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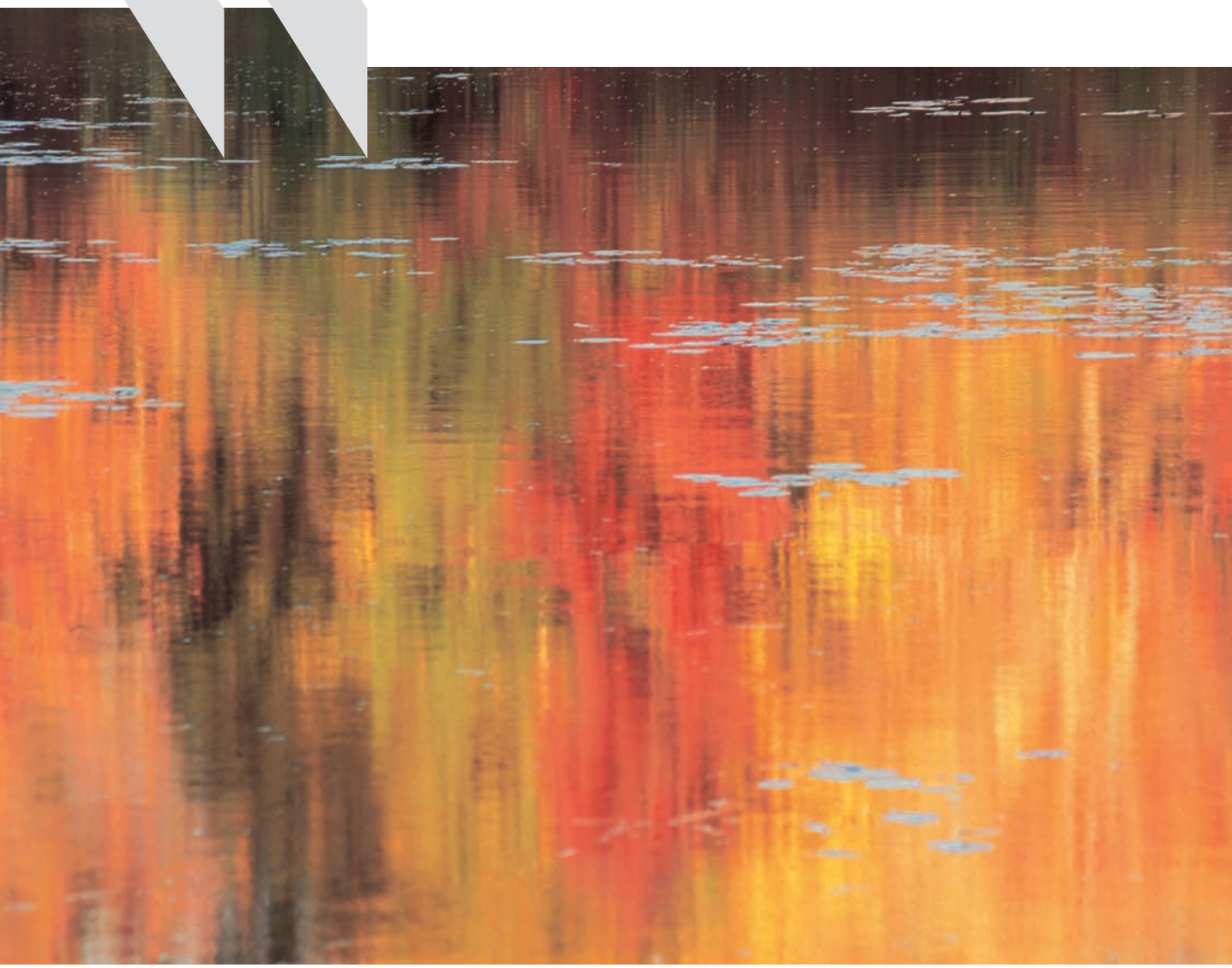
KOREA



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The Secretariat's draft report was prepared for the Committee by Randall S. Jones, Byungseo Yoo and Masahiko Tsutsumi under the supervision of Vincent Koen. Research assistance was provided by Lutécia Daniel.

The previous Survey *of Korea was issued in December 2008.*

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BASIC STATISTICS OF KOREA

THE LAND

Area (thousand km^2)	100
Agricultural area (thousand km^2)	20
Forests (thousand km^2)	64

Major cities, 2009 (million inhabitants):	
Seoul	10.5
Pusan	3.6
Incheon	2.8
Taegu	2.5

THE PEOPLE

Population, 2009 (million)	48.7
Per km^2, 2009	487
Annual rate of change of population, 2009	0.3

Civilian labour force, 2009 (million)	24.4
Civilian employment	23.5
Agriculture, forestry, fishing	1.6
Industry	4.0
Construction	1.7
Services	16.2

PRODUCTION

GDP, 2009 (trillion won)	1 063.1
GDP per head (USD)	28 196
Gross fixed investment, 2009 (trillion won)	311.6
Per cent of GDP	29.3
Per head (USD)	8 265

Origin of GDP, 2009 (per cent of total):	
Agriculture, forestry, fishing	2.6
Industry	29.8
Construction	6.9
Services	60.7

THE GOVERNMENT

Public consumption, 2009 (per cent of GDP)	16.0
Central government revenue, 2009, consolidated basis (per cent of GDP)	24.0
Central government budget balance, 2009, consolidated basis (per cent of GDP)	–1.7

Composition of the National Assembly, June 2010:	Number of seats
The Democratic Party	84
The Grand National Party	169
Other	38
	291

FOREIGN TRADE

Commodity exports, 2009, f.o.b. (per cent of GDP)	43.6
Main exports (per cent of total exports):	
Light industry products	6.7
Heavy industry products	90.4
Electronic products	25.8
Cars	7.0

Commodity imports, 2009, c.i.f. (per cent of GDP)	38.8
Main imports (per cent of total imports):	
Consumer goods	10.3
Industrial materials and fuels	58.1
Crude petroleum	15.7
Capital goods	31.6

THE CURRENCY

Monetary unit: Won

Currency unit per USD, average of daily figures:	
2006	955
2007	929
2008	1 101
2009	1 275

Executive summary

Korea's strong recovery from the 2008 global recession has been driven by buoyant export growth, due to the won's depreciation and demand from China, and an effective policy response. The fiscal stimulus was the largest in the OECD area, while monetary policy and measures to support financial institutions helped to prevent a liquidity crunch. Output is projected to grow 5¾ per cent in 2010 and 4¾ per cent in 2011, as a double-digit increase in exports leads to stronger domestic demand growth. With the recovery on track, government spending is being reduced in 2010, which is necessary if Korea is to achieve its medium-term target of cutting the fiscal deficit to close to zero by 2013 and keeping gross government debt below 40% of GDP. Meanwhile, the policy interest rate has remained at a record low of 2% for more than a year. Given the strength of the expansion, it is important to begin normalising interest rates to ensure that inflation remains within the central bank's 2% to 4% medium-term target.

Sustaining growth and rising living standards over the medium term depends on increasing labour force participation to offset population ageing and on raising labour productivity. It is important to boost women's labour force participation rate by narrowing the gender wage gap, expanding the availability of childcare and encouraging family-friendly workplaces. The high share of non-regular workers in the labour force creates serious problems for both growth and equity. It should be reduced through a comprehensive approach of reducing employment protection for regular workers and expanding social insurance coverage and training opportunities for non-regular workers. The scope for productivity gains is largest in services, where it is low compared to manufacturing, reflecting overly strict regulations that obstruct investment. The objective should be to strengthen competition by accelerating regulatory reform, upgrading competition policy and creating an environment that will attract more inflows of foreign direct investment.

Reforming the financial sector. *While financial institutions appear to have overcome the crisis without significant damage, reforms are necessary to strengthen the financial sector. Increased assistance to small and medium-sized enterprises, including measures to expand bank lending to them, should be withdrawn to avoid supporting non-viable firms. It is also important to reduce Korea's vulnerability to external shocks and improve the governance of financial institutions. The risk of excessive mortgage debt should be dealt with through appropriate limits on loan-to-value and debt-to-income ratios, while supply-side policies are needed to address longstanding concerns about housing prices in the capital region.*

Reforming health and long-term care. *The health-care system has contributed to the impressive gains in health outcomes in Korea while keeping expenditure below the OECD average. But spending is rising at a double-digit pace and rapid population ageing and the plan to expand the coverage of the National Health Insurance will increase spending pressure further. It is therefore critical to introduce efficiency-enhancing reforms, notably changing the payment system away from fee-for-service, shifting long-term care out of hospitals to less expensive care, reducing expenditures on drugs, promoting healthy ageing and introducing gatekeepers. To finance health spending, it is essential to shift toward a broader tax revenue base and away from social insurance payments,*

which will have an increasingly negative impact on the labour market as the population ages. It is important to ensure that the very high out-of-pocket payments by patients do not impede access to necessary health care for low-income households and the chronically ill. Quality should be improved by increasing transparency about patient outcomes, allowing the entry of investor-owned institutions to upgrade the hospital sector and increasing the number of physicians.

Promoting green growth and addressing global warming. *Korea plans to make green growth the driver of economic development, while cutting greenhouse gas emissions significantly by 2020. To achieve this target in a cost-effective manner, Korea should introduce a comprehensive emissions trading system as quickly as possible. Setting a price for carbon would also encourage the development of new technologies to lower abatement costs. The spending in the Five-Year Green Growth Plan should focus in particular on basic R&D, while policies to secure new growth engines should avoid industry-specific measures as policies to "pick winners" are risky.*

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Assessment and recommendations

Korea has rebounded strongly from the global recession thanks to buoyant exports…

Korea has achieved one of the fastest recoveries in the OECD area from the global recession. Korea's trade-dependent economy had initially been hard hit by severe global financial distress in late 2008, leading to exceptionally sharp declines in exports and output. The recession was accompanied by financial turbulence that widened risk premia and tightened bank lending attitudes. Large capital outflows pushed down equity prices but the resulting depreciation of the won – by 25% in effective terms during the six months from August 2008 – combined with strong demand from China laid the foundation for an export-led recovery. Indeed, Korea became the ninth-largest exporter in the world in 2009, from 12th in 2008, and its current account surplus rose to 5% of GDP. Korea's strong recovery, together with its chairmanship of the G20 in 2010, have significantly raised its profile in the global economy.

… and a prompt and effective policy response

Fiscal and monetary policies, combined with measures to stabilise the financial sector, also played an important role. The government implemented the largest fiscal stimulus package among OECD countries, amounting to 6.1% of GDP, almost evenly split between additional expenditures and tax cuts. Increased spending boosted public investment and created nearly 300 thousand temporary public employment jobs in 2009, thus mitigating the upward pressure on unemployment and sustaining private consumption growth. Meanwhile, the Bank of Korea reduced its policy rate from 5¼ per cent in 2008 to a record-low 2% by February 2009, while introducing exceptional measures to increase liquidity to avoid a credit crunch. To reduce financial distress, the authorities used public money to recapitalise banks and purchase non-performing assets. Finally, public assistance to small and medium-sized enterprises (SMEs) was ratcheted up through increased government support and credit guarantees, as well as a range of other measures to support lending to small firms.

The expansion is projected to continue through 2011…

The expansion is projected to remain on track, with output growth of 5¾ per cent in 2010, easing slightly to 4¾ per cent in 2011. The recovery in world trade will sustain Korean exports, although some of the competitiveness gain from the won's decline has been offset

by its appreciation over the past year. Nevertheless, the prospect of vigorous growth in China, which accounts for almost one-third of Korean exports, is a positive sign. The impact of buoyant exports will be increasingly evident in domestic demand, supporting business investment and employment. The permanent cuts in personal and corporate income tax rates in 2009-10 and improving household and business confidence will also bolster domestic demand, helping to reduce the current account surplus to below 2% of GDP. The main risks to the outlook are linked to the evolution of world trade and the exchange rate. Moreover, the high level of household debt might hold back consumption somewhat.

