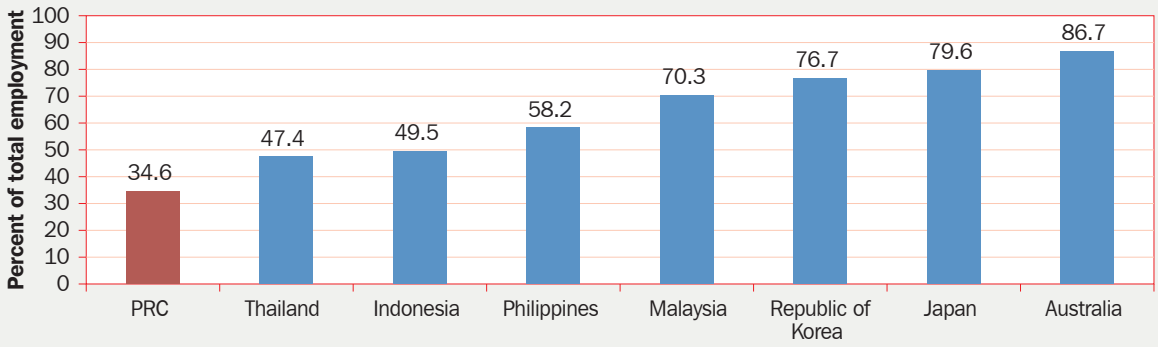
On the supply side, the imbalance is mainly between industry (particularly manufacturing) and services. In 2010, PRC services as a share of GDP was 43.1%, compared with 50% on average for low-income countries, 52% for lower-middle-income countries, 56% for upper-middle-income countries, and over 75% for high-income countries (Figure 4.19). The service sector's share of employment is even lower, at about 35% in 2011, compared with Thailand (47%), Indonesia (50%), the Philippines (58%), Malaysia (70%), the Republic of Korea (77%), Japan (80%), and Australia (87%) (Figure 4.20).

More disaggregated data show that, in 2009, as a share of GDP, most of the PRC's major services subsectors underperformed compared with developed economies such as the US and Japan, and middle-income countries such as India, the Philippines, and Thailand, with the exception of transport and storage (Table 4.5). The least developed subsector is communication, finance,

Figure 4.19 **Service sector share in GDP, by country grouping, 2000 and 2010**

GDP = gross domestic product, PRC = People's Republic of China.
Source: World Bank, *World Development Indicators Online* (accessed January 2012).

Figure 4.20 **Employment in services, selected economies, 2011**



PRC = People's Republic of China.
Note: Data for PRC is for 2010.
Source: ADB, *Key Indicators for Asia and the Pacific 2012*.

and business services. For instance, in 2009, this subsector accounted for 9.4% of GDP in the PRC, compared to the 25.1% in the US, 17.2% in Japan, 16.1% in the Republic of Korea, 14.6% in Malaysia. Another subsector with a very low share of GDP in comparison with other countries is public administration, community, personal, and other services. Service sector labor productivity is also low. In 2010, for example, annual value added per worker for services was only 68% of that for industry (Figure 4.21).

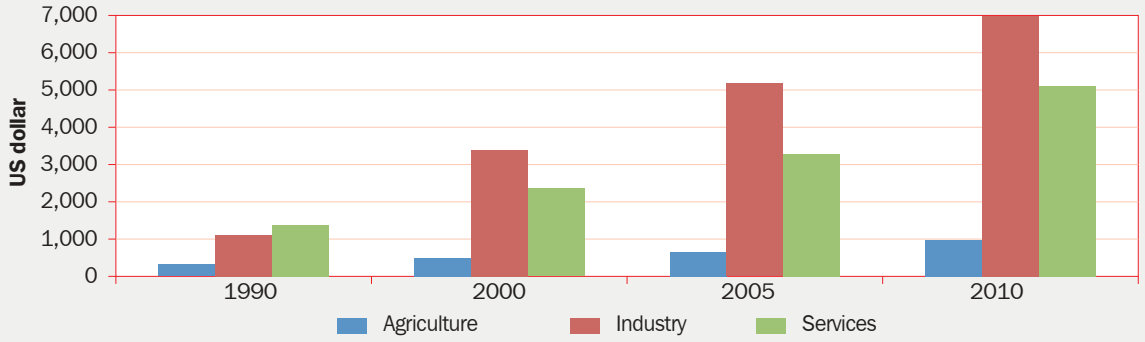
The underdevelopment of PRC services relative to manufacturing can be attributed to several factors, many policy-related (Xu 2011). First, many service subsectors remain subject to significant entry barriers or closed to private competition—including rail transport, telecommunications, education, health care, and financial services. Second, certain aspects of the PRC's macroeconomic and tax policies are not conducive to services development. The export-oriented growth model favors manufacturing instead of largely non-tradable services, and services have until recently been subject to business tax instead of the less onerous value-added tax used for manufacturing (Ping et al. 2009, Xu 2011). Third, services develop with the urban economy and this has been hampered by the relatively low

Table 4.5 **Services shares in total value added, selected economies, 2010 (%)**

Economy	Total services	Wholesale and retail trade	Hotels and restaurants	Transport and storage	Real estate and dwellings	Communication, finance, and business services	Public administration, community, personal, and other services
US	80.2	11.6	3.8	2.8	12.2	25.1	24.8
Japan	72.6	12.3	–	4.5	13.0	17.2	25.7
Republic of Korea	58.5	8.6	2.3	4.2	7.2	16.1	20.1
Philippines	55.1	17.4	–	3.9	6.5	13.9	13.4
Thailand	43.0	13.1	4.7	4.1	1.4	7.7	12.0
Malaysia	46.0	11.9	2.3	3.3	4.1	14.6	9.7
India	54.7	15.1	1.4	6.4	6.1	11.0	14.5
PRC	43.4	8.5	2.1	4.9	7.3	9.4	11.2

PRC = People's Republic of China, US = United States.
Note: "–" means data not available or combined with "other services." Data for PRC and Japan refer to 2009.
Source: ADB staff estimates using data from CEIC (accessed April 2012).

Figure 4.21 **PRC: Levels of labor productivity by sector, 1990–2010**



PRC = People's Republic of China, US = United States.
Sources: ADB staff estimates using sector value-added data from World Bank, *World Development Indicators Online* and employment data from NBS, *China Statistical Yearbook* (all accessed August 2012).

level of urbanization. Finally, large enterprises tend to provide business services in-house because the development of a deeper outsourcing culture has yet to take root.

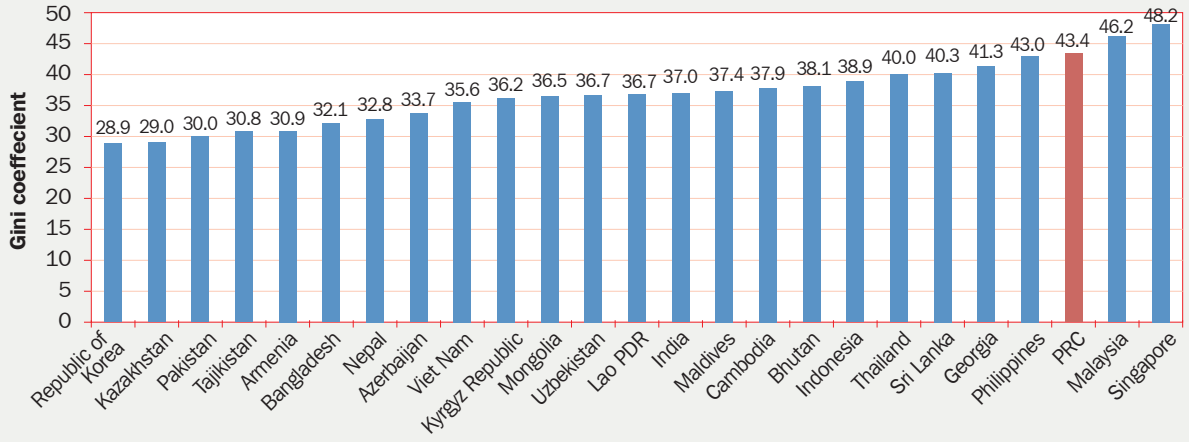
The underdevelopment of services has significant implications for the structure of the PRC economy. First, services are generally labor intensive, and their underdevelopment means a large number of potential jobs have not been created. This has implications on wage rates, labor incomes, and household consumption—contributing to imbalances on the demand side. Second, many services are closely related to human wellbeing and the quality of life. Underdeveloped services such as education and health care affects the quality of life. Third, business services help improve industrial productivity, and thus their absence is a barrier to improving industrial productivity.

4.4. Rising income inequality

Since the PRC embarked on economic reform, income inequality has risen significantly. The country's overall Gini coefficient of per capita consumption expenditure—a measure of inequality—increased from about 30 in the early 1980s to 43.4 in 2008, among the highest in Asia (Figure 4.22). Disaggregated data show that inequality increased in both rural and urban sectors—rural inequality increased from 30.6 in 1990 to 39.4 in 2008, while urban inequality increased from 25.6 to 35.2 during the same period (Figure 4.23). High and rising inequality can retard growth as low-income households contribute little to effective demand and are unable to invest in boosting human capital through improved health and education. Beyond the direct economic effects, inequality has the potential to ignite social unrest, which can derail the growth process.

It is not just the PRC that experienced rising inequality in Asia. Many other Asian countries, such as India, Indonesia, and the Republic of Korea, have also seen Gini coefficients rise in recent years. A recent study by ADB (2012b) identifies several fundamental drivers of rising inequality in Asia. Technological progress, globalization, and market-oriented reform have led to rapid growth and opened enormous new opportunities for economies to prosper. But they have not benefited all people equally. These drivers affect income distribution through three channels—(i) rising skill premiums/returns on education, (ii) declining contribution

Figure 4.22 **Income inequality, selected economies, latest available**

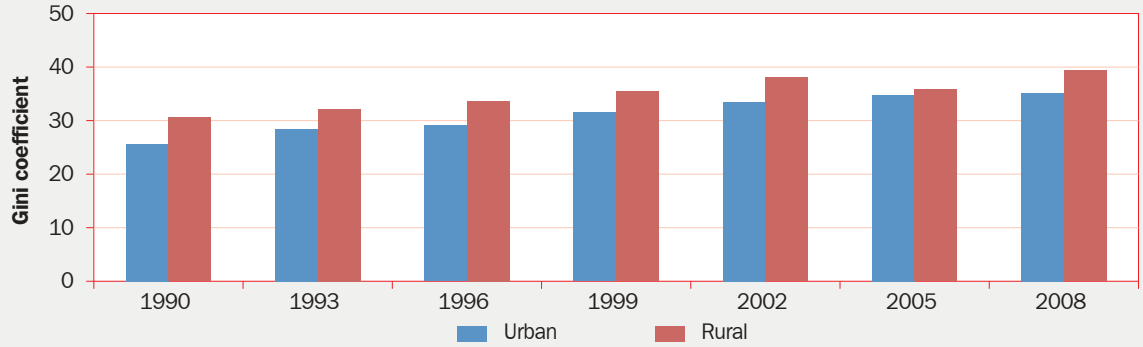


Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Note: Gini coefficients are based on consumption data except for Malaysia and Singapore (income-based). Latest available data for Indonesia (2011); Bangladesh, India, the Republic of Korea, and Nepal (2010); Kazakhstan, the Kyrgyz Republic, the Philippines, Tajikistan, and Thailand (2009); Armenia, Azerbaijan, Cambodia, Georgia, Lao PDR, PRC, and Viet Nam (2008), Afghanistan, Bhutan, Mongolia, and Pakistan (2007); Sri Lanka (2006); the Maldives (2004), Uzbekistan (2003).
Source: PovcalNet (accessed March 2012), supplemented by ADB estimates from household survey data (India and PRC).

of labor to total income, and (iii) increasing spatial inequality. Further, the impact has been compounded by unequal access to opportunity due to various governance weaknesses, market imperfections, and policy distortions.

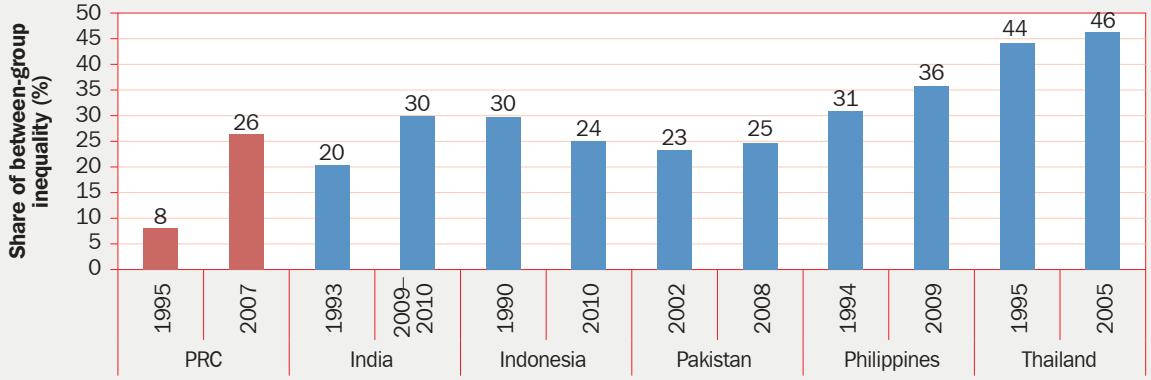
During 1995–2007, the share of total inequality that can be explained by differences in educational attainment increased from 8.1% to 26.5% in the PRC (Figure 4.24). Kang and Peng (2010) provide evidence from survey data that returns on higher education (universities and professional schools) increased, while returns on upper- and lower-middle schooling decreased from the 1990s to the 2000s. Figure 4.24 shows that, among the Asian countries listed, about 25%–35% of total inequality can be explained by inter-person or inter-household differences in human capital and skill endowments in the late 2000s. The PRC does not rank highest, but its increase over time has been the most significant. There is a large body of literature on how globalization (especially trade integration) and technological change can increase wage differentials between skilled and unskilled workers (ADB 2012b). For the PRC, the move toward market-oriented wage determination as a result of enterprise reform is also a major contributing factor to rising skill premiums.

Figure 4.23 **PRC: Urban and rural inequality, 1990–2008**



PRC = People's Republic of China.
Note: Gini coefficients are based on per capita consumption expenditure.
Source: ADB, *Asian Development Outlook 2012*.

Figure 4.24 **Share of inequality related to educational attainment, selected economies**



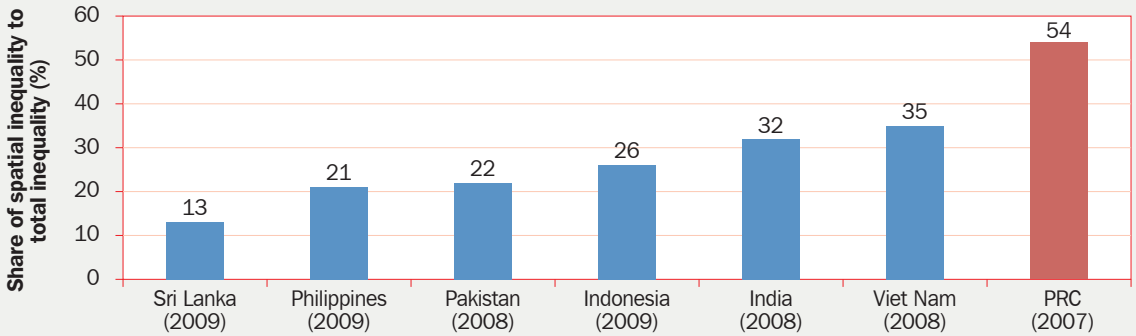
PRC = People's Republic of China.
Note: Estimates are based on per capita consumption expenditure in nominal terms, except for the PRC, which is based on income. The decomposition is based on the generalized entropy measure GE (0).
Source: ADB, *Asian Development Outlook 2012*.

A decline in the share of labor income in total income—or a rise in the share of capital income—increases inequality because capital incomes are in general less equally distributed. Figure 4.16 shows that, between 1995 and 2007, labor income as a share of total value added for the entire PRC economy declined from 59% to 47%. The share of labor income in manufacturing value added also fell during the same period, from 48% to 42% (ADB 2012b). This decline in labor income share is not confined to the PRC. In fact, many countries globally, both developed and developing, have experienced a decline in the share of labor income in recent years, partly attributable to technological change (ADB 2012b). For the PRC, however, two other factors have also played an important role. One is the large amount of rural surplus labor—associated with the dual economy—that puts downward pressure on urban wages despite the rapid growth of labor productivity. The other is wage system reform and the move toward market-oriented wage determination.

A more important contributing factor to rising inequality in the PRC is increasing spatial inequality. The impact of technological progress, globalization, and market-oriented reform are usually geographically uneven, leading to rising spatial inequality. This is because new economic opportunities, released by these growth drivers, often appear closer to existing trade routes—for example, coastal areas—and in areas with better public infrastructure, mostly cities (Lewis 1976). Economists have also highlighted the role of agglomeration benefits—where, as concentration develops from natural or other advantages (such as those related to policy), there is a self-perpetuating process of increasing concentration (Krugman 2008).