… allowing the phasing out of fiscal stimulus…

With vigorous output growth, government spending in 2010 is being appropriately reduced by 4% from the high level recorded in 2009 due to fiscal stimulus. In light of recent tax cuts, limiting the pace of expenditure growth is essential to achieve the medium-term fiscal target of reducing the consolidated central government budget deficit, excluding the social security surplus, from around 4% of GDP in 2009 to 0.5% in 2013. The target implies limiting spending growth from the 7% average annual pace recorded between 2004 and 2008 to around 4%. The recent reforms to the medium-term fiscal plan are expected to make it more effective in controlling spending. Even so, additional steps to make the spending targets more binding deserve to be explored. As in many other countries, the longer-term impact of population ageing should also be taken into account.

… which is important to keep public debt at a low level

Achieving this 2013 budget target would help limit gross government debt, currently at 35% of GDP, to less than 40%, far below the projected OECD average of 96% in 2010. Maintaining a low public debt burden is an important priority for Korea, given rapid population ageing and uncertainty about the eventual cost of greater economic integration with North Korea. Besides, the debt of public corporations increased sharply in recent years, from 10% of GDP in 2004 to 17% in 2008. To limit any possible fiscal burden, the growth should be kept in check, in part by subjecting public corporations to tighter financial control. In addition, moving ahead with the privatisation of the 18 public institutions identified in the 2008 plan would shrink the public enterprise sector.

It is time to start normalising interest rates

The central bank has scaled back the exceptional liquidity provisions introduced in the wake of the crisis. Nevertheless, considerable monetary stimulus remains in place, with the policy rate still at 2%, making it negative in real terms. Monetary conditions have tightened somewhat since early 2009 with the appreciation of the won, but they remain exceptionally relaxed, and are still close to the level they were in 1998 in the wake of the financial crisis. Inflation decelerated sharply from its 2008 peak of 5.5% (year-on-year), well above the Bank of Korea's target zone of 2% to 4%, to 2% in mid-2009. However, inflationary pressures are expected to build up, with private-sector employment increasing and the unemployment rate projected to fall below 3½ per cent in 2011. Therefore, given its outlook for strong output growth led by private-sector demand, the central bank should start to

normalise interest rates to keep inflation expectations firmly anchored at their current level of 3%. Such pre-emptive action would avoid another run-up in inflation, which would likely require a significant tightening that could undermine the expansion. Finally, the flexible exchange rate policy has served Korea well and should be maintained.

Sustaining growth over the medium term requires reforms in the labour market to boost participation rates and…

While appropriate fiscal and monetary policies are essential to keep the upturn on track, measures to support Korea's growth potential are also a priority. Korea's per capita income rose to around two-thirds of the level in the more advanced OECD countries by 2008, thanks in part to an exceptionally large labour input. However, working hours are declining steadily and population ageing is projected to be the most rapid in the OECD area over the next 40 years. This prospect makes it all the more important to boost women's labour force participation, which is one of the lowest in the OECD area. A range of policies are needed to increase the availability and quality of childcare and make it more affordable, lengthen maternity leave and improve its coverage and encourage family-friendly workplaces that enable parents to combine work and family responsibilities. In addition, it is important to reduce the gender wage gap by moving away from a seniority-based wage system and giving more emphasis to performance. This would also encourage firms to keep older workers, as the current system makes them too expensive, resulting in their departure from firms before age 55 on average. Prohibiting companies from setting a mandatory retirement age and phasing out the lump-sum retirement payment in favour of company pensions would also help make more effective use of older workers.

… measures to reduce labour market dualism

Labour market reforms are also needed to reduce the high share of non-regular workers, who account for more than one-third of employees. Labour-market dualism reflects the rising share of temporary workers to 28% of employment, double the OECD average. Firms hire non-regular workers to increase labour flexibility, given the difficulty of dismissing regular workers, and to reduce labour costs, as wages for non-regular workers are significantly lower. Moreover, more than half of non-regular workers are not covered by employer-based social insurance systems, further cutting their cost to firms. Addressing the problem of labour market dualism requires a comprehensive approach that includes lowering employment protection for regular workers, expanding the coverage of non-regular workers by the social insurance system and improving training, including lifelong learning opportunities, to enhance their employment prospects. Reducing dualism, which is most prevalent among women, would also make the labour market more attractive to them, thus encouraging female employment. In addition, it would address the equity problem resulting from having such a large share of the population subject to precarious employment and significantly lower wages, while receiving less social insurance coverage. Finally, reducing dualism would encourage human capital formation, given that temporary workers receive less on-the-job training than permanent workers, thereby promoting the growth of labour productivity.

Increasing productivity, particularly in services, is a priority…

Labour productivity per hour worked in Korea is only half of that in the more advanced OECD countries, suggesting considerable scope for growth. The greatest potential lies in services, where productivity is only 58% of that in Korea's manufacturing sector, as well as in agriculture, where government support is among the highest in the OECD area. The government has appropriately attempted to shift the focus from manufacturing, which has driven Korea's rapid economic development during the past half-century, to services, notably by launching a major initiative in 2009. There has been progress in reducing entry barriers, notably by easing the minimum capital requirement, while international competition is being strengthened by including services in Korea's growing list of free-trade agreements. However, several aspects of the service initiative raise concerns. *First,* the inclusion of certain services on the list of "growth engines" could raise fiscal costs and lead to distortions in resource allocation. *Second,* levelling the playing field between services and manufacturing would be better achieved by reducing support to the latter, rather than, as planned, extending more government guarantees and payments to service firms, notably SMEs.

… through strengthening competition and R&D…

The government recognises that overly strict regulations obstruct investment and competition in services. Reform is particularly important in the following areas:

- Competition policy should be further upgraded by increasing financial penalties and phasing out the special treatment of SMEs, which play a dominant role in services.
- Regulatory reform should be accelerated, focusing on entry barriers. The time, cost and number of procedures to create a new firm, which are still above the OECD average, should be further reduced. In addition, the reforms introduced in the six Free Economic Zones should be extended to the rest of the country.
- The stock of inward foreign direct investment (FDI) as a share of GDP in Korea is among the lowest in the OECD area, as is the share of services in Korea's inward FDI. Foreign investors should be encouraged by reducing formal barriers, removing product market regulations and creating a more foreign investment-friendly business climate.

Finally, government R&D programmes should be more open and relevant to service firms, which account for only 7% of private-sector R&D, the lowest share in the OECD.

… and scaling back public support for SMEs

The problems in services are closely linked to those of SMEs, which account for more than 90% of service-sector employment. Extensive public support for SMEs has blunted competitive pressure, slowed reform and reduced the efficiency of resource allocation. In 2009, to prevent chain bankruptcies and minimise systemic risk, the government increased assistance to SMEs by: *i)* sharply raising guarantees by public financial institutions for lending to SMEs; *ii)* advising banks to automatically roll over loans to SMEs (excluding those already delinquent on existing loans); *iii)* creating two initiatives to aid SMEs in distress; and *iv)* doubling government spending to assist SMEs. Moreover, government assistance to banks, such as guarantees on their foreign borrowing and capital injections, were contingent on increased lending to SMEs.

While expanded financial support to SMEs has prevented some bankruptcies and helped to sustain employment, it has also exacerbated moral hazard problems by increasing the reliance of SMEs and banks on public assistance. With the economic recovery in place, the government has started to scale back support. It is essential to speed up the phasing out of this assistance – particularly the automatic rollover of loans and expanded loan guarantees – and to promote the restructuring of SMEs. Supporting non-viable firms will act as a drag on Korea's growth potential.

While the financial sector has weathered the crisis well…

The health of the SME sector has important implications for the banking sector, given that it accounts for about one-half of banks' lending. Banks have thus far weathered the crisis relatively well, thanks to their initially strong position and an effective policy response. The authorities provided injections of public capital amounting to 0.4% of GDP into eight financial institutions and purchased non-performing assets for an additional 0.3% of GDP. In addition, the supervisors took measures, allowed within the framework of Basel I, to boost banks' reported capital, thus enhancing their lending capacity.

… further reforms are needed to address weaknesses…

While the banks appear sound at present, it will be important to monitor them closely, particularly as non-performing loans could increase as support for SMEs is scaled back. Moreover, reforms are needed in a number of areas. *First,* it is important to upgrade the governance of financial institutions in line with the guidance of the Basel Committee on Banking Supervision, which follows the OECD principles. *Second,* the reliance on credit rating agencies in financial regulation should be reduced, while enhancing the accountability of the agencies. *Third,* while developing securitisation would increase efficiency in the financial sector, the global financial crisis shows the need for measures to enhance the transparency of securitised products and trading rules so as to reduce the risks. *Fourth,* fostering financial institutions that would be large by international standards could create concerns, given recent experience in a number of countries. The efficiency gains from large institutions appear to be small, while the moral hazard associated with "too big to fail" can be severe.

… while reducing vulnerability to sudden capital outflows…

In addition, reforms are needed to limit the risk of sudden capital outflows. As an export-oriented and non-reserve currency country with an open capital account, Korea is relatively sensitive to external shocks, even in 2008 when it had the world's sixth-largest foreign exchange reserves and its economy and financial sector were relatively strong. It is important to continue building a transparent and sound financial system that would help maintain investors' confidence and better absorb shocks from abroad. In particular, foreign investors' concern about Korea was linked to the rise in external borrowing by the banks and the mismatch in maturities of their assets and liabilities. The planned measures to reduce foreign exchange risks, in part through the revision of the regulation on foreign

currency liquidity, are an important step. Additional measures to further internalise the risk of foreign borrowing by financial institutions to provide incentives for them to monitor this source of funds more carefully would be welcome. For example, deposit insurance premiums could be adjusted on the basis of banks' foreign borrowing. Given the important role of foreign bank branches in increasing Korea's external borrowing, it would also be helpful to expand Korea's ability to supervise those branches, based on an agreed international framework. Finally, Korea's bilateral currency swaps announced in late 2008, in addition to its large stock of foreign exchange reserves, helped it overcome the recent crisis. Such swaps, perhaps supplemented by a more formal multilateral framework, remain a useful tool to cope with any future crises. In particular, it is preferable to the more costly option of further building up Korea's already large foreign exchange reserves.

… and the risks associated with mortgage lending

Another important risk is related to mortgage lending, which played a pivotal role in the 2008 global crisis. Korea managed to avoid a housing bubble, in part due to a regulation limiting mortgage loans to 40% of the value of a property in some parts of the country. Nevertheless, there is chronic concern in Korea about rising housing prices in the capital region, reflecting strong demand driven by economies of agglomeration and the educational opportunities in the capital, coupled with restrictions on new construction in the region, designed to limit the concentration of the population. The government should phase out the various policies used in recent years to control housing prices, such as price controls on new housing, and rely on appropriate loan-to-value (LTV) and debt-to-income (DTI) ratios to limit risks to financial institutions. In addition, it should avoid frequent changes in these ratios, which were relaxed in late 2008 and then tightened in 2009, to foster price stability. Finally, a longer-term solution to concern about housing prices would be to relax regulations, including in the capital region, with a view to increase the supply of housing.

Reform of the health-care system is important to limit costs,…

Another area for reform is the rapidly growing health-care sector, which has contributed to the marked improvement in the health status of Koreans. Although health spending as a share of GDP in Korea was the third lowest in the OECD area in 2008 and only one-half is financed by the public sector, health spending – both the total and the public share – has been rising at double-digit rates since 1995. Moreover, rapid population ageing and the plans to expand the range of services covered by the National Health Insurance (NHI) will lead to substantial increases in the years ahead. Improving the efficiency in supplying health services will ease the impact on public spending and the need for higher government revenue, thereby limiting the burden on households. Priorities for reform include:

- The fee-for-service payment system, which contributes to long hospital stays and the highest number of physician consultations in the OECD area, should be shifted to a Diagnostic-Related Group (DRG) approach for in-patient care. The DRG has been found to reduce unnecessary treatment and the length of hospital stays in Korea. For out-patient care, some form of capitation would help reduce the incentive for frequent and short appointments with physicians.