Decomposition analysis shows that more than half of the PRC's total inequality in 2008 can be explained by spatial inequality—rural/urban income gaps and inter-provincial disparities combined. This was the highest among selected Asian countries (Figure 4.25). During 1990–2010, the ratio of per capita disposable income between urban and rural households increased from 2.2 to 3.2.[14] At the same time, the Gini coefficient of provincial per capita mean income increased from 22.6 in 1990 to 27.6 in 2003—before dropping to 24.7 in 2008 and 22.7 in 2010 (ADB 2012b). This suggests the increase in spatial inequality has been driven largely by widening urban/rural income gaps. This is confirmed by decomposition analysis—Figure 4.26 shows that the share of PRC total

Figure 4.25 **Contribution of spatial inequality, selected economies, late 2000s**



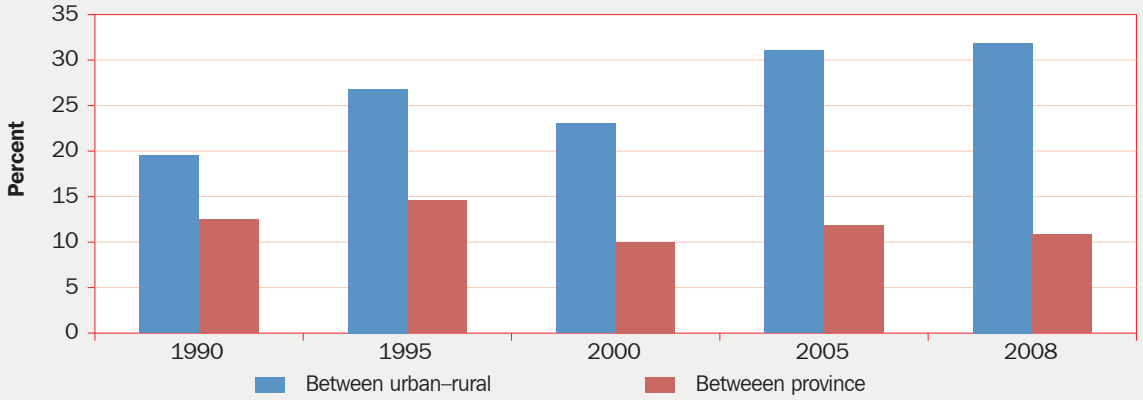
PRC = People's Republic of China.
Note: Spatial inequality covers both between-regions and between-urban/rural inequality. The estimation involves dividing all sample households into groups classified by both region and urban/rural. For example, if a country has 20 provinces, the total groups will be 40 (20 for urban and 20 for rural). The between-group inequality is the combined spatial inequality.
Source: ADB staff estimates using household survey data.

[14] See *China Statistical Yearbook 2011*.

inequality derived from urban/rural income gaps increased from 20% in 1990 to 32% in 2008, while the share from inter-provincial inequality remained more or less unchanged at slightly over 10%.

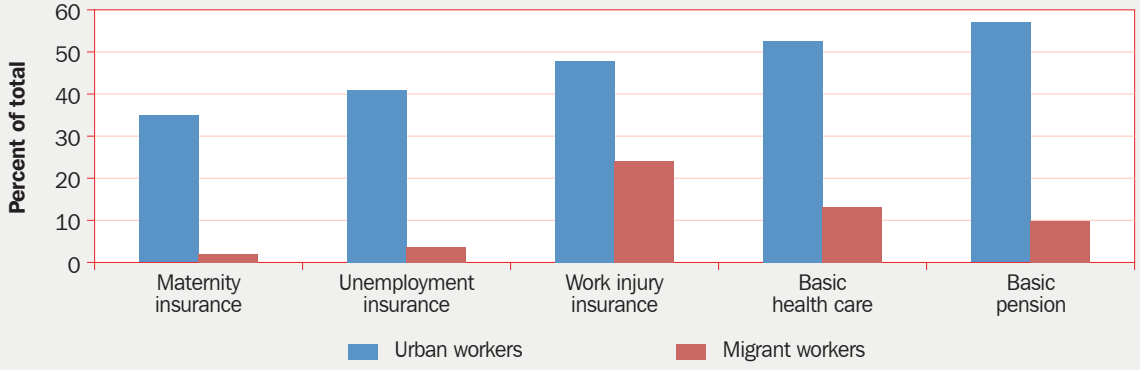
To a large extent, high and rising inequality in the PRC is also due to incomplete reforms, remaining barriers to factor mobility, and weaknesses in governance—leading to unequal access to opportunity. For example, the *hukuo* system—where urban residents with *hukuo* and rural migrant workers without *hukuo* have different social welfare entitlements such as access to education, health care, social protection, and housing, among others, continues as a significant wedge in income levels between urban and rural areas and across provinces (Figure 4.27). Some industries enjoy monopolistic power due to entry barriers, leading to monopolistic rents and increasing inter-industry wage differentials (Chen, Lu, and Wan 2009). The large government role in resource allocation, extensive direct economic intervention, and weaknesses in governance has also

Figure 4.26 **PRC: Shares of inequality accounted for by urban/rural income gaps and inter-provincial disparities, 1990–2008**



PRC = People's Republic of China.
Note: Estimates are based on per capita income adjusted by cost of living between urban and rural areas and across provinces. For more details on the adjustment, see Lin, et al. (2008). The decomposition is based on the generalized entropy measure GE (0).
Source: ADB staff estimates using PRC provincial grouped household income data sources from *Provincial Statistics Yearbooks*; Lin et al. (2008).

Figure 4.27 **PRC: Social protection coverage by urban and migrant workers, 2009**



PRC = People's Republic of China.
Source: Taken from Cai (2011).

left wide scope for rent-seeking by those with special privileges and connections, making their earnings significantly higher than others.

4.5. Natural resource and environmental constraints

The PRC's rapid economic growth places increasing pressure on its natural resources. Among many constraints, water and energy attract the most attention. Rapid growth also raises concern over environmental sustainability. Air and water pollution creates health problems and damages the quality of life, with CO_2 emissions contributing to global climate change. These are some of the most serious challenges the PRC faces in the coming decades.

Water resource constraints

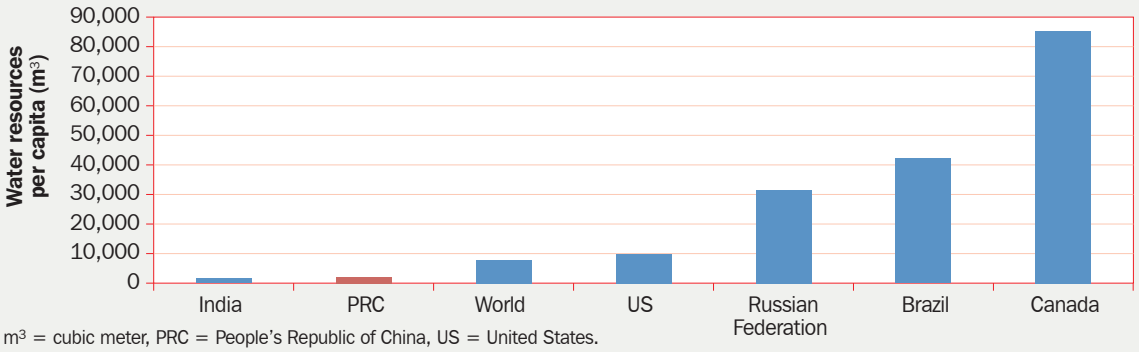
The PRC has the world's fifth largest available water resources—after Brazil, Russian Federation, the US, and Canada. Yet its per capita water availability during 2003–2007, at 2,125m^3, is only about one-quarter of the global average (Figure 4.28). The extremely uneven spread of water resources is also a significant problem. Annual per capita water availability in the north is one-fourth of that in the south—below the "water scarcity" level of 1,000m^3 per person (World Bank 2009).

The PRC's water resources and availability are being affected by two major factors—the changing pattern of rainfall—which may have been related to climate change (Parry et al. 2007)—and water pollution. Between 1956–1979 and 1980–2000, annual rainfall in four major river basins in Northern PRC (Yellow, Hai, Liao, and Huai) fell by an average 6%, reducing surface water by 17% and total water resources by 12% (Jiang and Huang 2011). In Southern PRC, by contrast, river basin water resources increased slightly between the same two periods.

The effects of water pollution—particularly on surface water—have been more serious. The government's 2009 Report on Environmental Statement (MEP 2010) indicates that surface water pollution remains severe nationwide despite recent efforts to control it. Of the 408 sections of 203 rivers monitored, only 57.3% are safe for human consumption after treatment (I–III classes), 24.3% are safe for industrial and irrigation use only (classified IV–V), and 18.4% are unsafe for any use (below class V).[15] Water quality in northern river basins is notably worse than the Yangtze and Zhu rivers.

Industrial and domestic wastewater, along with fertilizer and pesticide runoffs from agricultural, animal, or aquatic production, are primary sources of water pollution. With stronger policy interventions

Figure 4.28 **Per capita water resource availability, selected economies, 2010**



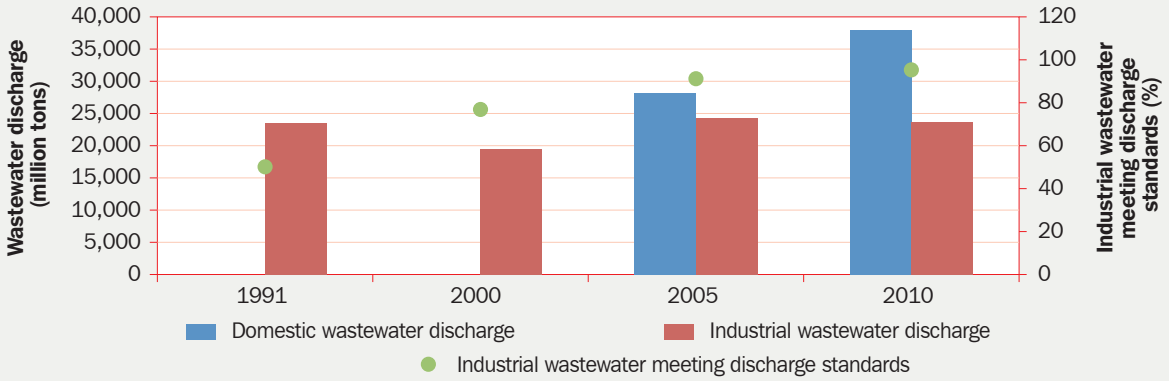
m^3 = cubic meter, PRC = People's Republic of China, US = United States.
Source: FAO, AQUASTAT database (accessed September 2012).

[15] Based on PRC's environmental quality standards for surface water (GB 3838-2002).

and tougher regulations, industrial wastewater discharges have been on a downtrend since 2005. The proportion of treated industrial wastewater meeting discharge standards has also increased—above 90% in recent years (Figure 4.29). However, domestic wastewater discharge and "non-point source" water pollution[16] from rural areas have been growing. Domestic wastewater discharge has surpassed industrial wastewater and increased rapidly—from 26,127 million tons in 2004 to 33,003 million tons in 2008.

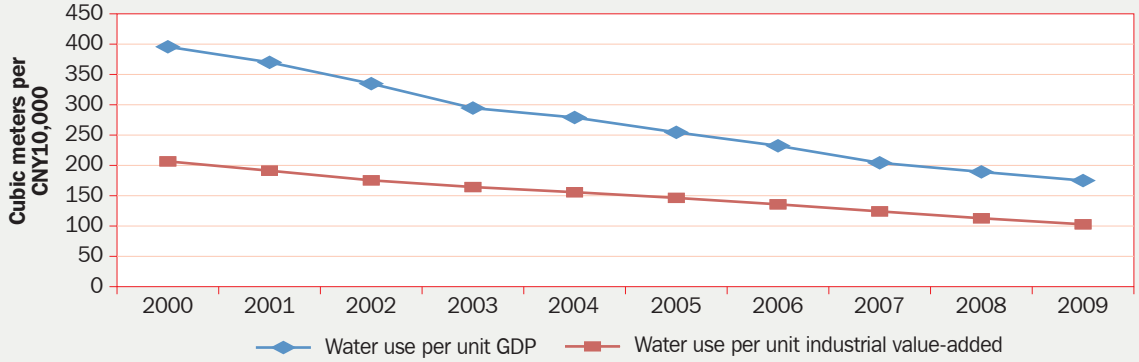
The PRC's total water use amounted to 597 billion m^3 in 2009, with agriculture accounting for 62.4%, industry 23.4%, and domestic use 12.5%. During 2000–2009, total water use grew approximately 1% annually. At the same time, water use efficiency has been improving. Water use intensity fell 56% during 2000–2009, from 396m^3 to 175m^3 per CNY10,000 of GDP (Figure 4.30). Industrial water use intensity has also improved. Water use efficiency improvement can be attributed to several factors, including the structural shift from agriculture to industry and services,

Figure 4.29 **PRC: Wastewater discharges, 1991–2010**



PRC = People's Republic of China.
Source: NBS, *China Statistical Yearbook* (accessed September 2012).

Figure 4.30 **PRC: Water use efficiency, 2000–2009**



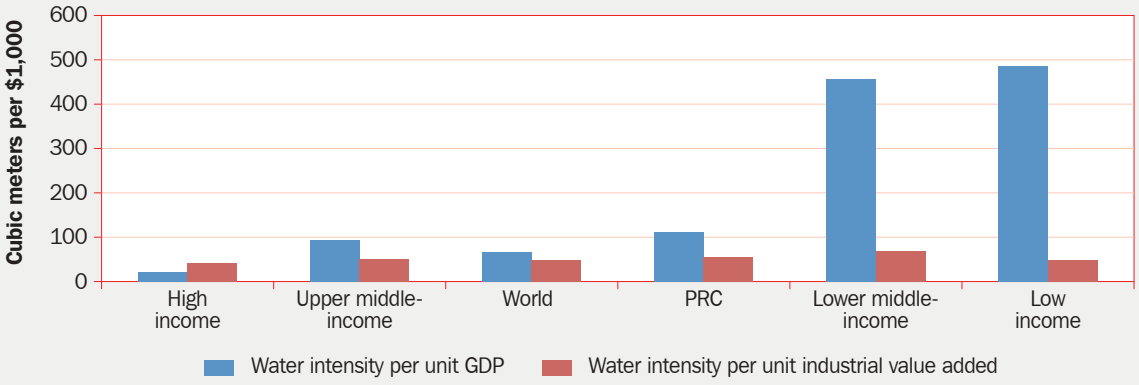
CNY = Chinese yuan, GDP = gross domestic product, PRC = People's Republic of China.
Note: GDP and industrial value added are in 2009 constant prices.
Source: NBS, *China Statistical Yearbook* (accessed September 2012).

[16] Non-point source water pollution results from diffuse sources, including land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrologic modification.

the use of more efficient technologies, and better management. Reduction in per capita residential water use by urban households—from 220 liters per day in 2000 to 177 liters per day in 2009—also played a part. However, per capita residential use in urban areas remains well above that in rural areas—72 liters per capita per day (MWR 2010). Despite the encouraging improvement, the PRC water intensity remains high by international standards (Figure 4.31). The PRC outperforms lower-middle-income countries in overall water efficiency, but falls behind in industrial water efficiency. Moreover, the PRC's water intensity is double or triple that in upper-middle-income countries. Thus, there is large room for improving the PRC's water use efficiency.

the PRC's National Comprehensive Plans for Water Resources—approved by the State Council in late 2010—aims to keep total water consumption below 700 billion m^3 (the supply capacity) by 2030 and water use in agriculture, industry, and domestic sectors below 407.8 billion m^3, 171.8 billion m^3, and 102.1 billion m^3, respectively (Table 4.6). These, however, are only targets. An ADB study (Jiang and Huang 2011) examines a business-as-usual (BAU) scenario, assuming that industrial and domestic water demand will grow at the same rate as the past decade—2.2% per year for industry and 3.0% for domestic use. This considers continued improvement in productive water use efficiency, industrialization, and urbanization. For agricultural water demand,

Figure 4.31 **International comparison of water use intensity, 2009**



GDP = gross domestic product, PRC = People's Republic of China.
Source: World Bank, *World Development Indicators Online* (accessed February 2011).

Table 4.6 **PRC: Projections of water demand in 2030**

Studies	Demand				Supply capacity	Demand-supply gap
	Agriculture	Industry	Domestic	Total		
Demand/supply in 2009, billion m^3	372.3	139	74.8	596.5	596.5	0
Annual growth in 2000–2009 (%)	–0.2	2.2	3	0.9		
McKinsey						
Demand/supply, billion m^3	420	265	133	818	619	199
Annual growth (%)	0.6	3.1	2.8	1.5		
NCPWR						
Demand/supply, billion m^3	407.8	171.8	102.1	700	700	0
Annual growth (%)	0.4	1	1.5	0.8		
Jiang and Huang (2011)						
Demand/supply, billion m^3	408	220	139	767	700	67
Annual growth (%)	0.4	2.2	3	1.2		

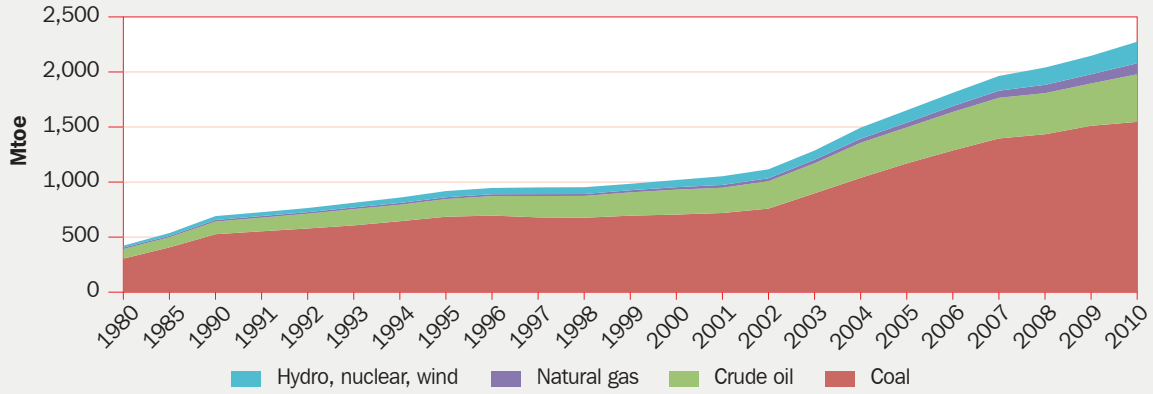
m^3 = cubic meter, NCPWR = National Comprehensive Plans for Water Resources.
Note: Total water demand also includes ecological demand of 18.3 billion m^3.
Sources: Jiang and Huang (2011); McKinsey (2009a); MWR, *National Comprehensive Plans for Water Resources.*

the growth rate (0.4%) in the NCPWR projections is used based on historical trends and the considerable potential for better irrigation efficiency. Under this BAU scenario, total water demand in 2030 is projected to increase to 767 billion m^3. Assuming water supply capacity will grow to NCPWR projected levels, the BAU projections show a sizable demand-supply gap, at 67 billion m^3—or 9% of total demand, in 2030.[17] These results suggest that immediate policy intervention and public action are needed to address water resource constraints, especially to reduce water pollution.

Energy constraints

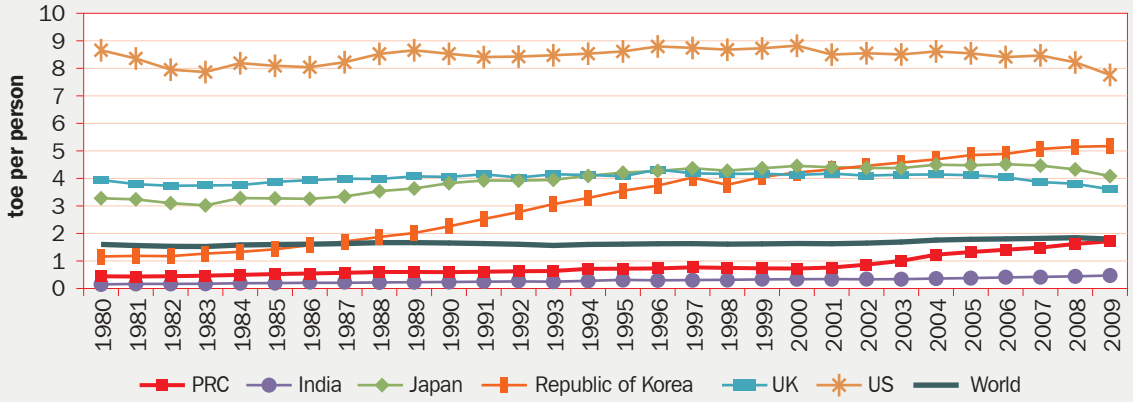
In 2009, PRC's total primary energy consumption was about 2.27 billion tons of oil equivalent (toe), five times the 1980 level, with coal accounting for 70%, crude oil 18%, natural gas 4%, and hydro, wind, and nuclear 8% (Figure 4.32). Although the total amount nearly matched the US—the world's top energy consumer in 2009 (IEA 2011)—in per capita terms, PRC's energy consumption remains below the world average (Figure 4.33). Rapid growth in energy consumption has occurred while

Figure 4.32 **PRC: Total primary energy consumption, 1980–2010**



Mtoe = million tons of oil equivalent, PRC = People's Republic of China.
Source: NBS, *China Statistical Yearbook* 2011.

Figure 4.33 **Per capita energy consumption, selected economies, 1980–2009**



PRC = People's Republic of China, toe = tons of oil equivalent, UK = United Kingdom, US = United States.
Source: US Energy Information Administration, *International Energy Statistics 2010*.

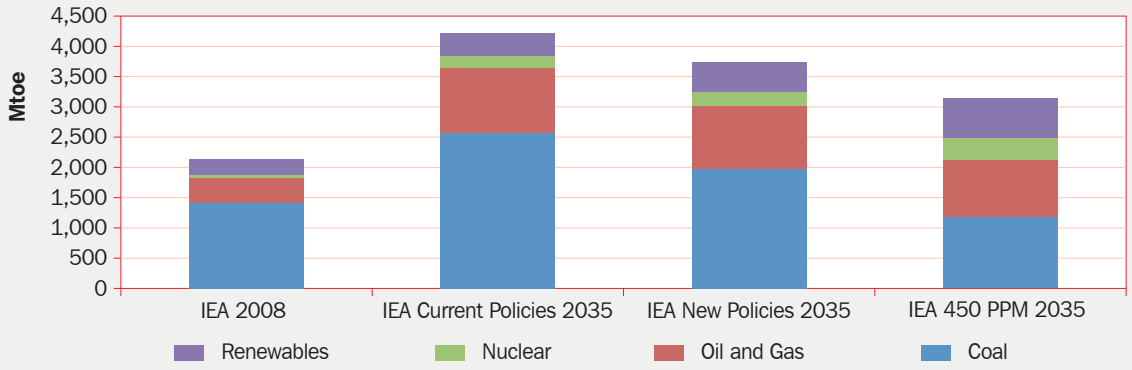
[17] A McKinsey & Company (2009a) study indicates that by 2030 PRC's annual water demand-supply gap could reach about 25% of total demand.

energy intensity has declined—from 0.85 toe in 1980 to 0.28 toe in 2008, per 1,000 GDP in constant 2005 PPP dollars. This is a significant achievement, thanks to increased efficiency and the structural shift of the economy from industry toward services. Despite this, energy intensity remains above advanced countries and the world average.

With abundant coal resources, the PRC has maintained a high level of energy self-sufficiency. In 2008, over 90% of its primary energy consumption was supplied from domestic production, compared with Japan (18%), US (75%), India (76%), and the average for members of the Organisation for Economic Co-operation and Development (OECD) (71%).[18] The country holds over 1,000 billion tons of coal resources—its proven recoverable reserves are the third-largest globally, behind the US and the Russian Federation (WEC 2010). In 2003, the Ministry of Land and Resources estimated economically viable coal reserves at 189 billion tons (MLR 2003, IEA 2009). In 2008, it produced and consumed about 3 billion tons of coal (NBS, *China Statistical Yearbook 2010*). At the same time, it has increasingly relied on oil and natural gas imports in recent years. In 2008, net oil imports topped 50% of total oil consumption.

The PRC needs to continue its strong growth in the coming decades to narrow the income gap with advanced economies. Its population, though aging, will increase until 2026. With urbanization accelerating, cities are expanding rapidly to accommodate a large number of migrants—therefore, energy demand will continue to expand. According to the International Energy Agency's World Energy Model projections, under its Current Policies Scenario (IEA 2010),[19] the PRC's total primary energy demand would double between 2008 and 2035, increasing from about 2,100 Mtoe to 4,215 Mtoe (Figure 4.34).[20] Coal is expected to remain the major source, supplying 61% by 2035, nuclear and renewables (hydro, wind, solar, biomass, and geothermal) are to increase, but

Figure 4.34 **PRC: Primary energy demand projection by scenario**



IEA = International Energy Agency, Mtoe = million tons of oil equivalent, PPM = parts per million, PRC = People's Republic of China.
Source: IEA, *World Energy Outlook 2010*.

[18] IEA, *World Energy Outlook 2010*.

[19] The IEA's Current Policies Scenario takes into account measures the PRC adopted by mid-2010 in pursuit of energy and environmental policies. It does not assume policy change beyond 2010.

[20] This is similar to projections by the Energy Research Institute of the China National Development and Reform Commission (NDRC 2009) under its Energy Conservation Scenario, which accounts for policies already introduced to conserve energy and reduce pollution, but without specific measures to move toward low carbon growth.

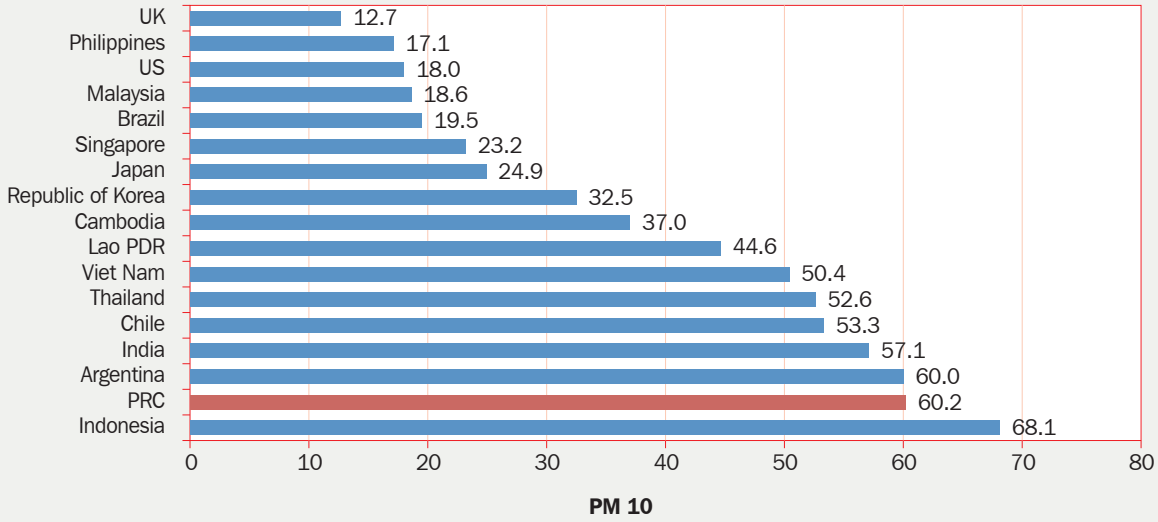
remain relatively small at about 13%, and 26% is to come from oil and natural gas.

This huge jump in energy demand could stress the PRC's energy system. According to IEA (2007), dependence on net oil imports could rise to 80% of total oil consumption by 2030, making it vulnerable to global oil supply disruptions and price shocks. The PRC's coal reserves are concentrated in the north and northwestern provinces, while demand centers are in southeastern coastal areas. Transport bottlenecks are already constraining coal production and will continue to limit future expansion. Inadequate power grid capacity and water availability (for thermal power plants and coal washing) in the north limit the coal-by-wire option.[21] Therefore, even with large coal reserves, supply will be increasingly constrained and face rising costs under the current energy consumption pattern. More policy actions are needed to further improve energy efficiency and develop new energy sources.

Environmental constraints

The PRC's current energy consumption pattern, especially the dominance of fossil fuels in the energy mix, is causing serious environmental problems. Extraction, processing, transport, and burning of coal and combustion of oil and petroleum products emit air pollution—such as sulphur dioxide (SO_2), nitrogen oxides (NO_X), carbon monoxide (CO), and particulate matter. It is estimated that 85% of SO_2 and 60% of NO_X emissions in PRC come from burning coal (Wang and Feng 2003). The country was ranked 148 of 179 countries in air pollution measured by PM10[22] in 2009, with the level of air pollution much higher than developed countries such as the UK, the US, Japan, and the Republic of Korea, upper-middle-income countries such as Malaysia, Brazil,

Figure 4.35 **Air pollution ranking by PM10, selected economies, 2009**



Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China, US = United States, UK = United Kingdom.
Note: Particulate matter concentrations refer to fine suspended particulates less than 10 microns in diameter (PM10) that are capable of penetrating deep into the respiratory tract and cause significant health damage. Data for countries are urban-population weighted PM10 levels in residential areas of cities with more than 100,000 residents. The estimates represent the average annual exposure level of the average urban resident to outdoor particulate matter. The state of a country's technology and pollution controls is an important determinant of particulate matter concentrations.
Source: World Bank, *World Development Indicators Online* (accessed August 2012).

[21] Coal-by-wire refers to the transmission of energy in the form of electric power generated from coal-fired power plants located near the mines to the market through high-voltage transmission lines.

[22] Fine suspended particulates less than 10 microns in diameter. The alternative measure is PM2.5—fine suspended particulates less than 2.5 microns in diameter.

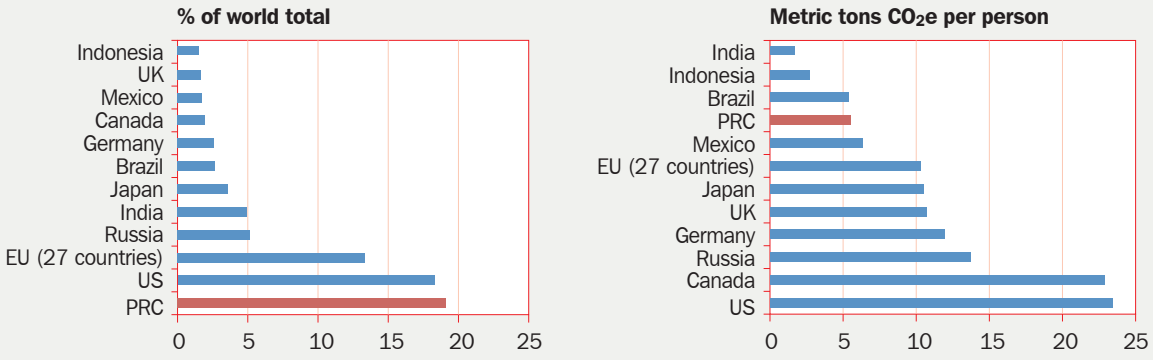
and Thailand, and low- or lower-middle-income countries such as the Philippines, Cambodia, the Lao PDR, and Viet Nam (Figure 4.35). Air pollution causes respiratory diseases, leads to acid rain, causes water pollution, and damages agriculture. A recent study estimates the annual health and environmental cost of coal use for the PRC is around $250 billion (Mao, Sheng, and Fang 2008). A study by the World Bank and PRC's State Environmental Protection Administration (2007) puts the costs of pollution—such as health care and labor, and land productivity losses—at 3.8% of GDP in 2005.

Aside from damaging the local environment, coal and oil use releases carbon dioxide (CO_2)—a greenhouse gas—into the atmosphere, contributing to global climate change. In 2009, the PRC emitted about 6.9 $GtCO_2$ [23] from energy consumption, mostly from coal (IEA 2010). The PRC may be the world's largest source of CO_2 emissions, although in per capita terms, its emission level is low (Figure 4.36). Climate change leads to rising temperatures and sea levels, increases extreme weather, affects water supply and agriculture production, causes coastal degradation, damages ecosystems, and endangers human health. According to Stern (2007), if the world continues BAU, climate change could cost the world an equivalent of up to 20% of GDP annually by 2200.

Given the potential damage to the environment of a coal-based energy structure, PRC authorities have recently taken significant measures to improve energy efficiency and develop clean and renewable energy sources. The government aims to reduce energy intensity by 17.3% and carbon intensity by 18% during its 12th Five-Year Plan.[24] It has committed to reducing the country's CO_2 intensity between 40% and 45% by 2020 relative to 2005, and to raising the share of non-fossil fuels in primary energy consumption to around 15% by 2020, under the Copenhagen Accord.[25] More recently, at the Conference of Parties 17 in South Africa, the PRC committed to the unprecedented Durban Platform—which will bring developed and developing countries together by 2015 under a common and legally binding global framework that becomes effective in 2020.

Under the IEA Current Policies Scenario, the PRC's energy-related CO_2 emission level is projected to reach 12.6 $GtCO_2$ in 2035, an increase of 6.5 $GtCO_2$ from the 2008 level (Figure 4.37). IEA (2010) has compared this with those under two alternative,

Figure 4.36 **Greenhouse gas emissions, 2005**



CO_2e = carbon dioxide equivalent, EU = European Union, PRC = People's Republic of China, UK = United Kingdom, US = United States.
Note: The countries in both charts are the top 12 globally in terms of total emissions. The PRC is ranked 84th and the US is 9th in the world in terms of emissions per person. Figures are for 2005, latest available.
Source: *World Resources Institute Database* (accessed July 2011).

[23] Gt = gigaton = 10^9 metric tons.