- Expenditures on pharmaceutical drugs could be reduced by cutting the average number of drugs per prescription from more than four at present to as low as two, as in some OECD countries. Savings could also be achieved by changing the pricing system for drugs, cracking down on illegal rebates by pharmaceutical manufacturers and letting the price of generic drugs fall. Gradually removing the regulation that requires non-prescription drugs to be sold only in pharmacies would also reduce drug prices by enhancing competition.
- The long average stay in hospitals is partly a result of their role in providing long-term care to the elderly. The introduction of long-term care insurance in 2008 provides an opportunity to shift such treatment to less-expensive home-based care or long-term care facilities.
- It is important to promote healthy ageing to limit health-care costs as the population ages. The priority is to raise the exceptionally low tax on cigarettes to reduce the high smoking rate of men.
- Introducing a gatekeeper system would favour less expensive and more effective primary care. This would require increasing the number of physicians who are general practitioners.

… to finance health spending efficiently,…

Even with such reforms, spending on health will rise significantly in the future, making it important to finance it in the least distortive manner possible. Increasing the already high co-payment rates, which range from 20% for in-patient care to 30% to 60% for out-patient care, is not an option. Given the already high level of private spending on health care, relying mainly on private insurance to finance the increase in health spending would not be appropriate. Consequently, funding will have to come primarily from social insurance payments, which finance most of public health spending at present, and tax revenue. Tax-based financing, which is currently low, could be increased over time, in conjunction with effective measures to keep spending in check. Continuing to rely primarily on social insurance payments levied on wage income to finance growing health spending would progressively increase the labour-market tax wedge and thus hold back employment and growth. This negative effect would become stronger as population ageing reduces the number of persons between the ages of 20 and 64 from more than six per elderly person at present to only 1.3 by 2050. Broadening the base of financing for health care would mitigate the disincentives for work, especially if the revenue were raised through indirect taxes. More reliance on tax-financing would also ease the problem of the large and growing gap between the social insurance payments by employees and the self-employed, who account for one-third of the labour force. Nevertheless, it is essential to improve the compliance of the self-employed with social insurance payments and income taxes to promote horizontal equity.

… to ensure adequate access to health care…

Out-of-pocket payments, for co-payments and services not covered by the NHI, accounted for 4.6% of household final consumption in 2007, the third highest in the OECD area. For low-income households, the share of such payments in income is about four times greater than for households with average income. High out-of-pocket payments are inequitable

and they reduce necessary, as well as unnecessary, health treatments. Korea introduced a ceiling on co-payments in 2004 and revised it in 2009 to make it depend on the level of social insurance payments to the NHI. Nevertheless, the permitted ceiling for co-payments remains high for low-income households, thus falling short in terms of risk protection. A second concern related to access is the shortage of physicians in certain medical specialties. Resolving such imbalances requires improving the annual fee-setting process so as to better equilibrate supply and demand, rather than the usual practice of granting uniform fee increases across-the-board.

… and to improve the quality of health care

Aside from high costs, the major complaint of patients concerns the quality of health care. Providing more information on patient outcomes would encourage quality competition among providers, thereby improving quality. In addition, expanding the pilot project that bases 10% of NHI reimbursements of hospitals on quality evaluations would also be beneficial, as much of the dissatisfaction about quality centres on hospitals. While only physicians and non-profit corporations are allowed to establish hospitals, they act as for-profit institutions in practice. However, their non-profit status limits their financing options. Allowing investor-owned hospitals would stimulate competition and may thus improve the quality of care. In addition, allowing mergers and acquisitions between hospitals would be beneficial. Another major complaint concerns waiting times for treatment. The government needs to raise the ceiling on the annual number of new medical students to boost the number of physicians, which at 1.7 per 1 000 population, is one of the lowest in the OECD.

Addressing the challenge of climate change…

Korea's long-term prospects will depend on how it responds to the challenge of climate change. In 2008, the President proclaimed "Low Carbon/Green Growth" as the vision to guide Korea's development during the next 50 years and in 2009 introduced the National Strategy for Green Growth to: *i)* mitigate climate change and promote energy independence; *ii)* create new engines for economic growth; and *iii)* improve the quality of life. In 2009, Korea voluntarily set a goal of cutting its greenhouse gas emissions by 30% relative to a "business as usual" baseline by 2020, which implies a 4% reduction relative to 2005. Meeting this target will be challenging, as emissions almost doubled between 1990 and 2005, making Korea one of the fastest-growing source of emissions in the OECD area. Moreover, Korea has one of the highest levels of energy intensity in the OECD area, reflecting its concentration in energy-intensive industries. Korea has thus far relied primarily on voluntary commitments by firms to reduce emissions.

… requires market instruments that set a price on carbon…

Achieving the 2020 target in a cost-effective manner requires improving the policy framework by introducing market-based instruments to reduce emissions. Market instruments are efficient as they equalise abatement costs across all emitters and, over the long run, provide incentives to develop new technologies that lower abatement costs. Korea is considering the introduction of an emissions trading system (ETS), although no

date has yet been set. It is important to move ahead quickly with a nation-wide ETS based on cap-and-trade, ideally with the initial permits allocated by auctioning. The ETS should be extended to as many sectors as possible, while introducing a carbon tax in other sectors. The system should include banking of permits and possibly borrowing as well, to limit risk, uncertainty and volatility. At the same time, it is important to remove subsidies for fuel-based energy production and consumption.

… while limiting distortions in policies to promote green industry…

The government launched the Five-Year Plan for Green Growth for the period 2009-13, which calls for spending 107 trillion won or 2% of GDP per year. The large amount reflects the inclusion of major infrastructure projects, such as the "Four Major Rivers Restoration Project" and the expansion of the high-speed train network. It also includes 23 trillion (2.2% of 2009 GDP) for securing new growth engines. Part of this amount will be used for "green finance", which will involve government lending and credit guarantees. Green finance also includes tax incentives for financial instruments that invest in firms and technologies that have been granted "green certificates" by public institutions. It is important to avoid the risk that the green finance project might fuel a bubble, as occurred when the government tried to jump-start the venture business sector in the late 1990s. More generally, direct government support for green industries raises a number of policy challenges, given the difficulty of picking winners and the risk of being locked into the wrong technology.

… by focusing on basic R&D and framework conditions

The Five-Year Plan also includes 13 trillion won (1.2% of GDP) in R&D focused on 27 core technologies. Given that price signals alone do not ensure adequate R&D and innovation, especially in the area of climate change, there is an important role for public R&D, particularly in basic research. Improving Korea's innovation framework would enhance its success in green R&D. However, in the absence of an appropriate price for carbon, it will be difficult to jump-start private innovation, thus underlining the need for the early introduction of an ETS. Finally, it is important to have good framework conditions, including flexibility to promote the redeployment of labour and capital from energy-intensive to green industries and openness to foreign competition.

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Chapter 1

Sustaining the recovery from the global financial crisis by promoting Korea's medium-term growth potential

Korea has achieved one of the strongest recoveries among OECD countries from the 2008 global recession, led by its robust export performance and the largest fiscal stimulus among member countries. The expansion is projected to continue through 2011 as the positive impact from external demand spreads further to the domestic economy. Sustaining high growth over the medium term requires narrowing the large labour productivity gap with more advanced OECD economies through reforms, particularly in services, where productivity is low. The priority is to strengthen competition by eliminating domestic entry barriers, accelerating regulatory reform, upgrading competition policy and reducing barriers to trade and inflows of foreign direct investment. Such measures should be accompanied by reforms to reduce labour market dualism, which has negative consequences for growth and equity. In addition, it is important to increase labour force participation, notably among women and older persons, not least to mitigate the impact of population ageing.

Korea bounced back quickly and vigorously from the global economic crisis. Its outstanding performance has raised its share of world exports and its profile in the global economy, which is also boosted by its chairmanship of the G20 in 2010. This chapter begins by analysing Korea's recovery from its sharp downturn in the second half of 2008 and its short-term economic outlook. Over the longer term, sustaining high growth will be necessary to narrow the still large gap in per capita income between Korea and the most advanced OECD countries. The chapter discusses the need for reform in two areas – the non-manufacturing sector and the labour market – to sustain Korea's growth potential.

Korea's recovery from the global financial crisis

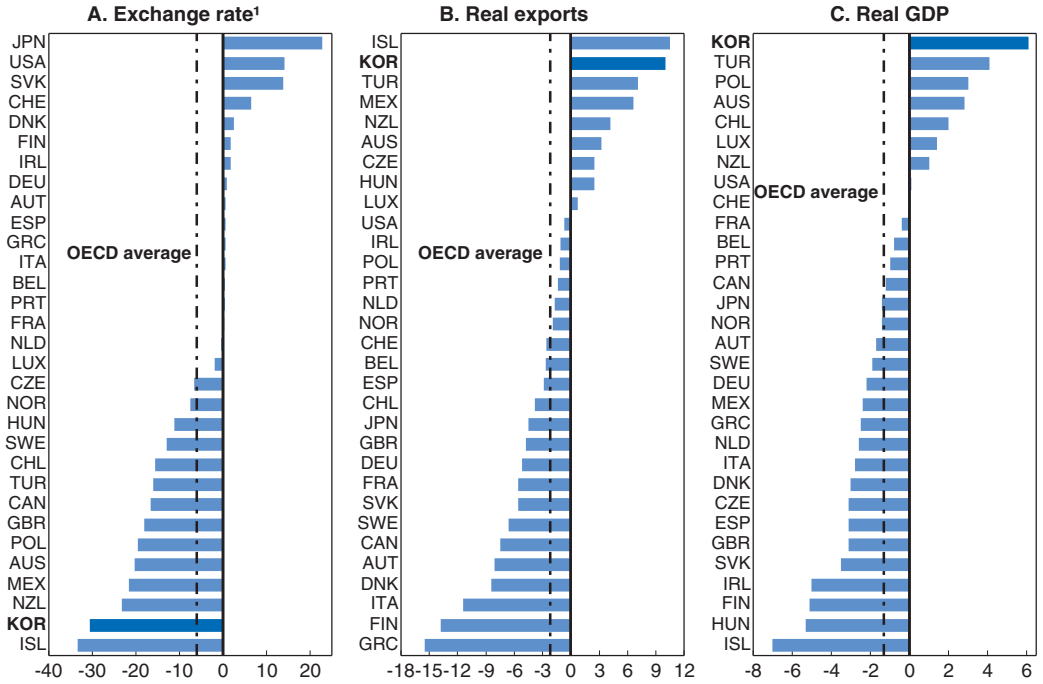
The Korean economy was already slowing prior to the intensification of the global financial crisis in September 2008, reflecting the US recession that had begun in December 2007, rising oil prices and the impact of tighter monetary policy. Although its financial sector was generally sound and had little direct exposure to the subprime problems, Korea was severely affected by the crisis. Indeed, Korea's output fell by 17% (at an annual rate) in the fourth quarter of 2008, more than double the decline in the OECD area, reflecting the collapse in world trade. Korea's export decline was particularly sharp, given its concentration in medium and high-technology products that are especially cyclically-sensitive.[1]

The sharp economic downturn in the fourth quarter of 2008 was accompanied by large outflows of foreign capital (Chapter 3). These outflows contributed to a sharp fall in equity prices and a jump in Korea's credit default swap (CDS) rate from 104 basis points in August to 699 points in October 2008, one of the highest in the OECD area. Meanwhile, risk premia soared in short-term money markets and corporate bond markets. As the capital market dried up, firms turned toward the banking sector, only to face tightening lending attitudes in the context of higher credit risks. Domestic banks, which had accumulated large external debt in the years prior to the crisis, found it difficult to roll over these loans given the global liquidity crisis. These adverse developments put additional downward pressure on the won, which by the first quarter of 2009, was 31% below its year-earlier level, the second-largest drop in the OECD after Iceland (Figure 1.1). The crisis, with large capital outflows and a sharp depreciation of the won, resembled the 1997 crisis in some respects (Annex 1.A1).