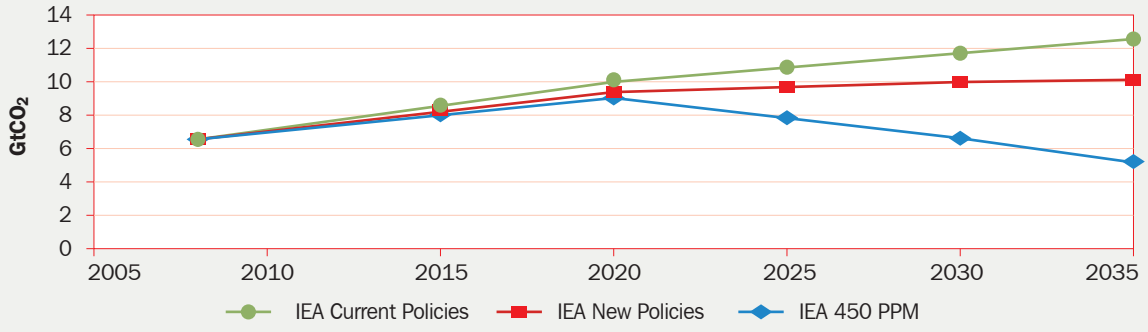
[24] National Development and Reform Commission, People's Republic of China (http://en.ndrc.gov.cn/).

[25] United Nations Framework Convention on Climate Change (http://unfccc.int).

greener growth scenarios—New Policies and 450 PPM—which incorporate policies specifically targeted at moving toward a low carbon and green economy. These include energy efficiency measures in power generation, industry, transport, buildings and appliances, increased use of clean fuel and renewable energy sources, a shift in economic structure from industry to services, and adoption of carbon capture and storage technology. The New Policies Scenario assumes that the PRC reduces CO_2 intensity by 40% by 2020 compared with 2005 (the lower end of its targeted range under the Copenhagen Accord) and continues this pace beyond 2020. The 450 PPM Scenario[26] assumes that the PRC reduces CO_2 intensity by 45% by 2020 compared with 2005 (the higher end of the targeted range under the Copenhagen Accord) and takes more aggressive mitigation measures than under the New Policies Scenario. Under these two scenarios, energy-related CO_2 emissions would reach 10.1 $GtCO_2$ and 5.2 $GtCO_2$, respectively, in 2035.

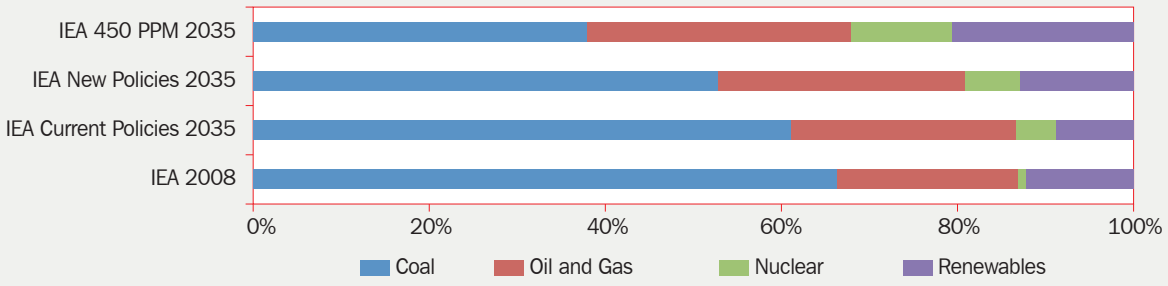
Primary energy demand and supply composition will look very different in these low carbon, greener scenarios from the Current Policies Scenario and the current energy consumption pattern (Figure 4.38). Under the New Policies Scenario, total primary energy consumption would be 3,736 Mtoe in 2035, with coal accounting for about 53%, nuclear and renewable energy 19%, and oil and gas 28%. Under the 450 PPM Scenario, total primary energy consumption would be 3,131

Figure 4.37 **PRC: Energy-related CO_2 emission by scenario, 2005–2035**



CO_2 = carbon dioxide, $GtCO_2$ = gigatons of carbon dioxide, IEA = International Energy Agency, PPM = parts per million, PRC = People's Republic of China.
Source: IEA, *World Energy Outlook 2010*.

Figure 4.38 **PRC: Composition of total primary energy consumption in 2035 under IEA scenario**



IEA = International Energy Agency, PPM = parts per million, PRC = People's Republic of China.
Source: IEA, *World Energy Outlook 2010*.

[26] Globally, this scenario is consistent with global requirements to stabilize atmospheric CO_2 concentration, thus curbing the rise in global temperatures to relatively safe levels.

Mtoe in 2035, with coal accounting for 38%, nuclear and renewable energy 32%, and oil and gas 30%.

Going green, especially under the 450 PPM scenario, creates a significant financing challenge. According to IEA (2010), moving from its Current Policies Scenario to 450 PPM scenario would cost the PRC about $70 billion per year by 2020 (about 1.3% of PRC's 2010 GDP) due to incremental investments in low-carbon technologies and energy efficiency, increasing to over $300 billion per year by 2035 (or about 5.6% of the PRC's 2010 GDP). Other studies show similar ranges of estimates of financing needs (Table 4.7).

While moving toward greener growth involves costs, it also brings significant benefits. First, according to McKinsey & Company (2009b), energy efficiency improvement measures—often called "win–win" options—would generate significant energy savings, offsetting much of the cash outlay for required incremental capital investments, especially in the early years. Second, the PRC will benefit significantly from green growth in terms of avoided damage from climate change. According to an ADB study on the economics of climate change in Northeast Asia (forthcoming), if the world continues as BAU, climate change could reduce PRC's GDP by 6.4% each year by 2100—close to the global average, compared with a no-climate change scenario.[27] Third, green growth will create better local air quality and quality of life. According to IEA (2010), moving from the Current Policies Scenario to 450 PPM scenario could reduce both SO_2 and NO_X emissions by 35% and particulate matter by 17%. Life-years lost due to exposure to anthropogenic emissions of PM2.5 would be reduced 23% by 2035. Fourth, green growth contributes to energy security and sustainability. Last, but not least, green growth creates new engines of growth and business opportunities. The PRC is now among the world's leader in wind and solar photovoltaic installation, and there is vast potential for future growth. Furthermore, the PRC could become the world's largest market for electric vehicles in the coming decades, benefiting its automobile manufacturers.

Over the coming years, the PRC will continue constructing new power plants, new industrial plants, and new commercial and residential buildings. Therefore, there is a strong case for an early green transition to avoid inefficient future lock-ins. This can allow a successful transformation to a clean, energy secure, and efficient economy, and ultimately move the country onto a sustainable growth trajectory. Mobilizing the sizable financing required, however, poses a great challenge.

Table 4.7 **PRC: Estimates of incremental investment required for green transition, selected studies**

	IEA	UNDP	NDRC	McKinsey & Company
Total CO_2 abatement (from the reference scenario), $GtCO_2$	1.0 in 2020 7.4 in 2035	3.2 in 2020 5.1 in 2035	2.0 in 2020 3.7 in 2035	6.7 in 2030
Annual incremental investment, constant $ billions	70 in 2020 310 in 2035	86 in 2020 269 in 2030	150 in 2010–2020 240 in 2020–2050	200–260 in 2010–2030
Annual incremental investment as a share of PRC total GDP in 2010, %	1.3 in 2020 5.6 in 2035	1.6 in 2020 4.9 in 2030	2.7 in 2010–2020 4.4 in 2020–2050	3.5–6.6 in 2010–2030

CO_2 = carbon dioxide, GDP = gross domestic product, $GtCO_2$ = gigatons of carbon dioxide, IEA = International Energy Agency, NDRC = National Development and Reform Commission, PRC = People's Republic of China, UNDP = United Nations Development Programme, US = United States.
The reference scenario is similar to IEA's Current Policies Scenario.
Sources: IEA, *World Energy Outlook 2010*; UNDP (2010), NDRC (2009), and McKinsey & Company (2009b).

[27] The PRC is vulnerable to many climate risks. Coastal provinces and large cities face a rise in sea levels and storm surges, while inland regions must cope with more variable climate change resulting in too much or too little water for agriculture and households. Rising temperatures will increase economic burdens, ranging from health risks to higher demand for cooling energy.

International cooperation based on common but differentiated responsibilities is the key.

4.6. Challenging external economic environment

The PRC's economic rise has profoundly changed its economic relations with the external world, especially its key trading partners. Before economic reform, the PRC was a small, closed economy with little global exposure. Today, as a large open economy, its impact on other countries will continue to increase, not only within the region but on the world's largest economies as well. At the same time, the center of economic power in the global economy is shifting. Combined, this will make the PRC's external economic environment more and more challenging with implications for its economy and growth prospects. The discussion below focuses on external demand and trade friction.

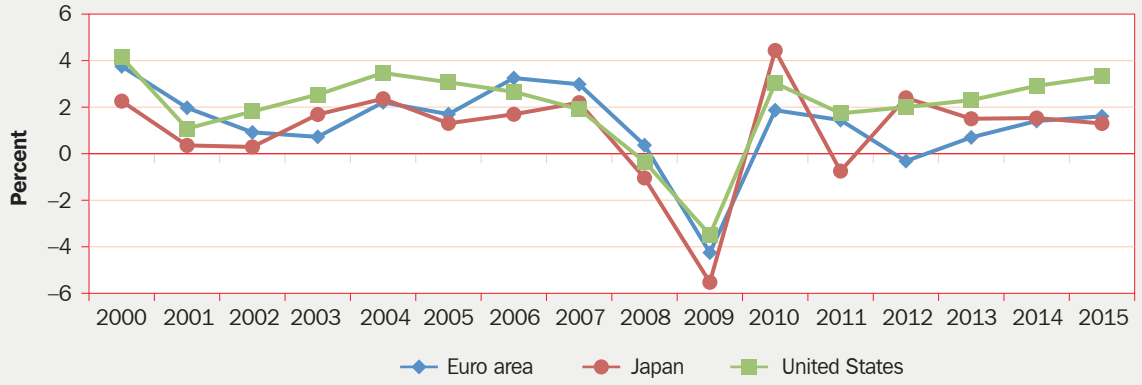
External demand

External demand has been a major source of the PRC's GDP growth. During 2000–2010, net exports contributed 1.9 percentage points to its annual average growth of 10.3% (see Figure 4.10), as evidenced by large current account surpluses—especially with the US and the EU. In 2010, the PRC accounted for 52% of the total US trade deficit. However, as the global economic structure evolves, the PRC may not be able to rely as much on net exports to developed markets as a source of growth as in the past. The slow pace of the US recovery from the 2008–2009 global financial crisis and the current eurozone crisis means that export demand from developed markets will remain weak in the foreseeable future (Figure 4.39). To sustain growth, the PRC will need to rely more on domestic demand and find new demand sources in emerging markets both within and outside Asia. In the longer term, this trend will likely be reinforced by a shifting of the center of gravity of the global economy from North to South and from West to East.

Trade friction

The PRC's rising share of exports in world markets have created some friction with both developed and developing countries. The PRC and most of its trading partners are members of the World Trade Organization (WTO)—and are thus obliged to follow WTO rules on equal treatment, openness, and production and trade subsidies. But disputes—often related to issues involving subsidies, the exchange trade, intellectual property rights, and market access—and retaliatory measures have been growing. Between 2008 and 2010, the PRC was the world's top target for discriminatory

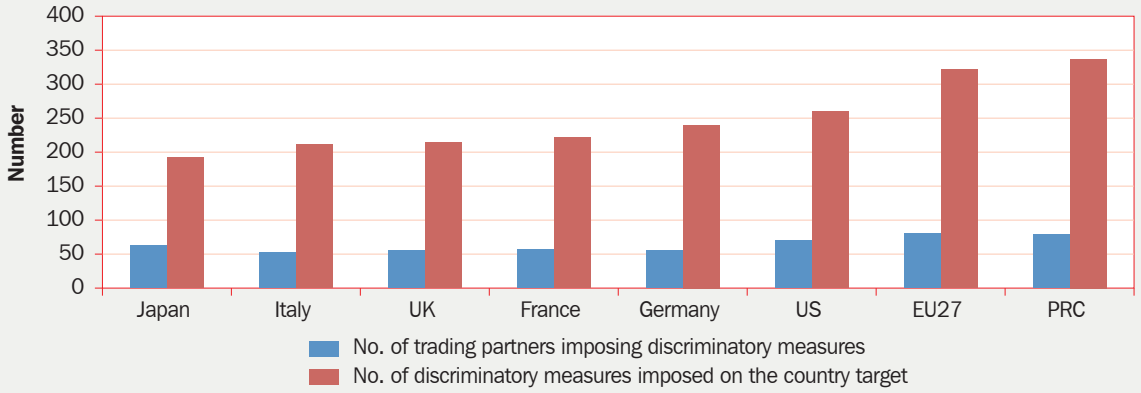
Figure 4.39 **Growth rates and projections for major industrialized economies, 2000–2015**



Sources: IMF (2012a, 2012b), *World Economic Outlook* Database.

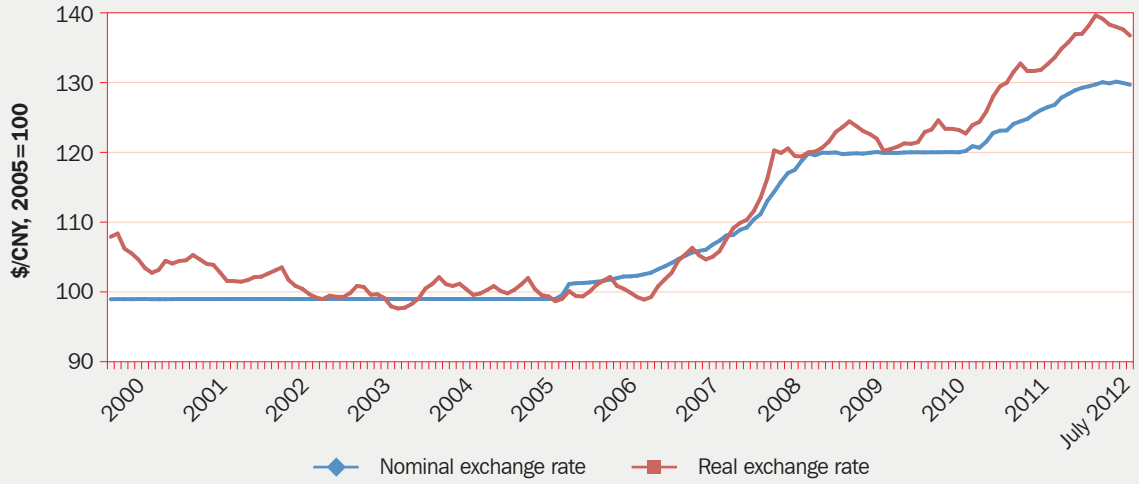
trade, with 337 measures imposed by 79 countries (Figure 4.40). The PRC's large current account surplus has frequently been cited as a major source of global payments imbalances. While the yuan has appreciated by close to 40% against the US dollar in real terms since June 2005 (Figure 4.41), it continues as a source of tension with global trading partners. Trade frictions hurt the PRC, its trading partners, and the global economy in general. While some friction is unavoidable, the PRC and its trading partners should prevent frictions from escalating into trade wars.

Figure 4.40 **Top 8 target economies for discriminatory measures, 2008–2010**



EU27 = European Union, PRC = People's Republic of China, UK = United Kingdom, US = United States.
Source: Data from Evenett (2010).

Figure 4.41 **CNY–US dollar exchange rate index, 2000–2012**



CNY = Chinese yuan, US = United States.
Source: IMF (2005 and 2011), *International Financial Statistics Yearbook*; ADB staff estimates.

5. How the PRC can avoid the middle-income trap: Policy options

The PRC graduated from low to middle income in 1998 and has, until very recently, continued to generate annual growth rates close to double digits. However, technology and productivity gaps with advanced economies remain large. To attain high-income status, the PRC needs to continue to grow strongly and to narrow these gaps. The country's rapid growth in the past 3 decades has benefited greatly from its low-cost advantage. But with rising wages and population aging, growth needs to be increasingly driven by productivity improvement through innovation, upgrading, and transition from low-cost to high-value production. At the same time, incomplete reform, compounded by rapid growth, has created various forms of economic imbalances, and contributed to rising inequality. If not addressed, these could become binding constraints to sustained growth (ADB 2011e).

Based on this analysis, to avoid the middle-income trap, the PRC needs a new development strategy that would allow it to grow beyond the low-cost advantage and help its transformation into a high-value economy. This strategy should have the following pillars: (i) stepping up innovation and upgrading; (ii) deepening structural reforms, in particular reforms of enterprises, labor and land markets, the financial sector, and the fiscal system; (iii) developing services and scaling up urbanization; (iv) maintaining macroeconomic and financial stability; (v) making growth inclusive; (vi) promoting green economy; and (vii) strengthening international and regional economic cooperation. Each of these pillars is critical and forms an integral part of the strategy:

- Innovation and upgrading are necessary for continued productivity growth to narrow technological and income gaps; they also enable firms to pay higher wages, which in turn increase household income, consumption, and help reduce imbalances.

- Enterprise reform is critical for supporting innovation and upgrading; factor market reform is essential to reduce and eliminate barriers to factor mobility and factor price distortions that contribute to imbalances and income inequality; while fiscal reform is needed to align the role of government within a market economy.

- The development of services provides a new source of growth, reduces supply side imbalances and, together with urbanization, generates greater urban employment opportunities; this in turn pushes up wages, absorbs more rural labor, increases household income and consumption, and reduces income inequality.

- Finally, a stable macroeconomy, social inclusion, a clean environment, and harmonious external economic relations are essential for sustaining the PRC's long-term growth.

In sum, the PRC needs a development strategy that tilts the balance from low-cost to high-value

production; from reliance on government to the use of market and competition; from investment to private consumption; from external to domestic demand; from targeting growth alone to both growth and distribution; and from a development-centric approach to one that matches development with environmental protection. The broad policy directions and options for each of these strategic priorities are discussed below. Many of the policy directions and options discussed below are already included in the PRC's 12th Five-Year Plan. For these, the critical issue is how to ensure effective implementation (ADB 2011d).

5.1. Stepping up innovation and upgrading

While the PRC is now referred to as the "workshop of the world"—due to the enormous quantity of goods produced, it remains the "assembler" or "processor" of the world. As the PRC's wages grow rapidly, coupled with population aging, its low-cost advantage will gradually erode. To remain competitive, it needs to move up the value chain. This requires continuously upgrading industries and services through innovation. The PRC should seek to become the world's "designer," "innovator," and "brand producer." To achieve these goals, the following policy measures could be considered.

Strengthening enterprise incentives for innovation

Enterprises are the drivers of innovation. The PRC needs to further strengthen incentives and build the capacity of enterprises to carry out indigenous innovation, while continuing to acquire foreign technologies. Different types of enterprises face different challenges, and require different solutions.

- SOEs are large, have easier access to credit, and possess more resources required for innovation. But they need better incentives due to corporate governance weaknesses and because in many cases they face limited competition. For these enterprises, the solution is to (i) expose them to greater market competition; (ii) reduce direct government intervention; (iii) put in place an effective corporate governance system, and (iv) make them truly commercial (see more discussion below).

- While private-owned enterprises have stronger incentives than SOEs, they are in general smaller in size[28] and have greater difficulty accessing credit.[29] Private firms must also compete against SOEs for talented workers and often lose out as state firms are seen as providing more stable employment.[30] The policy priorities for these enterprises are to (i) create an environment for them to compete with SOEs on an equal footing, especially in market access, finance, and taxation; (ii) encourage and support them to strengthen corporate governance and build innovation capacity; (iii) improve rules for mergers and acquisitions (M&A) to facilitate enterprise restructuring and expansion; and (iv) promote public–private partnerships in innovation.

- For foreign-invested enterprises, the main policy focus should be to allow equal treatment alongside domestic firms, promote fair competition, and address other concerns such as intellectual property rights protection.

Building a conducive environment for innovation

Because of market failures such as information and coordination externalities that deter innovation, the government has an important role to play in building an environment that supports innovation

[28] In 2009, the average size of industrial SOEs was eight times larger by number of employees, 11 times larger by gross output value, and 29 times larger by total assets compared with domestic private firms (NBS, *China Statistical Yearbook 2010*).

[29] SOEs are preferred borrowers for the large state-owned banks that dominate the financial landscape. For instance, private enterprise surveys show that in mid-2007, of the total outstanding loans by the five largest commercial banks, only 12% went to SMEs (http://www.bankloan51.com/a/qiyedaikuan/2011/0320/152.html). Private enterprises also pay higher interest rates than SOEs. The average rate paid by private firms in 2001–2005 was 4.53% compared with 2.55% for SOEs (Ferri and Liu 2010).

[30] For example, a recent survey of university graduate career planning in Tianjin shows 51% of respondents favored SOE employment, against 20% who aspired to join large private companies (http://henan.people.com.cn/news/2011/01/12/520535.html).

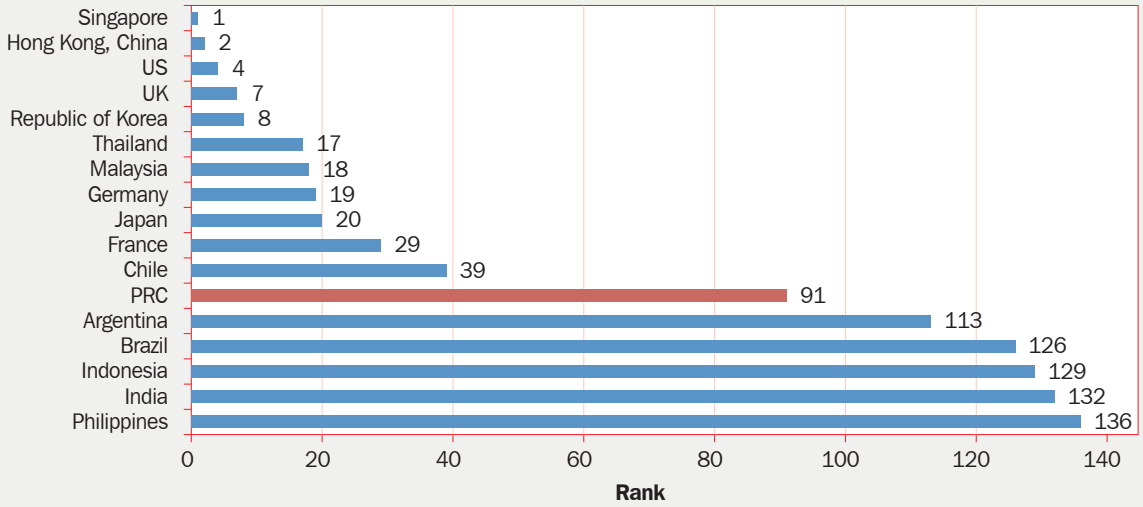
and addresses market failures. The following priorities could be considered:

- *Further strengthening market mechanisms to ensure fair competition, protect private property, effectively enforce contracts and encourage commercial trusts, and make the bankruptcy system work better.* According to the World Bank's latest Ease of Doing Business survey, the PRC ranked 91, far behind the Republic of Korea (8), Thailand (17), and Malaysia (18). The PRC's low score was mainly due to concerns over starting a business, construction permits, investor protection, and paying taxes (Figure 5.1).

- *Further stepping up public support for basic science and technology research.* Research and development (R&D) as a percentage of GDP almost tripled in the PRC to 1.5% in the 11 years to 2007, but remains much lower than the level in most developed countries, including the Republic of Korea and Japan (Figure 5.2). The PRC fell short of its own target of 2% set out in the 11th Five-Year Plan, achieving a level of 1.8% only by the end of the plan period. Notably, the 12th Five-Year Plan (2011–2015) has set a R&D expenditure target at 2.2% of GDP (BBVA Research 2011).

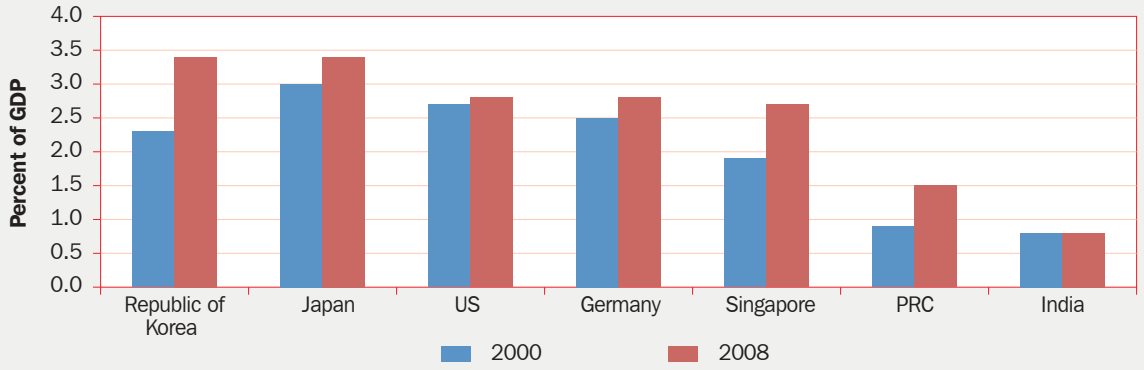
- *Gearing the use of industrial policy toward supporting the development of new industries, new products, and new technologies.* The PRC has used a variety of industrial policy tools to support innovation and manufacturing. A recent study on the PRC finds that industrial policy is effective in raising TFP and spurring product innovation, especially when sectors exhibit a high degree of competition (Aghion et al. 2011). As the market becomes better established and the private sector grows, industrial policy should shift toward supporting development of new industries, new products,

Figure 5.1 **Ranking in ease of doing business, selected economies, 2011**



PRC = People's Republic of China, UK = United Kingdom, US = United States.
Note: Chart shows selected countries from a total of 183 countries. A lower number means the regulatory environment is more conducive to starting and operating a local firm. This index averages the country's percentile rankings on 10 topics (starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency), giving equal weight to each.
Source: *The World Bank Doing Business* website (accessed January 2012).

Figure 5.2 **R&D expenditure, selected economies, 2000 and 2008**



R&D = research and development, PRC = People's Republic of China, US = United States.
Note: Latest available data for Germany (2009) and India (2007).
Source: World Bank, *World Development Indicators Online* (accessed August 2012).

and new technologies—where market failure is particularly prevalent.[31] Risk financing instruments such as venture capital could be developed to support innovation.

- *Further strengthening intellectual property rights protection.* Intellectual property rights protection in the PRC has improved in recent years. But compared with most high-income countries and some middle-income countries, it has much room for improvement. The *Global Competitiveness Report 2011–2012* of the World Economic Forum (2011) ranked the PRC's intellectual property protection at 4 on a scale of 1–7 with 1 very weak and 7 very strong, which is 47th, below most OECD countries and some middle-income countries such as South Africa (30), Malaysia (31), and Sri Lanka (44).

Investing in human capital and moving toward a knowledge-based economy

Innovation and industrial upgrading need to be supported by a large pool of high quality human capital. The PRC has made significant progress in human capital development during the last 30 years. However, there are still large gaps compared with advanced countries and some middle-income countries. In 2010, the average year of schooling of the PRC adult population was estimated at 8.2, lower than Malaysia (10.1), Japan (11.6), and the Republic of Korea (11.8) (Table 5.1). The PRC's tertiary gross enrolment rate was 24.3% in 2009, while 37.5% for Malaysia, 46.2% for Thailand, 59% for Japan, and 100% for the Republic of Korea. Relative to the size of its labor force, the number of scientists and engineers in the PRC is substantially below developed country levels. In 2005, for example, the PRC had 14 scientists or engineers for every 10,000 people, compared with 76 in the Republic of Korea and 102 in Japan. The PRC public spending on education was 3.6% of GDP in 2009, also lower than Malaysia (5.8%), the Republic of Korea (5.0%), and the US (5.4%).

To raise the level of human capital, the PRC could consider several policy measures: (i) further increasing public spending on education as a share of GDP to narrow the gaps in various key human capital indicators with advanced countries and other middle-income countries; (ii) reducing the gaps in tertiary education enrollment, at the same time expanding vocational and technical education to improve the quality of the labor force and reduce or avoid skills mismatches; (iii) pursuing education reform to improve efficiency and quality, and introducing university teaching and research performance evaluation systems to incentivize teachers and

[31] The 12th Five-Year Plan (2011–2015) targets seven strategic emerging industries—clean energy, clean energy technology, clean energy vehicles, next-generation information technology, biotechnology, high-end equipment manufacturing, and new materials.

Table 5.1 **Comparative performance on human capital attainment, selected economies, various years**

	Secondary enrolment (% gross)	Tertiary enrolment (% gross)	Public spending on education (% of GDP)	Average year of total schooling, 2010	No. of scientists and engineers (per 10,000 pop.)
Argentina	88.5 (2009)	71.2 (2009)	6.0 (2009)	9.3	–
Brazil	105.8 (2005)	25.6 (2005)	5.7 (2009)	7.5	–
Chile	87.9 (2009)	59.2 (2009)	4.5 (2009)	10.2	–
PRC	81.2 (2010)	25.9 (2010)	3.6 (2009)	8.2	14 (2005)
India	63.2 (2010)	17.9 (2010)	3.0 (2008)	5.1	–
Indonesia	77.2 (2010)	23.1 (2010)	3.0 (2010)	6.2	–
Japan	102. (2010)	59.7 (2010)	3.8 (2010)	11.6	102 (2004)
Republic of Korea	97.1 (2010)	103.1 (2010)	5.0 (2009)	11.8	76 (2005)
Malaysia	68.3 (2009)	40.2 (2009)	5.8 (2009)	10.1	–
Philippines	84.8 (2009)	28.9 (2008)	2.7 (2009)	9.0	–
Thailand	79.2 (2011)	47.7 (2011)	3.8 (2010)	7.5	–
US	96.0 (2010)	94.8 (2010)	5.4 (2009)	13.1	91 (2002)

"–" means data not available, GDP = gross domestic product, PRC = People's Republic of China, US = United States.
Sources: World Bank, *World Development Indicators Online*; Barro-Lee Educational Attainment dataset; NBS, *China Statistical Yearbook 2010* and NBS, *China Statistical Yearbook on Science and Technology 2007* (all accessed January 2012).

researchers to improve teaching and research quality; (iv) strengthening links and interaction between universities, research institutes, and enterprises and markets to provide more students with both marketing and innovation capacity, and increasing the rate of marketization of R&D; (v) encouraging private sector participation in providing education and further strengthening international cooperation and education exchange; and (vi) increasing education spending in poor areas, and expanding compulsory education in lagging regions.

5.2. Deepening structural reform

Despite significant progress over the last 3 decades, the PRC's transition toward a market economy is far from complete. First, although the private sector has grown rapidly and SOE performance has improved in recent years, the agenda for enterprise reform remains long. In particular, SOEs face limited competition with many less efficient or profitable than their private counterparts. At the same time, private enterprises face significant barriers to market entry and constraints in accessing credit and other production factors. Continued enterprise reform is critical if the PRC is to rely more on efficiency enhancement and technological innovation as drivers of productivity growth. Second, while product market reform is well advanced, factor market reform has lagged behind. Continued reliance on administrative intervention has restricted the mobility of labor, capital, and other production factors and distorted factor prices. This leads to inefficient resource allocation and utilization, contributes to structural imbalances and rising income inequality, and creates scope for rent-seeking. Third, the PRC will need further fiscal reform as the role of government shifts toward providing public goods and services and addressing market failures as opposed to direct intervention. Deepening structural reform means taking further steps in reforming enterprises, factor markets (labor, capital, and land), and the fiscal system.

Enterprise reform

SOE reform in the PRC, especially since the late 1990s, has largely involved privatizing small- and medium-sized enterprises through selloffs or management buyouts. Large SOEs have remained under sole state ownership or became publicly listed companies with the state controlling the majority ownership. As a result, in terms of the number of enterprises, the share of SOEs in industry has declined significantly—from 38% in 1999 to about 4% in 2010.[32] By other measures, however,

[32] Refer to those with annual revenue from principal business over CNY5 million.

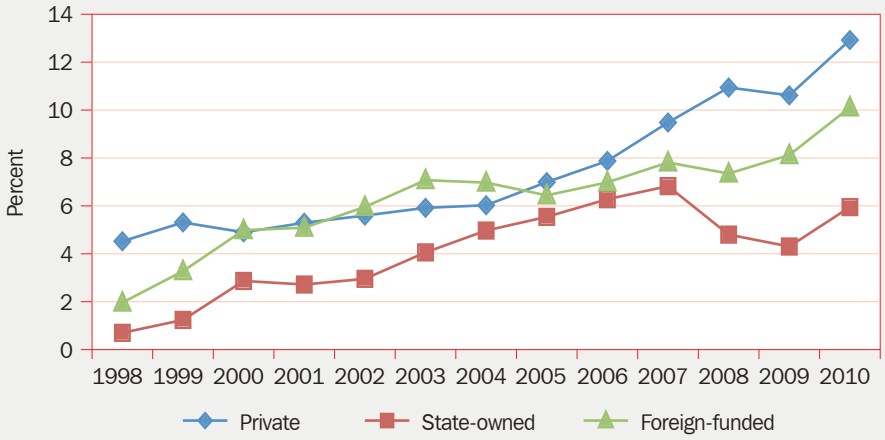
SOEs still control a large part of the economy. In 2010, SOEs produced 27% of total gross industrial output, owned 42% of total assets, and employed 19% of the industrial labor force. SOE performance has improved in recent years. But they are less profitable than private firms and do not perform as well as non-SOEs in terms of TFP growth (Box 5.1).