However, the sharp depreciation of the won also helped to trigger Korea's rebound by significantly improving its international competitiveness. Indeed, Korea rose from the world's 12th largest exporter in 2008 to ninth in 2009.[2] Export volumes increased 10% in the course of 2009, the second-fastest rise in the OECD area (Figure 1.1, Panel B).[3] Korea also benefited from its close trade ties with Asian countries and from the massive stimulus programme undertaken in China in 2009 (OECD, 2010c). Korea's exports to China (including Hong Kong, China) accounted for 87% of the rise in Korea's total exports over that same period (in US dollar value), boosting the share of China in Korean exports from 23% to 30%.[4]

Figure 1.1. **Korea has achieved the strongest recovery from the crisis, led by exports**

Percentage change in 2009 (4th quarter on 4th quarter)



1. Percentage change in the nominal effective exchange rate between the first quarters of 2008 and 2009, calculated *vis-à-vis* 41 trading partners.

Source: OECD Economic Outlook Database.

StatLink http://dx.doi.org/10.1787/888932302340

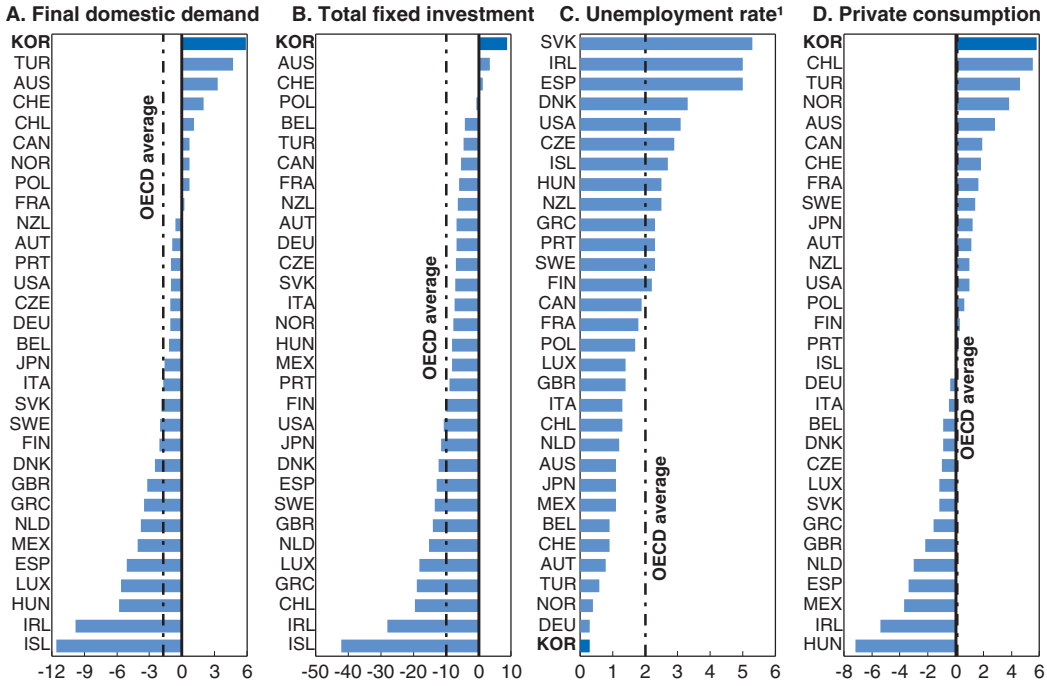
By product, export volume of semiconductors and electric appliances nearly doubled during 2009. Buoyant exports were a key factor helping Korea achieve the fastest output growth in the OECD area in the course of 2009 at 6.1% (Panel C).[5]

Strong domestic demand growth, again the fastest in the OECD area in 2009 (Figure 1.2), also played an important role in Korea's recovery, reflecting three factors. *First,* buoyant exports sustained employment and boosted investment in facilities equipment, as companies expanded production capacity. *Second,* financial market distress in Korea was relatively limited, thanks to the sound position of financial institutions prior to the crisis and an effective policy response (Chapter 3). *Third,* Korea's fiscal response was the largest among OECD countries adopting explicit crisis-driven stimulus programmes, boosting government consumption and investment (Chapter 2). Indeed, government investment increased 13% in the course of 2009, the fastest since 1996. Consequently, fixed investment growth in Korea was also the fastest in the OECD area during 2009 (Panel B), despite sluggish residential investment.

The fiscal response was particularly important in sustaining employment. The government launched the "Hope Employment Programme", providing 250 thousand jobs (1.5% of dependent employment) to vulnerable groups, as well as 99 thousand internships for new graduates. Consequently, short-term public employment increased from an average of 228 thousand in 2008 to 504 thousand in 2009,[6] more than offsetting the decline in private-sector employment. It is estimated that the unemployment rate during 2009

Figure 1.2. **Domestic demand growth was also exceptionally strong in Korea**

Percentage change in 2009 (4th quarter on 4th quarter)



1. Percentage-point increase in the unemployment rate between the fourth quarters of 2008 and 2009.

Source: OECD Economic Outlook Database.

StatLink http://dx.doi.org/10.1787/888932302359

would have been 4.3% – rather than the 3.6% recorded – without the additional public jobs.[7] Thus, the rise in the unemployment rate in Korea in 2009 was well below the OECD average of 2 percentage points (Figure 1.2, Panel C), although it was kept down by a fall in the participation rate. Employment gains boosted wage income and helped to sustain private consumption growth, which was also the highest in the OECD area during 2009 (Panel D).

The strong economic recovery, coupled with effective government policies, helped to normalise financial conditions from the first quarter of 2009 (Chapter 3). The capital account returned to balance in the first quarter of 2009, followed by significant surpluses in the following quarters. By April 2010, the equity price index had rebounded about 50% since the end of 2008, thanks in part to large purchases by foreign investors, bringing it to within 17% of its 2007 peak. Increased capital inflows also boosted the won, which in the first quarter of 2010, was 20% above its year-earlier level in effective terms. Risk premia declined, although remaining above the pre-2008 level, especially for lower-rated companies, while bank lending attitudes have returned to neutral, at least for large firms. By February 2010, the CDS rate for Korea had fallen to its August 2008 level. In addition, Moody's upgraded its rating of Korean government bonds in April 2010 from A2 to A1, its pre-crisis level. Finally, corporations and financial institutions have largely overcome the global crisis without the type of damage that occurred in the wake of the 1997 crisis, which saw a large number of bankruptcies, a huge run-up in non-performing assets and a lack of capital in financial institutions that required significant injections of public money.

Korea's short-term economic outlook

Output increased by 8.8% in the first quarter of 2010 (seasonally-adjusted annual rate), the fifth consecutive quarter of positive growth. Korea's recovery is projected to remain on track, with year-average real GDP growth reaching 5¾ per cent in 2010 and easing slightly to 4¾ per cent in 2011 (Table 1.1). Exports will remain a driving force as Korea's export market growth is projected to remain strong and firms continue to benefit from a weaker won, which is still 15% below its level in early 2008. Perhaps more importantly, given the competition with Japanese products in export markets, the won is still 25% weaker relative to the yen.[8] In short, Korea is well-positioned to further expand its share of world trade. Continued export growth will stimulate business investment to increase capacity for industrial production, which is already more than 10% above its pre-crisis peak. Moreover, the Business Sentiment Index had reached its highest level since 2002 by February 2010. Business investment, though, will face some headwinds from higher risk premia on bonds and a more restrictive lending attitude toward SMEs by banks, which have seem some rise in their sub-standard loans (Chapter 3). Nevertheless, fixed investment is projected to increase 6.7% in 2010, despite a fall in public investment as fiscal stimulus is phased out and sluggish residential investment in the context of a large stock of unsold homes and strict limits on mortgage lending (Chapter 3).

Table 1.1. **Short-term economic outlook for Korea**[1]

	Share of 2008 GDP[2]	2009	2010	2011	2009[3]		2010[3]		2011[3]	
					1st half	2nd half	1st half	2nd half	1st half	2nd half
Private consumption	54.7	0.2	3.8	4.0	–0.8	7.3	2.3	3.5	4.2	4.3
Government consumption	15.3	5.0	3.4	2.3	8.4	–1.8	8.3	–0.8	3.0	4.0
Gross fixed capital formation	29.3	–0.2	6.7	5.0	–2.4	11.0	5.0	6.0	4.7	4.4
Final domestic demand	99.3	0.8	4.6	4.0	0.2	6.9	4.1	3.5	4.1	4.3
Stockbuilding[4]	1.9	–4.6	2.2	0.0	–9.5	4.2	3.0	0.0	0.0	0.0
Total domestic demand	101.2	–3.8	7.1	4.1	–9.4	11.1	7.1	3.6	4.2	4.3
Exports, goods and services	53.0	–0.8	11.1	12.6	–6.1	18.5	7.0	12.6	12.8	12.4
Imports, goods and services	54.2	–8.2	14.2	11.9	–19.1	23.4	11.7	10.9	12.0	12.4
Net exports[4]	–1.2	4.0	–1.0	0.7	7.6	–1.9	–2.2	1.0	0.6	0.2
GDP at market prices	100.0	0.2	5.8	4.7	–1.8	9.2	4.9	4.6	4.8	4.5
Memorandum items:										
Consumer price index	–	2.8	3.0	3.2	1.9	2.4	3.2	3.2	3.2	3.3
Core consumer price index	–	3.6	2.2	3.2	3.2	2.2	1.8	3.2	3.2	3.3
Unemployment rate	–	3.6	3.6	3.3	3.7	3.6	3.9	3.4	3.4	3.3
Household saving ratio[5]	–	3.6	3.5	3.8	3.8	3.3	3.5	3.5	3.7	3.9
Gross government debt[6]	–	34.9	36.2	37.4	–	–	–	–	–	–
Net government debt[6]	–	–31.0	–29.7	–28.6	–	–	–	–	–	–
Current account balance[6]	–	5.2	1.7	1.6	6.2	4.2	1.3	2.1	1.8	1.5
Exchange rate (per USD)	–	–14.8	12.0	0.1	–20.8	25.5	12.0	0.5	0.0	0.0
Export market growth[7]	–	–8.5	15.8	9.5	–21.0	18.3	18.5	8.7	9.6	9.9

1. OECD projections published in *OECD Economic Outlook*, No. 87 (May 2010), based on the exchange rate of 10 May 2010 (1 131.8 won per dollar) and oil (Brent) at USD 80 per barrel.
2. As per cent of nominal GDP.
3. Annualised growth rates.
4. Contributions to changes in real GDP.
5. As a percentage of disposable income.
6. As a percentage of GDP.
7. Weighted import growth in volume terms in Korea's trading partners.

Source: OECD (2010b), *OECD Economic Outlook*, No. 87 and Bank of Korea.

The economy will face some drag from the removal of fiscal stimulus, as government spending is slated to fall by 4.2% in 2010 from the 2009 outcome (Chapter 2). In particular, job gains will be slowed somewhat by a scaling back of the government's public employment programmes. The average number employed in these programmes is planned to fall from 504 thousand in 2009 to 389 thousand in 2010. Consequently, public employment will cut the unemployment rate by 0.4 percentage point in 2010 as against 0.7 point in 2009. However, the fall in public employment will be more than offset by private-sector job gains, particularly in the industrial sector. Indeed, manufacturing jobs increased by 1.6% (seasonally-adjusted) in the first quarter of 2010. The recovery in private-sector employment is projected to lead to a pick-up in wage growth, which was relatively sluggish in 2008-09. Increased wage income should underpin a rebound in private consumption to 4% by 2011, despite the end of the tax incentives to encourage car sales. The Consumer Sentiment Index stayed above the benchmark of 100 for a third consecutive quarter in the first quarter of 2010,[9] although it fell slightly, reflecting instability in global stock markets, fiscal problems in Europe and tightening fiscal policy in China (SERIWorld, 2010).