The broad direction of enterprise reform includes the following. The first is to promote the development of the private sector by leveling the playing field so that it can compete equally with SOEs. This requires reducing or eliminating entry barriers in many sectors and discrimination in areas such as access to credit faced by private firms. The second is to strengthen SOE corporate governance, including moving toward a system where the arm's length control by the government is supported by robust auditing, monitoring and performance evaluation. SOE executives should be recruited through the market on the basis of individual merit. Many SOEs are now

Box 5.1 **Performance of PRC firms by ownership**

Although the financial performance of state-owned enterprises (SOEs) has improved in recent years, as a whole they are much less profitable than private and foreign firms (Figure B5.1-1). The gap narrowed in the mid-2000s, but has widened again recently. In 2010, the industrial SOE average rate of return on assets was less than half that of private firms, and three-fifths of that of foreign firms. Data from recent industrial enterprise surveys suggest that SOE profitability was much lower than non-SOEs regardless of whether SOEs in public utilities—electricity, water, and gas supply—were excluded or not (as they are subject to administrative pricing) (Xu 2011). Further, there is a statistically significant positive correlation between SOE financial performance and sector dominance—those with larger SOE dominance generally are more profitable, suggesting SOEs may profit from being monopolies. This correlation is insignificant among non-SOEs.

Figure B5.1-1 **PRC: Rate of return on assets by firm ownership, 1998–2010**



PRC = People's Republic of China.
Source: NBS, *China Statistical Yearbook.*

Empirical studies show that SOEs do not perform as well as non-SOEs in terms of productivity growth either. SOEs were 27% less productive than their private sector counterparts and their annual total factor productivity (TFP) growth was 4.6 percentage points lower, according a study covering 336,768 PRC firms (Brandt, van Biesebroeck, and Zhang 2011). Chen et al. (2010) found that of 37 industrial subsectors, the five with the lowest TFP growth between 1981 and 2008 were dominated by SOEs. These include gas, water, petroleum, electricity, and the extraction of petroleum. In four of the subsectors, TFP contracted over the period.

listed on stock exchanges. The PRC could further increase the proportion of SOE shares held by the general public to make them truly publicly-listed companies. The third is to strengthen regulations for natural monopolies, such as public utilities, to prevent them from extracting monopolistic rents. Special bodies can be set up to regulate price setting and service quality.

Labor market reform

Labor market reform could focus on two specific areas. The first is to reform the *hukuo* system with a view to integrating the labor market by reducing barriers to labor mobility especially from rural areas and the agriculture sector to urban areas and nonagriculture sectors. This principally involves granting migrant workers equal access to social services and welfare entitlements (health, education, and housing) currently enjoyed by registered urban residents. In recent years the PRC has introduced pilot programs in reforming the *hukuo* system in some cities. This could provide useful lessons for nation-wide *hukuo* system reform.

The second key area is to further improve and expand the coverage of labor market institutions—such as employment protection legislation, minimum wages, collective bargaining, and unemployment insurance—to better protect the basic rights of workers without imposing excessive costs on businesses or disrupting job creation. The PRC has moved toward a "flexicurity model" of labor market governance. This model combines flexibility (easy hire-and-fire laws that reduce retrenchment burdens on firms) with security (unemployment benefits, active retraining, and incentives to return to work), aimed at protecting the worker, not the job (Vanderberg 2008).[33] Going forward, the priorities are to ensure a proper balance between flexibility and security and to make the model cover the entire labor force.

Financial sector reform

Over the past 3 decades, the PRC has created many of the institutions needed for a modern financial system. However, financial sector reform is widely considered to lag behind reforms in other sectors. The financial sector remains dominated by state-owned banks, with administrative intervention in credit allocation and controlled interest rates distorting capital allocation, providing low returns to investors and savers, and contributing to excessive investment and structural imbalances. Rural households and micro-, small- and medium-sized enterprises (MSMEs) are underserved by the financial system. Capital markets (bond and equity) remain underdeveloped and are inadequate for long-term and risk financing. Further, weak corporate governance and lax internal control and risk management practices expose the economy to potentially significant financial risk. If the PRC is to rely more on efficiency, improved productivity, and innovation as sources of growth, it is critical that it deepens financial sector reform.

Priorities include (i) making the financial sector and financial intermediation more market-based—this means allowing demand and supply to play a greater role in determining interest rates, opening up the financial sector to private sector participation, and making state-owned banks truly commercial entities; (ii) enhancing financial safety by further strengthening regulation and supervision of financial institutions and establishing an effective financial safety net—including mechanisms for debt resolution and deposit insurance; (iii) further developing capital markets, including those for interbank lending, corporate bonds, equities, contractual savings, and financial futures and derivatives; (iv) broadening access to finance, especially by MSMEs and the rural households, and promoting financial inclusion; (v) making the exchange rate more flexible; and (vi) creating conditions for greater capital account liberalization (see Box 5.2).

[33] In a fast-changing globalized economy, few can expect to keep the same job for life. See Vandenberg (2008) for a survey of a "flexicurity" model for labor markets.

Box 5.2 **Priorities of financial sector reform in the PRC**

The priorities for deepening financial sector reform in the People's Republic of China (PRC) include the following:

Making finance and financial intermediation more market-based. In the case of interest rates, while interbank lending rates and bond yields are now largely determined by market demand and supply, commercial bank lending and deposit rates remain controlled by government—despite recent measures that introduced some flexibility. Greater flexibility in setting commercial bank interest rates could be introduced and—when specified conditions are met—interest rates, especially deposit rates, could ultimately be determined by the market. For financial institution reform, the broad direction is to make state-owned bank operations more commercially oriented by reducing administrative interventions, while simultaneously improving corporate governance. Private sector participation in banking should be supported, and a level playing field should be provided so private banks can compete with state-owned banks on an equal footing.

Enhancing financial safety. Further strengthening the regulatory and supervisory environment for financial institutions and establishing an effective financial safety net are among the needed reforms. The PRC has built a basic regulatory framework for the financial sector—the central bank sets and implements monetary policies and manages foreign reserves, while three regulatory bodies are responsible for regulating (i) deposit-taking financial institutions, asset management companies, and trust and investment companies; (ii) capital markets; and (iii) the insurance sector, respectively. The government could examine how the coordination among the four bodies can be further improved and institutionalized, as there are strong links between subsectors. At the same time, more effort is needed to enhance internal control and risk management systems of financial institutions, strengthen prudential monitoring, and further raise standards for disclosure, financial reporting and auditing. An effective financial safety net should also include facilities to support financial institutions that are solvent but face liquidity problems, mechanisms for debt resolution and workout, and deposit insurance schemes.

Developing capital markets. The PRC's financial sector is dominated by banks. While stock market capitalization is sizable, money market, bond market (especially corporate bonds), and the contractual savings industry are underdeveloped. Underdeveloped capital markets contribute to the misallocation of resources as larger enterprises—that otherwise might seek financing through capital markets—are relying more on banks, crowding out lending to private enterprises, especially, micro-, small-, and medium-sized enterprises (MSMEs). It also constrains corporate access to long-term as well as risk (for innovation) financing. Policy options include strengthening legal and regulatory frameworks, prudential monitoring, and enforcement to ensure financial safety; improving the quality of companies by strengthening disclosure and compliance, corporate governance, and encouraging merger and acquisition (M&A) activities; developing and improving capital market infrastructure—such as trading and settlement systems and credit rating agencies; increasing the range of financial products and services available, and promoting financial innovation while ensuring financial safety; fostering market competition; and investing in human capital.

Broadening access to finance and promoting financial inclusion. Like most developing countries, MSMEs and rural households in the PRC face severe constraints in accessing finance. This affects both growth and social inclusion. The government has taken a range of initiatives in recent years to support MSMEs and rural financing, including encouraging the establishment of special business units for MSME financing in financial institutions, supporting policies such as risk compensation for MSME financing and various tax and regulatory concessions, establishing a range of credit guarantee systems, and more recently, establishing SME boards on stock exchanges, policies to establish microcredit companies to serve mainly rural areas, and piloting financial reform in Wenzhou of Zhejiang Province to improve access to finance by MSMEs. While continuing efforts to promote financial inclusion and experimenting on new schemes, it is also critical for the government to review and put in place the adequate legal and regulatory framework needed to ensure that microfinance and microcredit institutions are well-governed and will not create systemic risks to the financial system as a whole.

Making the exchange rate more flexible. In recent years, the PRC's exchange rate has become more flexible, with both the current account and trade account surpluses declining. The government adopted the managed float with reference to a basket of currencies in July 2005, and more recently took steps to increase two-side exchange rate movements, including increasing the daily trading band. The PRC should further increase exchange rate flexibility.

continued on next page

Box 5.2 continued

Creating conditions for greater capital account liberalization. The PRC has taken a cautious approach to opening up its capital account. Over the years, the government reduced restrictions covering cross-border capital flows, especially for inward foreign direct investment (FDI). But it has maintained control over outward FDI, debt financing, real estate investment, and portfolio investment. These have helped the PRC maintain financial stability and avoid financial crises. The government is committed to further liberalizing its capital account given the significant benefits that can accrue—lowering the costs of capital for corporations, increasing portfolio diversification for investors, and promoting financial sector development that in turn boosts productivity in the real economy. Also, capital account convertibility is a prerequisite for internationalizing the yuan. But these policies must also recognize the risks associated with liberalization when the domestic financial system remains weak. The PRC should continue efforts to strengthen its domestic financial system to create conditions for greater capital account liberalization.

Sources: ADB (2012c), World Bank and DRC (2012), Wu (2011).

Land reform

An efficient and equitable land system is critical to promote agricultural investment and productivity, food security, optimal allocation of scarce land resources, reduction of urban/rural income gaps, maintaining social equity and stability, promoting urbanization, and the PRC's long-term growth. Authorities need to tackle a number of issues to make the land system more efficient and equitable, especially in rural areas.[34]

One priority is to develop the rural land market and make it work better. The Law on Land Contract in Rural Areas gives rural households rights to sell and resell land-user rights. While the market has been growing, transaction volumes remain low. Measures to support development of the rural land market include further strengthening and clarifying the legal framework and developing market institutions and services, such as surveyors and valuation, brokerage, land exchanges, and mechanisms for dispute resolution.

Another priority is to make land acquisition by local governments for urban use fairer and transparent. The current system gives the local government large powers to acquire agricultural land for urban development at prices far below market levels. While this has provided a key source of local government finance in recent years (as the government can sell the land-user rights at market prices), it has also increasingly become a source of social tension. The PRC needs a fairer and more transparent system for converting agricultural land for urban use to protect the interests of the rural population on one hand, and not to constrain urban development on the other.

Fiscal reform

The PRC has undergone significant fiscal reforms in recent years, helping build a solid fiscal position. Further reforms are needed, however, in view of the needs for aligning the fiscal system with the evolving role of government, for ensuring fiscal sustainability and stability, and for improving fiscal efficiency and equity. The PRC could consider several reform measures in fiscal spending, revenue mobilization, central/local government relations, and budgetary management, among others.

Composition of fiscal spending. As the PRC's transition toward a market economy deepens, there will be a need for shifting the focus of fiscal spending more toward providing public goods

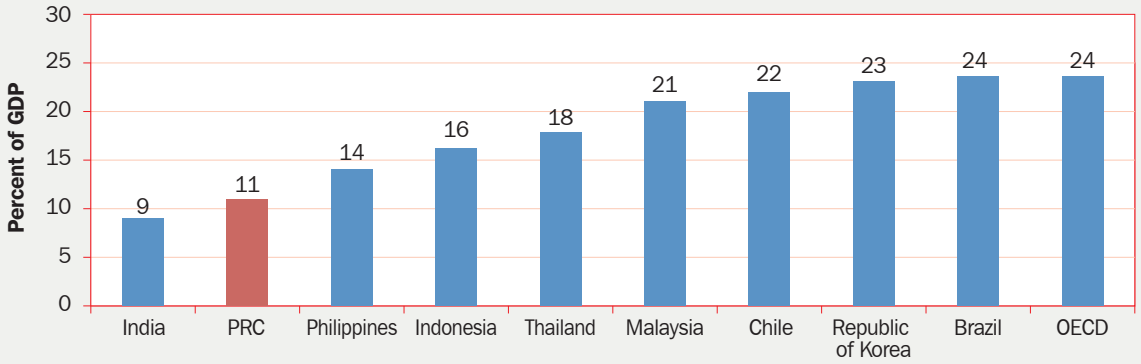
[34] Land in the PRC is owned by either the state (in urban cities) or collectives (in rural and suburban areas). In urban cities, enterprises, households and individuals acquire land-user rights through state allocation or the land market. In rural areas, a land contract system—governed by the Law on Land Contract in Rural Areas that came into effect in 2003—allocates user rights of farm and residential lands owned by rural collectives (mostly villages) to rural households, subject to several conditions covering restrictions on converting agricultural land for other uses and contract durations (30 years for agricultural land and 30–70 years for others).

and services, promoting social equity, and addressing market failures. Over the next 10–15 years, the PRC should gradually increase fiscal spending on education from a current 3.6% of GDP and health from a current 1.4% of GDP[35] to levels close to OECD averages.[36] Government spending on public housing, social protection, fiscal transfers to poor households and lagging regions, environmental protection, and basic science and technology research should likewise increase while maintaining fiscal sustainability. The government should continue to invest in infrastructure, but also promote private participation and public–private partnerships.

Revenue mobilization. Reforms are needed in revenue mobilization to ensure adequate funding for fiscal spending and fiscal sustainability, improve the efficiency and equity of revenue collection, and create incentives for better protection of the environment and more efficient resource utilization. Although the total size of the PRC's government revenues—including both in- and off-budget—is comparable to many upper-middle-income and high-income countries[37], its total budgeted revenues and central government revenues as a share of GDP, at 22% and 11% in 2011, respectively, were not high by international comparison (Figure 5.3).[38] Given the PRC's need for greater efforts in equalizing access to public goods and services, in reducing regional inequality, and in meeting other needs such as addressing climate change, protecting environment, and responding to future macroeconomic shocks, the size of its budgetary revenues may have to increase over time.

Key reform measures in revenue mobilization could include, among others: (i) bringing off-

Figure 5.3 **Central government revenues as a share of GDP, selected economies, 2011**



GDP = gross domestic product, OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.
Note: Data for Brazil and OECD refer to 2009.
Sources: MOF, Final Report on Government Revenues and Expenditures for the PRC; ADB, *Key Indicators 2012* for other Asian countries; OECD for OECD countries (http://www.oecd-ilibrary.org); and World Bank, *World Development Indicators Online* (accessed July 2012) for Brazil and Chile. Central government revenues exclude grants and social security funds and contributions.

35 The PRC's current government (both central and local) expenditures on education and health as a % of GDP refer to 2011 and were calculated on the basis of data provided in the Statistical Report on 2011 National Economic and Social Development released by the PRC National Statistical Bureau (http://www.stats.gov.cn); and the 2011 Final Report on Fiscal Revenues and Expenditures released by the Ministry of Finance (http://yss.mof.gov.cn). However, according to World Health Organization data, the PRC government (both central and local) expenditure on health as a share of GDP was 2.7% in 2010 (see http://apps.who.int/ghodata).

36 In the late 2000s, OECD average government expenditure on education as a share of GDP was about 6%, and about 6.5% on health (see http://www.oecd-ilibrary.org).

37 According to the PRC's Ministry of Finance data, the total size was at 35.3% of GDP in 2011. This covers central and local government budgetary revenues, revenues from state-owned enterprises, social security contributions, and other government revenues including those from land sales (http://www.mof.gov.cn).

38 The PRC's budgeted government revenues (central and local combined) as a share of GDP, currently at 22%, is low, especially in comparison with OECD countries. In 2009, the average general government revenues as a share of GDP for OECD countries was 41.4% including social security contributions, and about 31% excluding social security contributions (see http://www.oecd-ilibrary.org). The PRC's revenues from social security contributions, which are managed outside the government budget, were about 5% of GDP in 2011 (http://www.mohrss.gov.cn).

budget government revenues into the budget; (ii) reforming property taxes that provide sources of government finance and—at the same time—help to control property speculation; (iii) increasing personal income tax as a share of GDP (Box 5.3); (iv) making greater and more effective use of green taxes to control pollution emissions, conserve natural resources—including energy and water—and promote green growth (see section 5.4); (v) reforming the value-added tax (VAT) system to expand coverage to the entire service sector; (vi) strengthening asset management

Box 5.3 **Reforming the PRC's personal income tax system**

While the PRC's personal income tax rates are comparable to many middle- and high-income countries, a narrow tax base and weak enforcement have made personal income taxes an insignificant source of government revenue (Table B5.3-1).