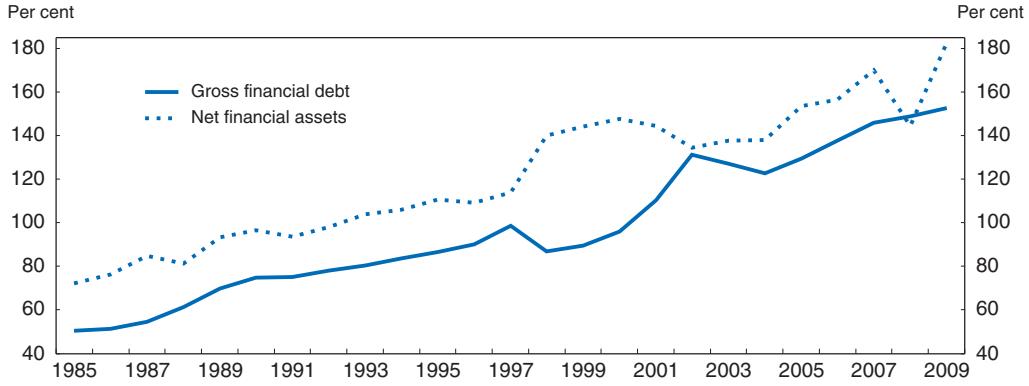
Consumer price inflation, which rose to nearly 6% (year-on-year) in mid-2008, has been brought within the Bank of Korea's target zone of 2% to 4% as a result of the significant economic slack in the wake of the crisis. Inflation bottomed out at 2% (year-on-year) in the third quarter of 2009 and has since picked up while remaining below the mid-point of the inflation target. Despite strengthening domestic demand, inflation is projected at around 3% in 2010-11, based on the assumption that the policy interest rate rises from its record low of 2% since February 2009 to 4½ per cent by the end of 2011. Meanwhile, stronger domestic demand is expected to reverse the large fall in imports in 2009, helping to reduce the current account surplus from 5.2% of GDP in 2009 to less than 2% in 2010-11.

For a major exporter like Korea, the risks to the outlook relate mainly to the world economic environment. To the extent that world trade growth departs from the 8% to 11% projected by the OECD for 2010-11, Korean output growth would be affected, as it is so sensitive to exports. Also, a large change in the value of the won would impact exports. On the domestic side, one uncertainty is the timing and pace of restructuring in the business sector and its impact on the recovery. The decision to automatically roll over bank loans to SMEs in 2009 enabled a number of non-viable firms to survive. On the upside, a continuation of the large positive contribution from stockbuilding recorded in the second half of 2009 and the first quarter of 2010 would lead to stronger growth in 2010.[10]

The most oft-cited domestic risk is household debt, which increased to 153% of disposable income (Figure 1.3), mid-way between the United States (128%) and the United Kingdom (180%). The rising debt ratio reflects a number of factors, including falling real interest rates on loans to households and the expanded use of credit cards. Most debt is at variable rates, shifting risk from financial institutions to households. However, the risk from household debt is mitigated by a number of factors. *First,* household net financial assets jumped to 182% in 2009 after a sharp fall in 2008. Thus, households have the ability to pay debt without disposing of their real estate in case of emergency. *Second,* banks have increased their loan-loss reserves from 8.4 trillion won in 2006 to 12.6 trillion won by the end of 2009, despite writing off 3 trillion won of non-performing loans in the second half of 2009, thus enhancing their ability to cope with any increase in substandard loans to the household sector. Nevertheless, there is a risk related to low-income households. Although the lowest income quintile accounts for only 5% of household debt, their share of assets was even lower at 3% in 2007 data (Table 1.2). Moreover, their debt service ratio of 28% is

Figure 1.3. **Household financial assets and liabilities**

As a per cent of household disposable income[1]



1. For the "Individual Sector" in the Bank of Korea's flow of funds data.

Source: Bank of Korea.

StatLink http://dx.doi.org/10.1787/888932302378

2.5 times higher than for the top income quintile, making them vulnerable to higher interest rates. In addition, the high level of household debt is partly explained by business-related borrowing by the self-employed, suggesting that household debt problems could weaken business investment.[11]

Korea's growth prospects over the longer term

Income per capita in Korea has converged from less than one-half of the benchmark of the average of the upper half of OECD countries in 1991 to two-thirds in 2008 (Figure 1.4). Nevertheless, the gap remains wide despite the large contribution from labour inputs, which were one-third above the benchmark. Consequently, labour productivity per hour worked in Korea is only one-half of the benchmark. Looking ahead, the convergence process will face headwinds from declines in labour inputs, which will tend to slow potential growth from its rate of above 4% in the early 2010s, according to OECD estimates. Indeed, working hours, which have been falling at a 1.5% annual rate since 2000, are likely to continue declining from 2 256 hours per year in 2008 toward the OECD average. In addition, the Korean population is set to age more rapidly than in most OECD countries, with a projected doubling of the share of persons over the age of 65 from 7% in 2000 to 14% by 2018. Sustaining the momentum of convergence to the per capita income levels in the most advanced countries depends on narrowing the large gap in labour productivity and

Table 1.2. **Financial status of households by income quintile**

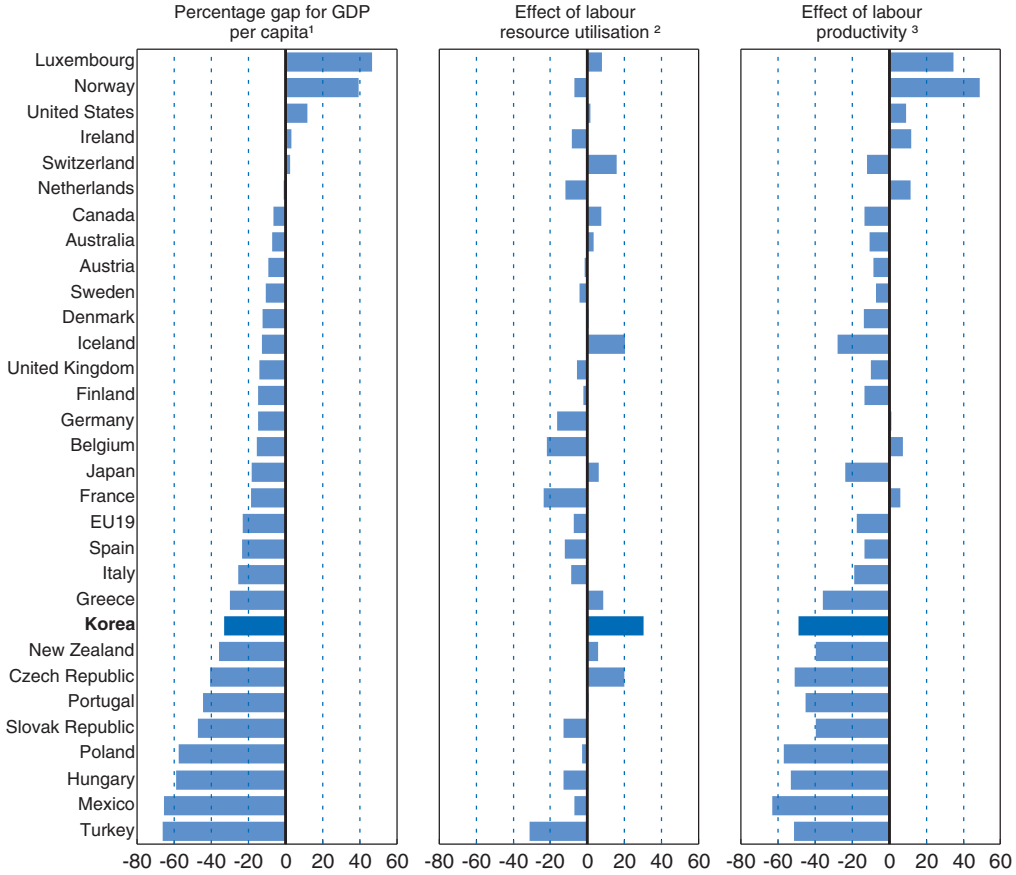
In per cent

	Lowest quintile I	Second quintile II	Third quintile III	Fourth quintile IV	Highest quintile V	Total
Share of indebted households	24	40	48	53	53	44
Proportion of total debt	5	10	16	23	46	100
Proportion of total assets	3	7	13	24	52	100
Total debt/financial assets	12.4	11.0	6.1	4.2	2.8	3.8
Debt-service ratio	28	14	12	11	11	. .

Source: Kim *et al.* (2009).

Figure 1.4. **Explaining differences in income**

In 2008



1. Relative to the simple average of the highest 15 OECD countries in terms of GDP per capita, based on 2008 purchasing power parities (PPPs). The percentage gap in labour resource utilisation and labour productivity do not add up exactly to the GDP per capita gap since the decomposition is multiplicative.
2. Labour resource utilisation is measured as total number of hours worked per capita.
3. Labour productivity is measured as GDP per hour worked.

Source: OECD (2010a), *Going for Growth*, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932302397

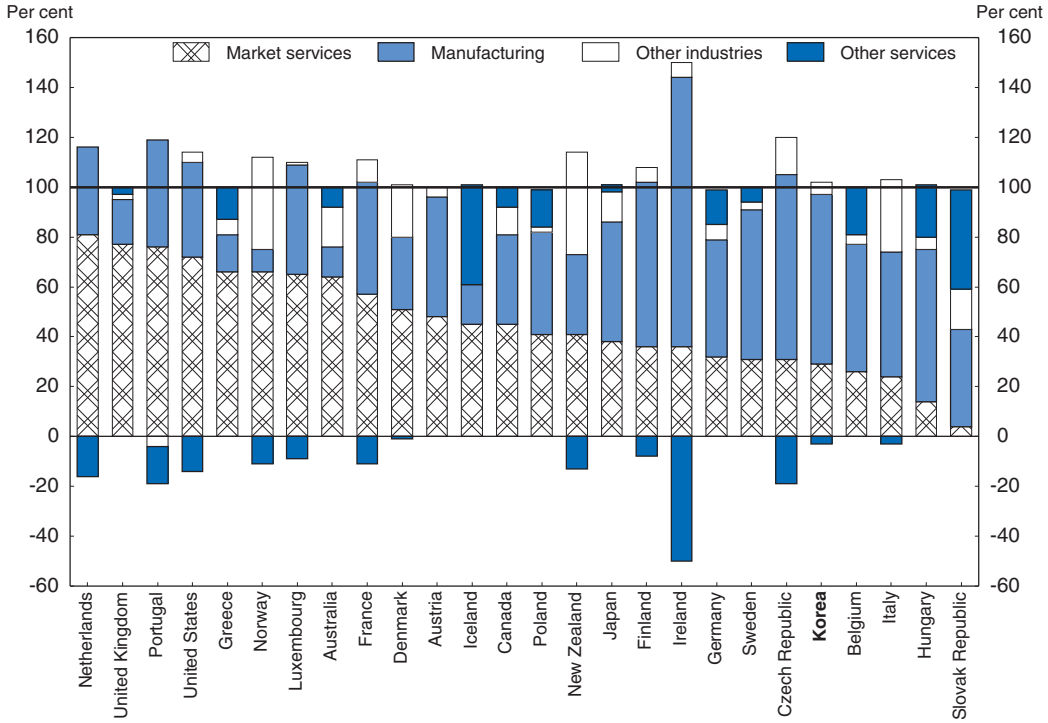
mitigating the fall in labour inputs. This section first discusses policies to boost labour productivity in Korea's non-manufacturing sector, notably services, and then focuses on measures to promote labour force participation, particularly for women and older persons.

Raising productivity in the non-manufacturing sector

Korea's service sector is relatively small, accounting for 60% and 67% of value added and employment in 2008, respectively, the second-lowest shares in the OECD area. The Korean economy has been led by manufacturing: only four of the 30 largest enterprises are in services, compared to 12 in the United States. The contribution of market services to aggregate productivity growth in Korea from 2000 to 2008 was one of the smallest in the OECD area and was partially offset by a fall in other services (Figure 1.5). Consequently, the level of productivity in services in Korea is relatively low at 58% of the manufacturing sector and 44% of the US service sector (MOSF, 2009).