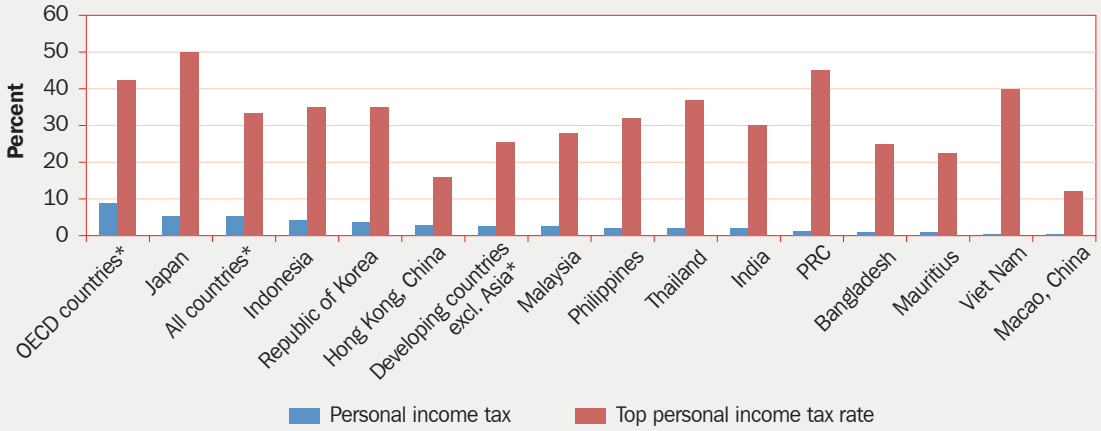
Table B5.3-1 **Composition of selected fiscal revenue sources, PRC and selected economies (% of GDP)**

	PRC (2011)	**Malaysia** (2009)	**Republic of Korea** (2010)	**Japan** (2010)	**OECD** (2010)
Corporate income taxes	3.6	8.1	3.5	2.8	2.9
Personal income taxes	1.3	2.2	3.6	5.2	8.7
Consumption taxes	10.4	3.9	8.5	5.1	11.0

GDP = gross domestic product, OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.
Sources: ADB staff estimates for PRC using data from NBS, *Statistical Report on 2011 Economic and Social Progress and MOF, Final Report on Government Revenues and Expenditure*. IMF, *Government Finance Statistics* (for Malaysia); OECD.Stat (accessed August 2012, for the Republic of Korea, Japan, and OECD).

In 2011, PRC personal income taxes accounted for only 1.3% of gross domestic product (GDP), very low compared with Japan's 5.2%, Republic of Korea's 3.6%, and the average 8.7% for members of the Organisation for Economic Co-operation and Development (Table B5.3-1). This is despite the fact that the PRC has a relatively high top personal marginal tax rate on wages and salaries (45%). Many Asian developing countries also have a much higher personal income tax as a share of GDP—4.2% in Indonesia, 2.2% in Malaysia, 2.1% in Thailand and the Philippines, and 2% in India. These figures suggest that there is much room for the PRC to better use personal income tax as a source of government revenues (Figure B5.3-1).

Figure B5.3-1 **Top personal income tax rate (%) and personal income tax (% of GDP), selected economies, 2009 or latest available**



* = Unweighted average, GDP = gross domestic product, OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.
Note: Sorted from highest to lowest tax revenue as a percent of GDP.
Sources: IMF, *Government Finance Statistics and International Finance Statistics*; OECD.Stat; ECLAC, CEPALSTAT; KPMG, *Individual Income Tax and Social Security Rate Survey 2011*; and NBS, *China Statistical Yearbook 2011*.

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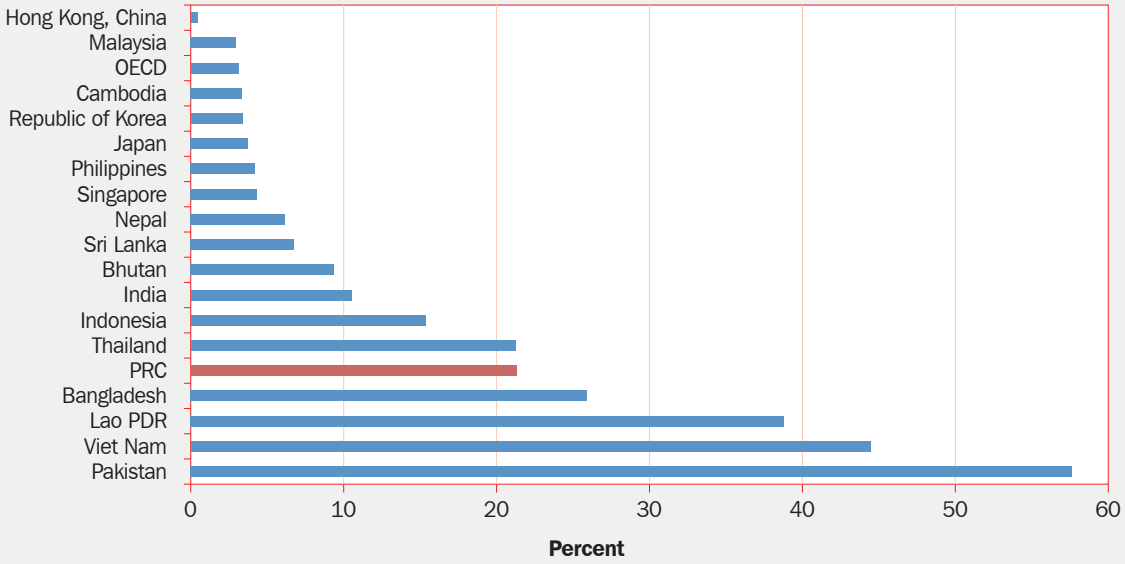
Box 5.3 continued

Under the current system, 11 types of personal incomes are liable for tax—including wages and salaries; operating incomes of privately owned businesses; incomes from contracted management or leasehold management for enterprises; remuneration for labor services; income from royalties and franchises; interest, dividend, and bonus; rents and leasing incomes; among others. Some of these categories are taxed progressively (wages and salaries), while others at a flat rate (such as incomes of personal services, royalties, and rental and lease income). Income is not taxed on a consolidated basis, so income earners receive multiple deductibles for incomes derived from different sources. High-income earners pay lower rates than if taxed on the basis of consolidated incomes, making income taxes less progressive.

Figure B5.3-2 **Top personal income tax rate threshold, selected economies, latest available**



Lao PDR = Lao People's Democratic Republic, OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.
Note: For OECD countries, data refer to 2008 or 2009; figure is simple average (excluding Turkey). For Asia, data are for 2012. It is assumed that gross national income per capita of these countries in 2012 is growing at the average 2000–2010 rate.
Sources: ADB estimates using *International Bureau of Fiscal Documentation Database* (accessed January 2012): ADB (2011a); *OECD Tax Database.*

To even out personal income taxation, the PRC could move toward a system where taxes are calculated based on consolidated incomes. Implementing such a system, however, requires putting in place a personal income reporting system and associated legal framework, along with physical infrastructure. At the same time, the current tax structure could be reviewed to identify areas where reforms are needed. One example is to lower the income threshold at which the top tax rate applies. Compared with many other countries, the PRC's income threshold for the top tax rate is relatively high: about 22 times its per capita GDP in 2010, as opposed to 3–5 times for Japan, Republic of Korea, Malaysia, and the OECD average (Figure B5.3-2).

Although taxation is not an effective means of redistributing income, and more effective redistributional policies may be implemented with spending programs on social welfare and other social programs, taxes are important to raise financing for government spending to achieve distributional objectives. Unfair tax systems can reduce people's willingness to pay taxes and thus the government's ability to raise necessary funds. Notably, reforming the personal income tax system is a policy priority of the 12th Five-Year Plan.

of SOEs and increasing their dividend payments to the general government budget—which will also help to improve investment behavior of SOEs; and (vii) raising public awareness of tax payments as a citizens' responsibility, and strengthening tax law and legal enforcement to reduce tax evasion.

Intergovernmental fiscal relations. Among others, two issues have attracted particular attention in recent policy discussions on the PRC's intergovernmental fiscal relations (Whiting 2007). One is the mismatch between revenues and expenditure responsibilities at various local government levels. It has been suggested that the 1994 reform shifted a large share of fiscal revenues from local governments to the central government, but did not substantially reassign expenditure responsibilities back to the central government. As a result, local governments at all levels, including the county, lack adequate revenues to finance the wide range of public goods and services mandated. The other is that the fiscal gap leads to the growth of off-budget funds (including revenues from land sales) and hidden local government debt.

The PRC could consider several measures to reform intergovernmental fiscal relations: (i) assignments of expenditure responsibilities and revenue sources could be reviewed and better aligned at each level; (ii) off-budget funds could be brought into budgetary management to increase fiscal transparency and accountability and reduce fiscal risk; (iii) the property tax could be reformed and used to replace land sales revenues as a source of local finance; and (iv) reforms are also needed to enhance the effectiveness of fiscal transfers from the central government to lagging regions in reducing regional disparities through measures such as better performance evaluation.

Fiscal management. To ensure fiscal sustainability and stability, the PRC should also further strengthen fiscal management. Measures include establishing a comprehensive budget system to cover government budget, state-owned assets budget, social security budget, and off-budget funds; and setting up an effective monitoring and reporting system for public debt, especially those of local governments (ADB 2012a).

5.3. Expanding services and scaling up urbanization

Expanding services

PRC services are underdeveloped compared with its current stage of development. This is due to a number of factors—including, among others, limited market opening in certain services subsectors, the slow pace of urbanization, and policy biases that favor manufacturing (ADB 2009). Expanding services will be a key part of the solution to reducing imbalances in the sources of growth. In the coming decades, services will provide a key source of growth and job creation. Productive services will help improve productivity in manufacturing and support industrial upgrading, and social services will help improve the quality of life.

Policy options to promote services include, among others: (i) reducing or further reducing entry restrictions in certain services subsectors such as education, health care, finance, transport, and telecommunications—and promoting market competition from the private sector in these subsectors; (ii) promoting the development of high-value services, including finance, banking and insurance; transport and logistics; marketing, brokerage and advertising; management consulting; computing and information technology (IT); accounting and legal services; and design, and R&D; among others; (iii) promoting good quality services and strengthening market regulation of services firms to protect consumer interests, including establishing services quality codes and standards and dedicated regulatory agencies (for key public services such as water, electricity, and health care, for example); (iv) reducing or eliminating policy biases in favor of manufacturing, including making the exchange rate more flexible and eliminating discrimination against services for access to credit and in taxation; (v) encouraging services providers to invest more in services branding and, at the same time, strengthening protection of

intellectual property rights; (vi) investing more in services training and human capital development of employees, including introducing job skill grading; and (vii) promoting urbanization and services trade, as noted elsewhere.

Scaling up urbanization

Urbanization helps improve productivity and efficiency in resources utilization, promote industrial upgrading, expand services, create urban jobs, and increase household incomes and consumption. Urbanization offers agglomeration benefits. Urbanization is also a key part of the solution to reducing or eliminating economic imbalances and rural/urban income gaps, and is an effective way to promote balanced development of urban and rural sectors. Despite the rapid pace of urbanization in recent years, the PRC's rate of urbanization, at 51% by the end of 2011, remains low, especially in comparison with those of high-income countries and many upper-middle-income countries (Figure 5.4). Urbanization can be a major driver of PRC growth in the coming decades.

Some of the broad policy issues in promoting urbanization in the PRC are (i) reforming the *hukuo* system, including gradually delinking social welfare entitlements with *hukuo* in urban cities and removing other restrictions on urban settlement by rural migrant workers; (ii) improving the legal and administrative system governing the acquisition of rural land for urban development—to ensure both social equity and economic efficiency; (iii) further reforming/improving city administration, including aligning expenditure and revenue responsibilities of local governments at all levels, shifting the focus of local governments toward provision of public goods and services, and improving the efficiency of services delivery; (iv) promoting services by reducing entry restrictions on the private sector in certain subsectors, to both create more job opportunities and ensure better quality of life; (v) promoting green urbanization to conserve resources and protect the environment; (vi) ensuring that urbanization is carried out in an orderly manner, preventing and eliminating urban poverty, and exploring and developing a low-cost urban housing system suited for the PRC's current circumstances; and (vii) building capacity for urban planning through education and training and continuing to explore urbanization strategies suited to the PRC.

5.4. Reducing income inequality to make growth more inclusive

Ensuring every citizen can participate in and benefit from growth, thereby reducing income inequality, is at the heart of inclusive growth (Zhuang and Ali 2010). It is also a key condition for the PRC to sustain strong growth, avoid the middle-income trap, and achieve a harmonious society. Rising income inequality to some extent is part of the development process for a dual economy. But it is also due to the PRC's incomplete economic transition and the fact that there are significant barriers to factor mobility, institutional rigidities, governance weaknesses, and market imperfections. Policy options for reducing inequality include, among others:

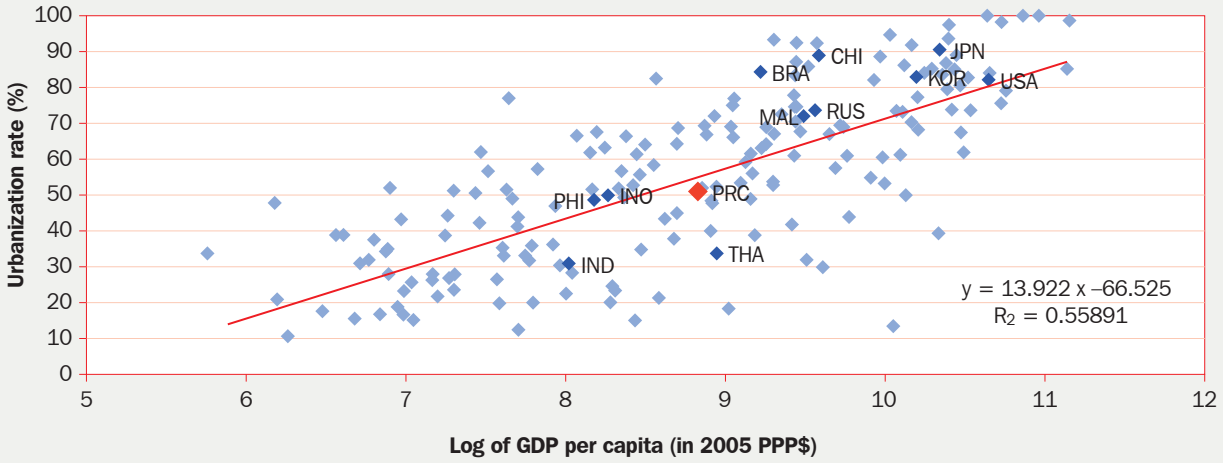
Reducing urban/rural income gaps

Reducing urban/rural income gaps requires further promoting urbanization and developing services, to create sufficient productive jobs for rural migrant workers. At the same time, rural migrant workers and urban resident workers should have equal social welfare entitlements. This requires gradually reforming the *hukuo* system. Urbanization needs to be accompanied by more rural investment (in infrastructure and public services, for example) and in agriculture (such as irrigation and R&D), and speeding up countryside development.

Reducing regional income gaps

To a large extent, regional inequality reflects the unbalanced allocation of resources across regions. This is partly the nature of the development process, and partly related to barriers to factor mobility and development policy biases in favor of coastal areas over past decades. Reducing regional income

Figure 5.4 **Urbanization rate and per capita income, selected economies, 2010**



BRA = Brazil, CHI = Chile, GDP = gross domestic product, IND = India, INO = Indonesia, JPN = Japan, KOR = Republic of Korea, MAL = Malaysia, PHI = Philippines, PPP = purchasing power parity, PRC = People's Republic of China, RUS = Russian Federation, THA = Thailand, USA = United States of America.
Note: PRC's urbanization rate is for 2011.
Sources: World Bank, *World Development Indicators Online* (accessed August 2012); United Nations, *World Urbanization Prospect: The 2011 Revision; NBS, China Statistical Yearbook 2011.*

inequality requires increasing investment in infrastructure in poor and lagging regions, breaking down regional monopolies and promoting domestic market integration, increasing fiscal transfers to low-income regions, promoting industrial migration from coastal to inland provinces, and reducing barriers to migration from poor to rich regions. Empirical evidence suggests that the PRC's great western development strategy has been effective in reducing regional inequality in recent years (see ADB 2012b), and this strategy should be further implemented.

Increasing spending on and ensuring equal access to public services

Public services—including basic education, health care, social security, and other social services—require further resources. In basic education, the PRC needs to increase government spending on compulsory education, education in rural areas and in poor and lagging regions, ensure the adequacy of the education budget, equalize access to education opportunities, and—at the appropriate time—increase the number of years of compulsory education to 12 years. In health care, there is need for more government spending to reduce household out-of-pocket medical expenses, extending the coverage of public medical insurance, and ensuring every patient can get basic medical care. In social security, priorities include establishing an integrated social security system covering the entire country and increasing the portability of social security accounts; increasing the coverage and depth of social security, especially in rural areas; encouraging the development of commercial social security and pension schemes as a supplement to the public social security system; and increasing government spending on low-cost housing and developing an effective administrative system for housing allocation; and ensuring fiscal sustainability of social security (ADB 2010).

Making the personal income tax system work better and fairer

Although taxation is not an effective means of redistributing income, and more effective redistributional policies can be implemented with spending programs on social welfare and social

sectors, taxation is important to raise finance for government expenditures for distributional objectives. Unfair tax systems can reduce people's willingness to pay and hence the government's ability to raise necessary finance. Given the PRC's low level of personal income taxes as a share of GDP, there is large room for the government to gradually increase it through broadening the tax base and making the tax system more progressive (Box 5.3). This can be achieved using measures such as lowering the income thresholds at which top tax rates are applied, moving toward a system in which taxes are calculated on the basis of consolidated incomes, and strengthening tax collection and administration to reduce tax evasion.