Figure 1.5. **Share of the service sector in productivity growth**

Between 2000 and 2008



Source: OECD DSTI Database.

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The government recognises that "Overly strict regulations are also obstructing investment and competition" in services (MOSF, 2009). It is also concerned by the trade deficit in services, which increased from 0.7% of GDP in 2000 to 2.1% in 2009, but this reflects Korea's strong comparative advantage in manufacturing and should not be a problem. Korea's current account has averaged a surplus of 1.8% of GDP since 2000, and is even higher now, implying that there is no need to improve its external balance. The key objective ought to be generating employment and boosting domestic demand by promoting the development of services. Experience shows that market opening allows new firms, such as low-cost airlines, to offer new services, thereby opening up new areas of consumer demand. Stronger domestic demand would also reduce Korea's heavy reliance on exports and its vulnerability to foreign shocks, while providing beneficial spillovers to other countries. At the same time, more efficient service industries would also benefit other sectors, notably manufacturing, that use service-sector inputs. In other words, ensuring a competitive and dynamic service sector would have a double impact.

The government launched a major initiative in May 2009 to develop services. One objective is to provide a more level playing field between services and manufacturing, which receives greater tax incentives, fiscal aid and SME support. For example, knowledge-based services are being given more government credit guarantees. To increase the amount of SME assistance received in the service sector, the government greatly relaxed the requirements for service firms to be classified as SMEs.[12] However, providing more equal treatment between services and manufacturing would be better achieved by scaling back benefits to manufacturers, thereby reducing the fiscal cost, as well as the distortions that are likely to occur from fiscal support and tax expenditures.

In addition, in January 2009, the government identified five service sectors, including heath care, education, green financing (Chapter 5), contents and software, and conventions and tourism (Table 1.3). The government has developed a strategy to develop each of these services (National Council for Science and Technology, 2009). The May 2009 initiative also selected nine services with the aim of creating high-quality jobs and supporting economic growth. Five areas – medical services, logistics, consulting, design and IT services – were chosen because of their high value-added and strong growth potential. Another four – education, content provision, broadcasting and communications, and employment support – were designated because of their prospects for creating more jobs and reducing the trade deficit in services (MOSF, 2009).

Table 1.3. **New growth industries announced in January 2009**

Sector	New growth engines
Green technology industry	• New renewable energy • Low carbon energy • Water technology • LED application • Green transport system • High-tech green city
State-of-the-art fusion industry	• Media communication fusion • IT fusion system • Robot application • New materials and nano-fusion • Biomedicine and medical devises • High value-added food industry
High value-added service industry	• Global health care • Global education services • Green financing • Contents and software • Conventions and tourism industry

Source: National Council for Science and Technology (2009).

More important and less risky than service industry-specific measures are broader policies to strengthen competition in services by eliminating domestic entry barriers, accelerating regulatory reform, upgrading competition policy and reducing barriers to trade and inflows of foreign direct investment (FDI), as recommended in the 2008 *OECD Economic Survey of Korea* (Box 1.1). The government has had success in reducing entry barriers, as reflected in the improvement in Korea's ranking in the category "cost of starting a new business" from 126th in the world to 53rd for the year to May 2009, according to a World Bank study (Table 1.4). The progress reflects the easing of the minimum capital provision and a reduction in the number, time required and cost of procedures to start a new business, although each indicator is still above the OECD average. The Korea Fair Trade Commission (KFTC) has also taken steps to remove measures that restrict entry and reduce consumer welfare. *First,* it identified 68 anti-competitive regulations imposed by lower-level governments and received pledges to improve almost half of them. *Second,* the KFTC analysed 60 market entry regulations that distort the market structure and reached agreements with the relevant government agencies to improve 26 of them. While the KFTC has had some success, half of the anti-competitive measures that it identified have not been changed, suggesting that industry promotion efforts take precedence over competition in many areas.

Box 1.1. **Taking stock of structural reforms: enhancing productivity growth in the service sector**

Recommendations in the 2008 *Survey*	Actions taken or proposed by the authorities
Provide a favourable environment for the service sector	
Scale back government assistance to SMEs, including subsidies, financial aid, credit guarantees and tax incentives, to make them less dependent on such support.	Government assistance to SMEs was significantly increased in 2009 through higher subsidies, expanded credit guarantees and measures to boost bank lending to SMEs.
Eliminate discrimination against the service sector by ensuring equal treatment with manufacturing.	The definition of SMEs in the service sector was relaxed to allow more firms to receive tax benefits and financial support.
Establish an efficient reporting system for intellectual and intangible assets and provide adequate protection of intellectual property to encourage investment in intangible assets.	Legislation to deal with copyright infringement on the Internet was introduced in July 2009, while measures to deal with counterfeit goods have been upgraded.
Accelerate regulatory reform	
Enhance the use of regulatory impact assessments (RIAs) and public consultations to improve the quality of regulation and adopt an explicit policy that regulations can only be adopted if the benefits justify the costs.	Guidelines for RIAs were introduced in December 2008.
Step up the pace of regulatory reform to reduce entry barriers and regulations that limit competition and expand the scope to cover additional areas, such as industrial and regional policies.	The Korea Fair Trade Commission identified 60 market entry regulations and reached an agreement with relevant government ministries to improve 26 of them. The time and cost of starting a new business was significantly reduced.
Create a mechanism in the National Assembly to ensure the regulatory quality of proposed legislation.	No action taken.
Extend successful reforms introduced in special zones on a nation-wide basis and phase out the special zone approach.	No action taken.
Upgrade the competition framework	
Strengthen the deterrent effect of surcharges and criminal penalties, including individual sanctions.	The number of criminal penalty cases increased from 33 in 2008 to 43 in 2009 while the amount of surcharges rose by 36%.
Provide the KFTC with compulsory investigative powers for more effective enforcement.	No action taken.
Scale back remaining exemptions from the competition law and preferential measures, particularly for SMEs.	No action taken.
Strengthen international competition	
Promote inward FDI by eliminating restrictions on foreign ownership and improving the business climate.	In July 2009, foreign investors were allowed to own up to 20% of firms that provide content for Internet multimedia broadcasting.
Liberalise product market regulations, which tend to discourage potential foreign investors.	In 2009, 175 regulations restricting location, facilities, etc. in new growth engine sectors were relaxed or removed.
Utilise FTAs to strengthen competition in the service sector and reduce barriers that limit trade.	The Korea-EU FTA was initialled in October 2009.The Korea-India Comprehensive Economic Partnership Agreement, which includes services, came into effect in 2010.
Remove restrictions and enhance competition in key service industries	
Telecommunications	
Safeguard in practice the independence and transparency of the KCC's regulatory decisions, as spelled out in the law.	No action taken.
Relax foreign investment restrictions.	No action taken.
Further liberalise entry requirements for facility-based services.	No action taken.
Introduce an auction system for the allocation of spectrum, while promoting a secondary market.	A January 2009 bill to allow operators to choose between the existing fee-based system and an auction system is pending.
Liberalise regulations on CATV to create a level playing field with the converged services of IPTV.	Limits on the market share of CATV and on the number of CATV stations owned by one operator were eased in late 2008.
Business services	
Remove unnecessary constraints on entry, form of practice, advertising, and foreign participation, in line with the OECD guidelines for the regulation of business services.	No action taken.
Encourage international competition by expanding recognition of certificates acquired overseas.	The US-Korea FTA will allow US attorneys to provide counsel on US and international law.
Raise and eventually abolish the ceiling on the number of law students and persons passing the bar exam.	The number of new entrants into the legal profession was cut from 2 000 to 1 000 in 2010 but is to be raised to 2 300 in 2012.

Table 1.4. **Time and cost of starting a new business**

Countries shown by their rank from least to most restrictive

	2009 world ranking	2008 world ranking	Number of procedures	Time (days)	Cost (per cent of income per capita)	Minimum capital (per cent of income per capita)
New Zealand	1	1	1	1	0.4	0.0
Canada	2	2	1	5	0.4	0.0
Australia	3	3	2	2	0.8	0.0
United States	8	6	6	6	0.7	0.0
Ireland	9	5	4	13	0.3	0.0
United Kingdom	16	8	6	13	0.7	0.0
France	22	14	5	7	0.9	0.0
Denmark	28	16	4	6	0.0	38.6
Finland	30	18	3	14	0.9	7.2
Belgium	31	20	3	4	5.3	19.4
Iceland	33	17	5	5	3.0	15.8
Norway	35	33	5	7	1.9	18.7
Hungary	39	27	4	4	8.0	10.2
Sweden	43	30	3	15	0.6	28.5
Korea	**53**	**126**	**8**	**14**	**14.7**	**0.0**
Turkey	56	43	6	6	14.2	9.5
Portugal	60	34	6	6	6.4	33.5
Slovak Republic	66	48	6	16	2.0	23.8
Chile	69	55	9	27	6.9	0.0
Netherlands	70	51	6	10	5.6	49.4
Switzerland	71	52	6	20	2.0	26.4
Luxembourg	72	69	6	24	1.8	19.9
Italy	75	53	6	10	17.9	9.7
Germany	84	102	9	18	4.7	0.0
Mexico	90	115	8	13	11.7	8.9
Japan	91	64	8	23	7.5	0.0
Czech Republic	113	86	8	15	9.2	30.5
Poland	117	145	6	32	17.9	15.3
Austria	122	104	8	28	5.1	52.0
Greece	140	133	15	19	10.9	21.4
Spain	146	140	10	47	15.0	12.8
Average			**5.9**	**13.9**	**5.7**	**14.6**

Source: World Bank (2009), *Doing Business 2010*.

Strengthening links to the world economy is another means to boost productivity growth in services. The globalisation of services has been driven by technological advances, such as broadband networks and digitalisation, regulatory reform and trade liberalisation. Despite increasing openness, Korea's level of integration with the world economy is still very low in terms of import penetration, the share of foreign workers and the stock of inward FDI (2007 *OECD Economic Survey of Korea*). Korea has taken steps to increase international competition in services through its growing participation in free trade agreements (FTAs) since 2004:

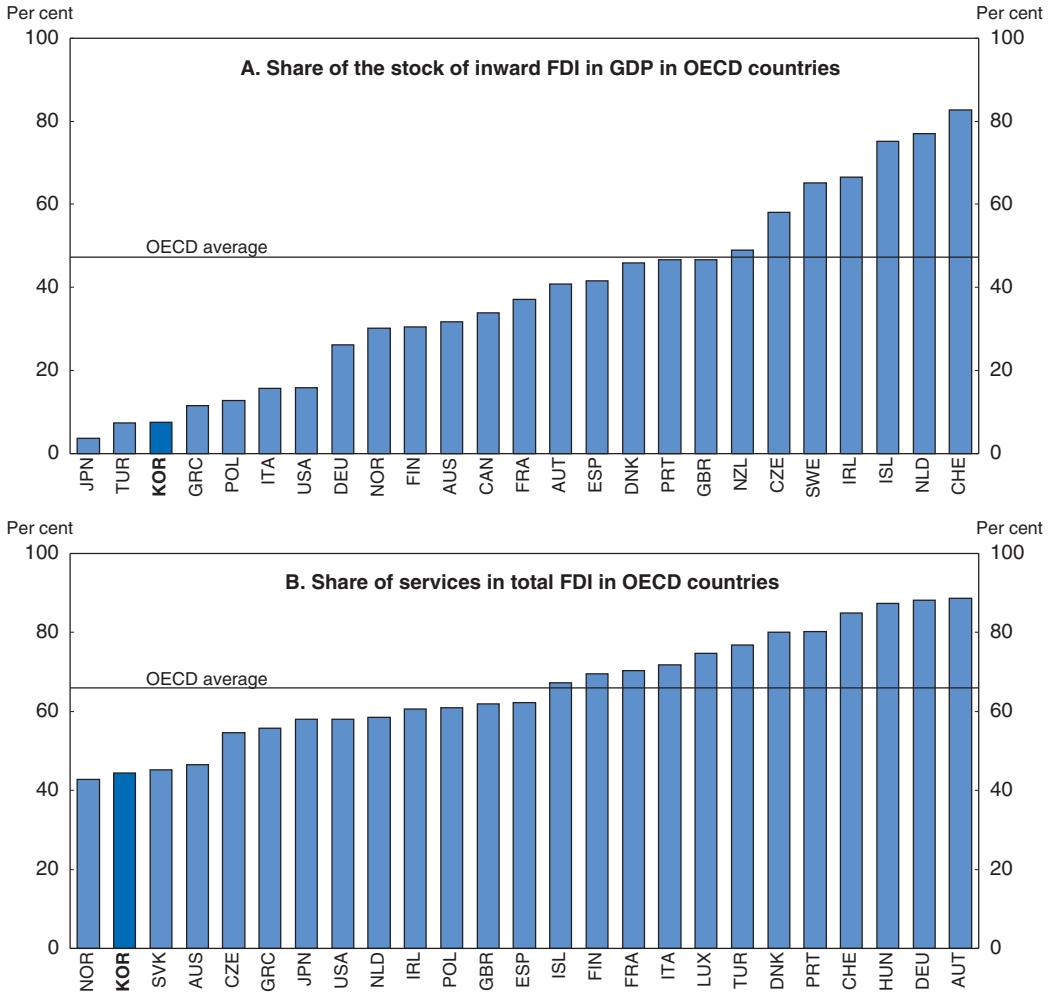
- Korea has five agreements in effect covering about 15% of its international trade: Chile (2004), Singapore (2006), EFTA (2006) and ASEAN (2006 and later expanded to include services in 2009). In addition, a Comprehensive Economic Partnership Agreement (CEPA) with India (2010) covers professionals in 163 categories, including computer experts and management technology.

- Korea has signed or initialled agreements with the United States (2007) and the EU (2009) that are still awaiting final approval. These FTAs will include significant liberalisation in professional services, such as law and accounting, and in transport, distribution, construction and finance.
- Korea is currently negotiating agreements with Australia, Canada, Columbia, Japan, Mexico, New Zealand and the Gulf Co-operation Council.
- FTAs are under joint study or consideration with China, Israel, Turkey, the Russian Federation, Mercosur and the South Africa Customs Union.

Efforts to liberalise trade through FTAs may also help boost the stock of inward FDI from its 2008 level of 8% of GDP, the third lowest in the OECD area (Figure 1.6). Moreover, Korea is one of only four countries where the share of FDI in services is less than one-half of the total stock. Consequently, the stock of inward FDI in services is only 4% of GDP in Korea compared with an OECD average of 28%. FDI inflows increased by 11.4% in 2008,

Figure 1.6. **International comparison of the stock of inward foreign direct investment**

In 2008 or latest year available



Source: OECD Economic Globalisation Indicators Database.

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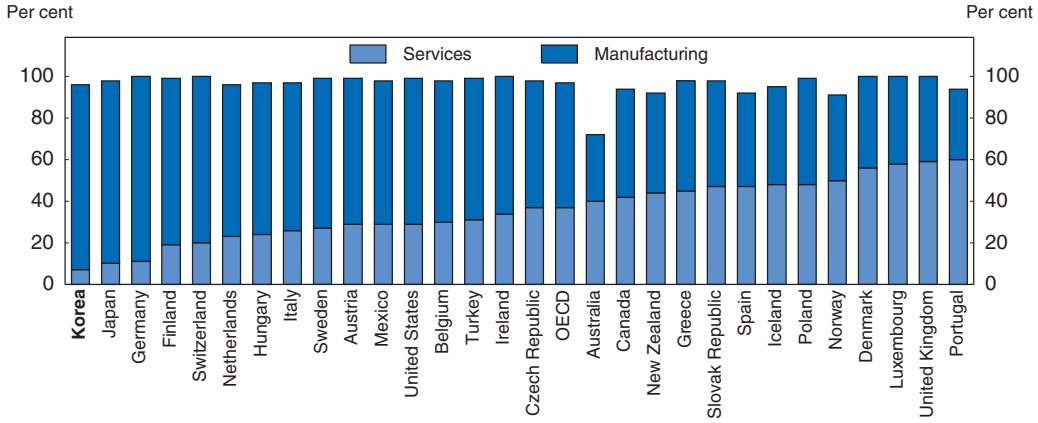
reversing a prolonged downward trend, and declined by less than 2% in 2009 despite the sharp contraction in the global economy. To encourage inflows, Korea should further relax FDI restrictions, including foreign ownership ceilings in key services, and liberalise product market regulations.[13] In addition, it is important to foster a foreign investment-friendly environment, thereby encouraging more cross-border M&As, enhance the transparency of tax and regulatory policies and reform the labour market (see below). The treatment of manufacturing and services in the six Free Economic Zones should be more balanced. While all manufacturing industries qualify for benefits, including tax breaks and rent support, logistics, tourism, education, R&D and medical services are the only eligible service sectors. Finally, the emphasis on special zones should not distract policymakers from the top priority of improving the business climate.

Greater competition in services – both domestic and foreign – would also help encourage innovation. Korea is a front-runner in R&D, an important element of innovation, spending 3.2% of GDP in 2007, the fourth highest in the OECD. However, the service sector accounts for only 7% of private-sector R&D, the lowest share in the OECD area and far below the average of 35% (Figure 1.7). In addition to strengthening competition, the government's policies for promoting innovation should be oriented more toward service firms, while raising the service sector's awareness of existing public programmes. In addition, links between service firms and government research institutions should be strengthened. In sum, Korea's exceptional economic development over the past half century has been driven in no small part by its successful innovation in manufacturing. The priority now is to extend rapid innovation to other parts of the economy, notably services.

Figure 1.7. **R&D spending in the manufacturing and service sectors**

Business enterprise expenditure on R&D by sector in 2007 or latest year



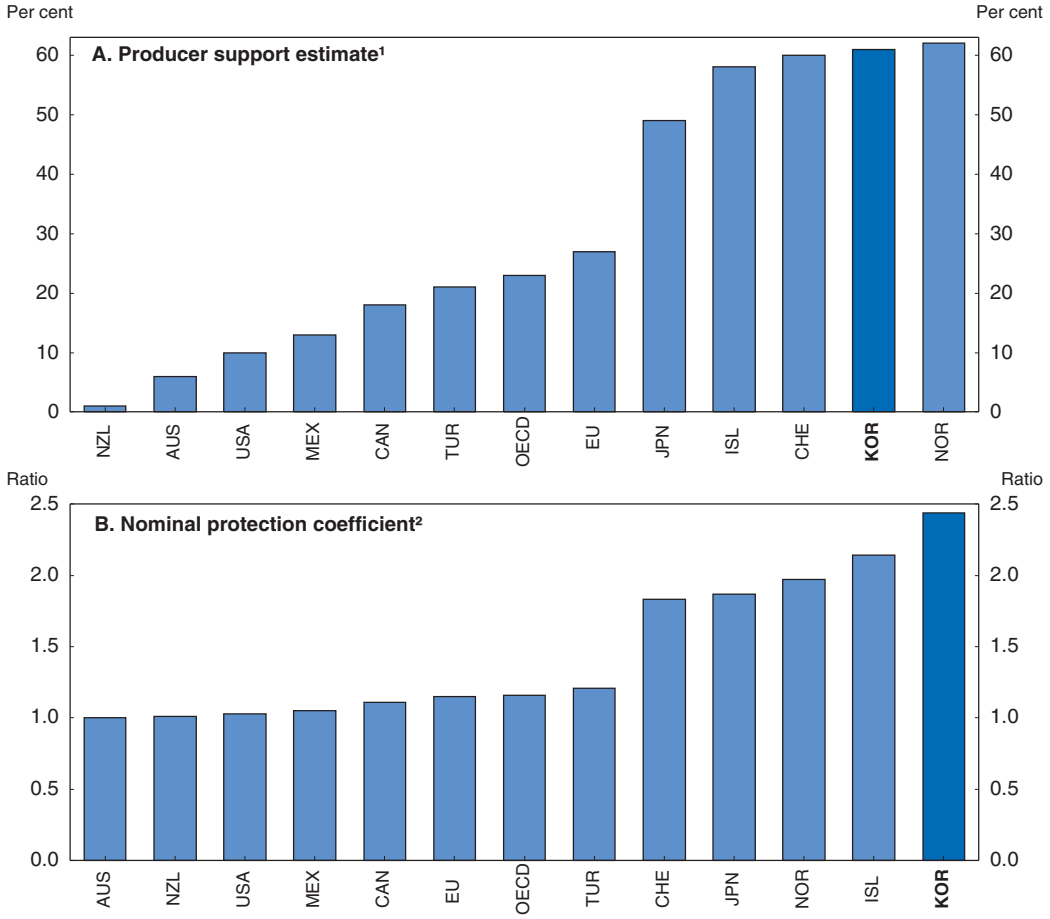
Source: OECD DSTI Database.

StatLink http://dx.doi.org/10.1787/888932302454

Agriculture, another low-productivity sector in Korea, receives a high level of support that imposes heavy burdens on consumers. Although agricultural support, as measured by the percentage producer support estimate (PSE), has fallen from 70% of the value of agricultural production in 1986-88 to 61% in 2006-08, it remains far above the OECD average of 23% (Figure 1.8). Total support to agriculture amounted to 2.9% of GDP over that period and made consumers pay more than double the world price for agricultural products

Figure 1.8. **International comparison of agricultural support**

Average of 2006-08



1. The PSE is an indicator of the value of monetary transfers to agriculture resulting from agricultural policies. It is presented as a share of the total value of production at domestic producer prices.
2. The nominal protection coefficient is a measure of market protection defined as the ratio between the average prices paid by consumers and the international price.

Source: OECD (2009a), *Agricultural Policies in OECD Countries 2009: Monitoring and Evaluation*, Paris, OECD.

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(Panel B). Market price supports, which distort production and trade, accounted for 87% of the support provided in Korea in 2008, compared to 47% in the OECD area. It is essential to replace them with direct support for farmers, thus limiting the distortions to production and trade. While FTAs are helping to open the market, agricultural products receive special treatment. For example, Korea's FTA with ASEAN excludes rice and gives special treatment to other major agricultural goods as "hyper-sensitive products". The government is trying to strengthen the links between agriculture and the food industry through reforms to increase the competitiveness of agricultural firms and farmer organisations. However, more measures are needed to attract the participation of non-agricultural corporations and facilitate the emergence of new types of business organisations (OECD, 2009a).

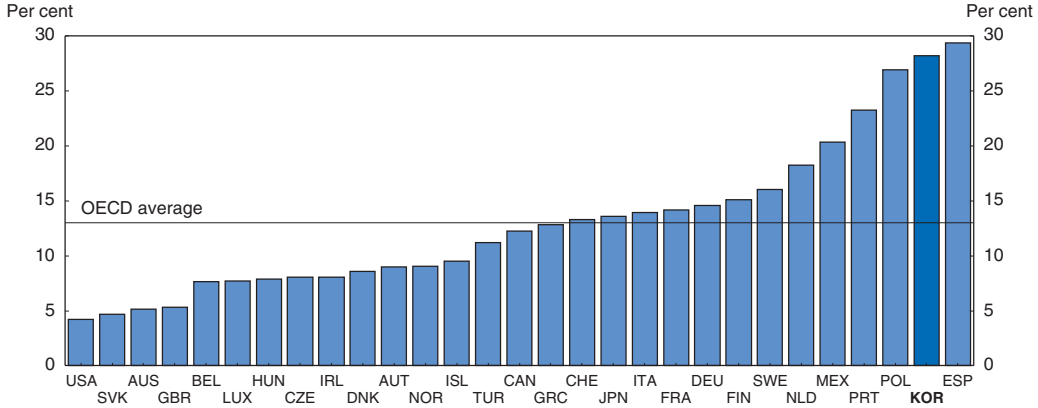
Labour market reform

Reducing the large share of non-regular workers

A major problem in the labour market is the rising degree of dualism: the share of "non-regular workers" now exceeds one-third of employees. The concept of non-regular employment includes workers with fixed-term contracts, part-time workers (those working fewer hours than full-time workers) and atypical workers (temporary agency workers, home-based workers, etc.). The largest component of non-regular employment is temporary workers, whose share of employment increased from 16.6% in 2001 to 28% in 2007, the second highest in the OECD area (Figure 1.9). According to surveys, firms hire non-regular workers to reduce labour costs and to increase employment flexibility, given the difficulty of laying off regular workers (OECD, 2007). According to one study, the productivity of non-regular workers is 22% below that of regular workers, while their wages are 44% less (Korea Employers Federation, 2006). In addition, firms face lower social charges for non-regular workers due to gaps in social insurance coverage: the share of non-regular workers participating as employees in 2009 was 38.2% for the National Pension Scheme, 42.7% for the Employment Insurance Scheme and 43.4% for National Health Insurance.