Strengthening governance and ensuring social equity and justice

A key part of inclusive growth is to strengthen governance to make the market work more efficiently, firms behave more responsibly, and government agencies serve citizens better. Policy priorities for good governance include promoting fair competition, protecting the rights of workers and consumers, eliminating social exclusion and discrimination, preventing corruption, and strengthening the legal system and rule of law.

5.5. Promoting green growth to conserve resources and protect the environment

The PRC is committed to moving toward a green and low carbon development path. The 12th Five-Year Plan highlights the increasing resource and environmental constraints, and emphasizes the importance of conserving water and energy resources, reducing emissions, improving incentives and control mechanisms, and promoting resource-saving and environmentally friendly production and consumption.

To prevent resources from becoming constraints on growth, the PRC could consider the following policy options: (i) further reducing the resource intensity of growth through structural transformation, industrial upgrading, innovation, and the development of services; (ii) improving resource allocation efficiency and utilization and reducing waste through better pricing systems, stronger incentive mechanisms including fiscal and tax measures, and by removing barriers that block adoption of available new and efficient technologies (and reducing and eliminating distortions); (iii) strengthening government regulation and enforcement to control and reduce pollution; (iv) for water, increasing investment in water-related infrastructure and improving overall water resource planning and management; (v) for energy, increasing investment in efficiency improvement technologies and in clean and renewable energy sources; and (vi) encouraging private investment in resource conservation and investment protection.

A key part of green growth and environmental protection is to reduce and control pollution. The government has made significant efforts, and aims to reduce energy intensity by 17.3% and carbon intensity by 18% during its 12th Five-Year Plan. It has voluntarily committed to reducing CO_2 intensity by 40% to 45% by 2020 (relative to 2005), and to raising the share of non-fossil fuels in primary energy consumption to around 15% by 2020. To achieve and exceed these targets, the PRC needs to pursue further energy price reform and introduce emission taxes to improve energy efficiency and reduce emissions and pollution; introduce emission permit trading to reduce the cost of emission reduction; promote innovation and develop/invest in renewable and clean energy sources; increase public awareness of the need for green growth and environmental protection to induce behavioral and culture change; and enhance international and regional cooperation and knowledge-sharing on clean energy development.

5.6. Maintaining macroeconomic and financial stability

Macroeconomic and financial stability is critical if the PRC is to sustain growth and avoid the middle-income trap. To a large extent, the PRC was able to maintain macroeconomic and financial stability

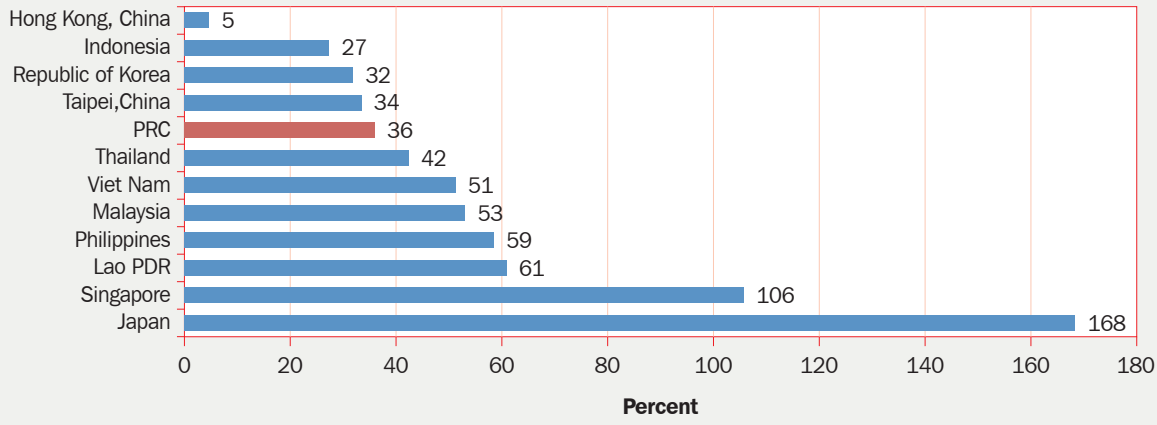
over the last 30 years because of high levels of administrative control over macroeconomic management and the financial sector—and because authorities have taken a very cautious approach to capital account liberalization. From another perspective, however, to varying degrees this control has also contributed to the PRC's economic imbalances. Whether from the viewpoint of deepening economic reform or reducing economic imbalances, the PRC will have to make greater use of the market in macroeconomic management and in developing its financial system—including letting interest rates better reflect demand and supply, making the exchange rate more flexible, allowing banks and financial institutions to operate more as commercial entities, and bringing more private participation in the financial sector, as noted earlier. Further, if the yuan is to become an international currency, the capital account will need to gradually open. In the process of further reform, it is critical that the PRC maintain macroeconomic and financial stability (see Section 5.2).

On the fiscal front, although current levels of public debt and fiscal deficits as a share of GDP are not high compared with most developed countries and many neighboring Asian economies (Figure 5.5), there is need for further fiscal reform and strengthening of fiscal management to ensure long-term sustainability and keep budget risks low. This is especially true, given the growing need to finance infrastructure, public services, and social protection programs. An aging population will also have significant fiscal implications. Among the fiscal system reform measures discussed in Section 5.2, fiscal management of local governments requires particular attention. Priorities include ensuring local government revenues are aligned with expenditure needs; drawing off-budget funds into budgetary management; establishing an effective reporting, monitoring, and surveillance system for local government finance; and increasing local government fiscal transparency and accountability.

5.7. Strengthening international and regional economic cooperation

Maintaining a harmonious external economic environment is essential for sustaining the PRC's long-term growth. This requires continued work forging international and regional economic cooperation. There are several key issues, among others, to consider: first, with its growing importance

Figure 5.5 **Public debt as share of GDP, selected economies, 2010**



GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Note: Central government debt for Indonesia; Republic of Korea; Japan; and Taipei,China; federal government debt for Malaysia; and national government debt for the Philippines.
Sources: ADB, *Asia Economic Monitor*; CEIC (accessed February 2012).

in the global economy, the PRC needs to increasingly consider the effects its economic policies have beyond its borders. It needs to continue efforts to establish and strengthen mutual trust with trading and economic cooperation partners. Participation in the Group of Twenty (G20), Asia-Pacific Economic Cooperation (APEC), Association of Southeast Asian Nations Plus Three Countries (ASEAN+3), and other multilateral, regional, and bilateral economic cooperation and policy coordination forums provides an effective means to articulate its economic policies, while at the same time influence global and regional economic policy making and governance; second, with the changing global economic landscape, the PRC should further increase reliance on domestic consumption as well as demand from emerging markets—both within and outside Asia—as sources of growth through deeper structural reform (see earlier discussions), and closer regional and South–South economic cooperation; third, the PRC also has a large role to play in contributing to global public goods, such as addressing climate change through international cooperation under the principle of common but differentiated responsibilities; and fourth, while significantly increasing its development aid to low-income countries in recent years, the PRC could consider establishing a dedicated government agency to enhance aid effectiveness by strengthening planning, coordination, and management of development aid—as much as possible following international practices in providing aid.

6. The long-term outlook of the PRC economy

This section examines the growth potential of the PRC economy over the next 2 decades, assuming it tackles the challenges it faces effectively. The growth scenario in this report is generated using a Cobb-Douglas production function with constant returns to scale and labor, capital and total factor productivity as inputs. Projections of sector-specific structural changes are generated from a recursive dynamic computable general equilibrium model. Labor projections are based on changes in sector-specific structure and estimates of the employment elasticity of growth. Projections of the size of the middle class are estimated on the basis of GDP growth and current income distribution.

In particular, the growth scenario is based on the following assumptions: (i) the investment rate will gradually decline from 44% in 2010 to 35% by 2030; (ii) the labor force will peak in 2016 at 789.5 million and decline gradually to 736.3 million by 2030—this is based on United Nations (UN) projections that the population will peak in 2026 at 1,395.6 million, declining to 1,393.1 million in 2030, and that the labor force participation rate will decline from the current 79.7% to 76.7% in 2030;[39] (iii) the speed of convergence is 1.8% each year;[40] and (iv) the exchange rate will appreciate about 1.2% each year in real terms. Given these four assumptions, the results are as follows:

- *Growth rates.* The PRC economy has the potential to grow an average of 8% per year during 2010–2020 and 6% during 2020–2030, for an average of 7% over 2010–2030 (Table 6.1).[41] These rates are well below the 10% annual growth recorded during 1990–2010. A slowdown is normal—when a country's per capita income grows, the role of convergence diminishes, leading to lower TFP growth. In the PRC, slow down in growth over the next 20 years will also come from expected declines in the investment rate (given the need for rebalancing the sources of growth), and due to projected declines in the size of the labor force as the working-age population decreases.

- *Factor contributions to growth*. The contribution of total factor productivity growth will decline from 6.2 percentage points per year during 2000–2010 to 4.6 percentage points during 2010–2030. Similarly, the contribution of capital accumulation will decline from 3.6 percentage

[39] Total population and working-age population data are sourced from UN (2009, 2010a).

[40] Estimated from historical data.

[41] A number of studies have carried out growth projections for PRC for the decades ahead. The latest is the World Bank and DRC (2012) which projects that the PRC has the potential to grow at 8.6% in 2011–2015, 7% in 2016–2020, 5.9% in 2021–2025, and 5% in 2026–2030. Lee and Hong (2010) project that if the PRC continues its structural reform, it has the potential to grow at 7% in 2011–2020 and 6% in 2021–2030.

Table 6.1 **PRC: GDP growth projections, 2010–2030**

	2000–2010	2010–2020	2020–2030	2010–2030
GDP growth (%)	10.4	8.0	6.0	7.0
Sources of growth (percentage points)				
TFP growth	6.2	5.0	4.2	4.6
Employment	0.6	0.1	–0.4	–0.2
Capital accumulation	3.6	2.9	2.2	2.6

GDP = gross domestic product, PRC = People's Republic of China, TFP = total factor productivity.
Source: ADB staff estimates.

Table 6.2 **PRC: Projections of per capita GDP, poverty, middle-class size, and sector shares, 2020 and 2030**

	2010	2020	2030
Per capita GDP at constant 2010 prices ($)	4,428	9,400	16,500
Per capita GDP at constant 2005 PPP $	6,816	14,500	26,000
Per capita GDP at market exchange rates ($)	4,428	10,600	22,800
Poverty at $2-a-day (%), constant 2005 PPP $	18	5	1
Poverty at $5-a-day (%), constant 2005 PPP $	50	23	9
Size of the middle class (%) (ranging from $5 per day up to the 90th percentile, constant 2005 PPP $)	40	67	81
Economic structure (%)			
Investment	44	40	35
Consumption	50	60	65
Agriculture	10	8	5
Industry	47	45	41
Services	43	47	54

GDP = gross domestic product, PPP = purchasing power parity, PRC = People's Republic of China.
Source: ADB staff estimates.

points to 2.6 percentage points and the contribution from employment will decline from 0.6 percentage points to –0.2 percentage points.

- *Per capita income.* Per capita income in 2010 constant prices would increase to $16,500 by 2030 (Table 6.2) and, if applying the current World Bank threshold, it would reach high-income status by 2025. Per capita income would reach $26,000 in constant 2005 PPP dollars and $22,800 at market exchange rates by 2030.

- *Sector shares/sources of growth.* The robust pace of growth will lead to significant structural transformation. The share of industry in GDP will likely decline from its current 47% to 41% in 2030; services will rise from 43% to 54%; and agriculture will decline further from 10% to 5%. On the demand side, the share of consumption (both private and government) will increase from 50% to 65%, with investment declining from 44% to 35%.

- *Poverty and the middle class.* Poverty in the PRC will likely be eradicated by 2030 given a $2-a-day (constant 2005 PPP$) poverty line. People living on less than $5-a-day (constant 2005 PPP$) will decline from 50% in 2010 to about 9% in 2030; and the middle class, defined as living in the range from $5 per day to the 90th percentile, should increase from about 40% in 2010 to 81% in 2030.

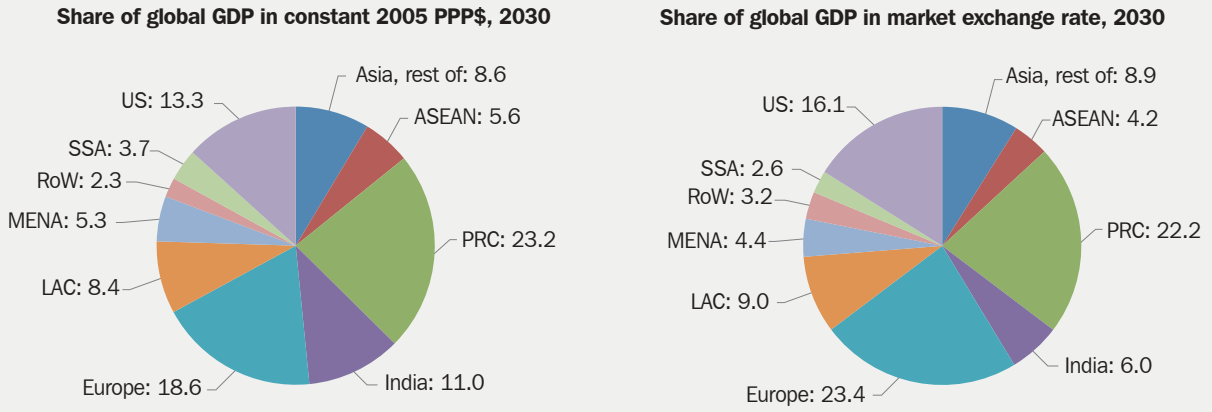
- *The PRC in the global economy.* The PRC would become the world's largest economy measured at constant 2005 PPP dollars by 2016—and at market exchange rates by 2025. In 2030, its share of global GDP at market exchange rates would be 22.2%, followed by the US at 16.1% and India at 6.0% (Figure 6.1). The share of the combined EU would be 23.4%. At constant 2005

PPP dollars, the PRC share of global GDP would reach 23.2% by 2030, followed by the US at 13.3%, and India at 11.0%.

Under this scenario, the PRC would join its East Asian neighbors in completing the transition from low-income to high-income status within 30 years. The five current high-income Asian economies completed the transition to high-income status at some point during the period from the late 1960s to the mid-1990s. As Table 6.3 shows, these economies maintained high rates of growth right up to the time they graduated. Japan and Hong Kong, China grew by an average of more than 9% in the decade prior to reaching high-income status, while Singapore, Taipei,China and the Republic of Korea grew at 8% or above.

The above growth scenario and long-term outlook for the PRC economy are far from guaranteed. They hinge very much on whether the PRC can effectively implement needed structural reforms, successfully upgrade its industries and move up the value chain through innovation, develop a knowledge-based economy, and address the other challenges discussed in this report. While the road is long, the payoff is great.

Figure 6.1 **Share of global gross domestic product, 2030**



ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product, LAC = Latin America and the Caribbean, MENA = Middle East and North Africa, PPP = purchasing power parity, PRC = People's Republic of China, RoW = Rest of the world, SSA = Sub-Saharan Africa, US = United States.
Source: ADB staff estimates.

Table 6.3 **GDP growth, selected Asian economies, 1960–2010 (%)**

	Japan	Hong Kong, China	Singapore	Taipei,China	Republic of Korea	PRC
1961–1969	10.4	10.4	9.7	–	8.3	3.0
1970–1979	4.1	9.6	9.5	–	8.3	7.4
1980–1989	4.4	7.4	7.8	7.7	7.7	9.8
1990–1999	1.5	3.6	7.3	6.3	6.3	10.0
2000–2010	0.9	4.4	6.0	4.1	4.6	10.3
Year became HI	1968	1977	1975	1988	1994	–
Average growth rate						
in 10 years before HI	9.8*	8.2	12.1	7.7**	8.5	–
in 5 years before HI	9.5	9.5	11.4	8.7	7.4	–

"–" means data not available, *over previous 7 years, **over previous 8 years, GDP = gross domestic product, HI = high income, PRC = People's Republic of China.
Note: All figures are average annual GDP growth. Republic of Korea dropped to upper-middle-income status during 1998–2000.
Sources: Author's calculations from World Bank, *World Development Indicators Online;* and for Taipei,China; ADB, *Statistical Database System* (all accessed August 2012).

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Growing beyond the Low-Cost Advantage
How the People's Republic of China can Avoid the Middle-Income Trap

The economic success of the People's Republic of China (PRC) over the last 3 decades has brought with it new challenges. Rising wages and population aging mean that future growth needs to rely more on productivity improvement through industrial upgrading and innovation, and transition from "low cost to high value" is critical. What makes this transition particularly challenging is the PRC's incomplete reform, which, compounded by rapid growth, has led to economic imbalances and contributed to rising inequality. Resource constraints and environmental degradation could also hinder growth. This report analyzes the challenges the PRC faces and examines policy options that could help its transformation from a low-cost to a high-value economy, bypassing the "middle-income trap."

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