Figure 1.9. **International comparison of temporary employment**

As per cent of total employment in 2008[1]



1. Reference year is 2001 in Greece, 2004 in Mexico, 2005 in the United States, 2006 in Australia and 2007 in Korea.

Source: OECD Employment Outlook Database.

StatLink http://dx.doi.org/10.1787/888932302492

The high proportion of temporary workers is a drag on growth as it increases worker turnover and hence reduces firm-provided training, which plays a very important role in Korea. It also raises equity issues as non-regular workers face precarious jobs, wage discrimination and less social protection. Reducing dualism requires weakening the incentives that encourage firms to hire non-regular workers. One priority is to liberalise employment protection for regular workers so that firms can achieve their desired flexibility without depending as much on non-regular workers (Box 1.2). A second priority is to increase the coverage of non-regular workers by the social safety net, thus improving equity and narrowing the gap in labour costs. Finally, it is important to increase training opportunities for non-regular workers to enhance their employment prospects. Public spending in Korea on labour training programmes as a share of GDP is one of the lowest in the OECD.

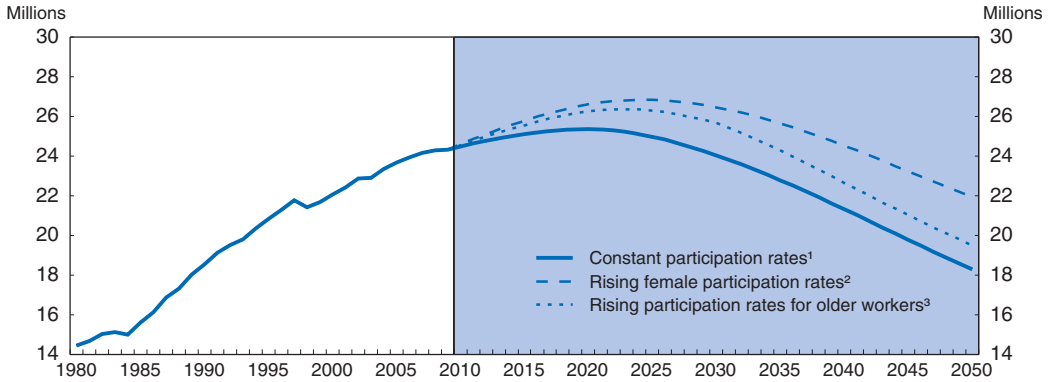
Box 1.2. **Taking stock of structural reforms: the labour market**

Recommendations in the 2008 *Survey*	Actions taken or proposed by the authorities
Reverse the trend toward increasing labour market dualism	
Liberalise employment protection for regular workers to reduce the incentive for hiring non-regular workers to enhance employment flexibility.	No action taken. The Economic and Social Development Commission, created in June 2009, is discussing ways to improve labour-related institutions and practices.
Expand the coverage of social insurance schemes to reduce firms' incentives to hire non-regular workers and provide better protection for such workers.	The collection of social insurance contributions for pensions, health, long-term care, employment and industrial accidents was combined in one agency, which may help improve the coverage for non-regular workers and small firms.
Ensure that the newly implemented law to protect non-regular workers does not slow employment growth.	Occupations facing large-scale layoffs can be exempted from the limit of two years for fixed-term workers.
Raise the labour force participation rate of women, while encouraging higher fertility	
Expand the availability of high-quality childcare by relaxing price controls on private-sector providers.	No action taken.
Lengthen maternity leave and ensure that eligible persons are able to take maternity and parental leave, while promoting family-friendly workplaces.	Parental leave was expanded for those with children age three and younger to those with children too young for primary school.
Reduce the use of seniority-based wages and reverse labour market dualism to provide better job opportunities for women.	The system of paying allowances to older workers whose wages decline under peak-wage systems was made permanent in 2009. A public research institute is providing consulting to support wider use of performance-based wages.
Improve job prospects for youth	
Reduce mismatches between skills provided in tertiary education and those required in the labour market by strengthening links between universities and companies.	Agreements for joint training by companies and Polytecs have been implemented and special training programmes for university graduates have been established in Polytecs.
Improve the quality of tertiary education by strengthening competition through increased transparency about performance, stronger accreditation procedures and regulatory reform.	The government introduced a university information disclosure system which requires universities to disclose major outcomes since end-2008. A university evaluation and accreditation system is being implemented in 2010.
Expand public support for universities as the number of elementary and secondary students decline.	The government is increasing spending in this area by 22% between 2008 and 2010.
Reduce the number of those who are not in employment, education or training (NEETs) by reversing the upward trend in non-regular employment.	The Youth New Start Project was launched, with outlays of 17 billion won in 2009, to integrate young adults lacking education and job experience into the labour force.
Improve quality and efficiency of public education to curb demand for after-school tutoring, in part by bringing teachers' salaries more in line with average income.	The government has launched a number of initiatives, including the "school autonomy expansion plan" in 2009, a teacher evaluation system in 2010 and the designation of high-quality schools where students do not need after-school tutoring.
Follow through on the plan to allow more independent schools to promote both efficiency and quality.	The government introduced an "autonomous private" high school system in 2009, with 25 such schools.
Promote the employment of older workers	
Abolish the mandatory retirement system, thus helping to flatten the wage-seniority profile.	The government provided financial aid for consultation costs for 33 companies introducing the Wage Peak System in 2009.
Phase out the retirement allowance by accelerating the introduction of company pensions.	A bill to simplify the introduction of company pensions is pending in the National Assembly that would, for example, make company pensions the default for newly established companies.
Improve ALMPs by focusing on training rather than wage subsidies and direct job creation.	A programme to help the older unemployed find jobs trained 700 persons in 2009 and is expected to train 3 000 in 2010.

Raising women's labour force participation rate

Population ageing is another challenge for Korea. Indeed, the rise in the elderly dependency ratio by 2050 is projected to be the largest in the OECD area, according to the government's population projections (Figure 4.8). If participation rates were to remain at their current levels for each age group, the labour force would peak at 25.4 million in 2020 and then fall by more than a quarter to around 18 million by mid-century (Figure 1.10). By

Figure 1.10. **Long-term projections of the labour force**



1. The participation rates for men and women are assumed to remain at their current levels for each age group.
2. Female participation rates are assumed to reach current male rates in each age group by 2050.
3. The participation rates are assumed to converge by 2030 to the maximum value in the OECD for each gender and age group over 50, while the rates for younger workers remain at their current levels.

Source: OECD Secretariat calculations based on population projections by the Korea National Statistical Office.

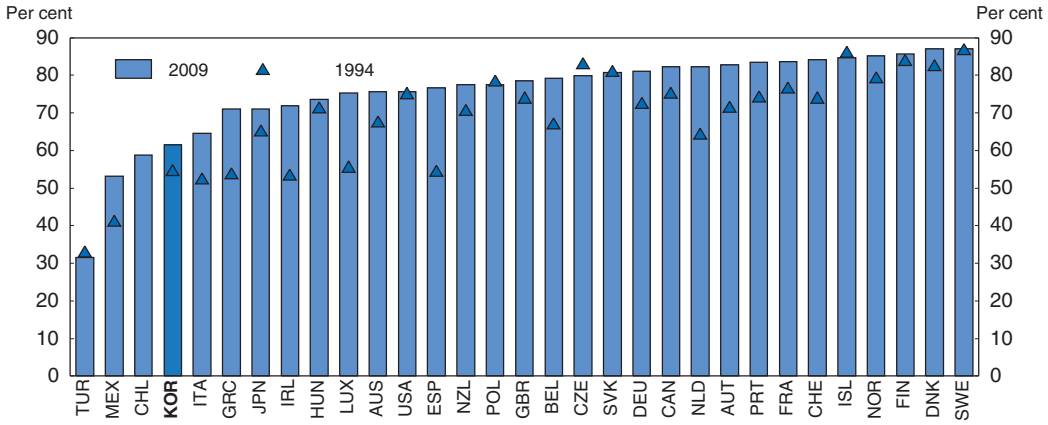
StatLink http://dx.doi.org/10.1787/888932302511

that point, there would be only 1.1 persons in the labour force for every elderly person, compared with 4.7 in 2009, suggesting that financing social spending would impose a heavy burden on workers. One option to ease the demographic burden would be immigration, although inflows have been closely restricted thus far. Indeed, foreign workers accounted for only about 1% of the labour force in Korea, well below the OECD average of 10% (OECD, 2007).

The most important strategy would be to increase women's participation rate, which is relatively low. For women between the ages of 25 and 54, the rate was 62% in 2009, the fourth lowest in the OECD area and far below the rates of over 80% in some OECD countries (Figure 1.11). If the female participation rate in Korea were to converge to the current level for males for each age group by 2050, the fall in the labour force would be limited to around 22 million, almost 20% higher than in the case of an unchanged participation rate

Figure 1.11. **International comparison of female labour force participation rates**

Rates for women aged 25 to 54 in 2009



Source: OECD (2010d), *OECD Employment Outlook 2010*, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932302530

(Figure 1.10). The lower participation rate for women in Korea reflects a number of factors. *First,* the gender wage gap in Korea is one of the highest in the OECD area, owing to the large share of women in non-regular employment, the tradition of seniority-based wages and the low share of women in managerial jobs. *Second,* there is a lack of suitable childcare. In a government survey (Ministry of Labour, 2008), more than 60% of women responded that the "burden of childcare" was the primary obstacle to joining the labour force. *Third,* the limited length (90 days) and coverage of maternity leave constrains female employment. *Fourth,* long working hours in Korea make it difficult to combine paid employment with family responsibilities, thus discouraging female employment. Despite the gradual introduction of the 40-hour work week from 2004, annual working hours are still more than one-third higher than the OECD average.

Addressing these issues is key to boosting female labour force participation and mitigating the impact of population ageing. *First,* reducing the gender gap requires tackling the non-regular worker problem and encouraging a move towards performance-based pay. *Second,* the availability and quality of child-care needs to be expanded, while making it more affordable, in part by relaxing price controls on private-sector suppliers (Box 1.2). *Third,* maternity leave should be lengthened beyond 90 days, while encouraging greater use of parental leave. While these policies are important, their impact would be limited in workplaces that are not family-friendly, not least due to very long working hours. Family-friendly workplaces are essential for the reconciliation of work and family life and also have important implications for the very low fertility rate of 1.2 in 2008. In short, the labour market will have to adjust in order to provide mothers with the hours, jobs, wages and careers that will attract them back into employment.

Making better use of older workers

Another key to mitigating the impact of population ageing is to increase the employment of older workers. Labour force participation in Korea remains above the OECD average for men over 50 and for women over 60. Nevertheless, the labour force would be 7% larger in 2050 if the participation rate for each gender and age group over 50 rose to the highest rate in the OECD, while the rates for younger workers remain at their current levels.

Equally important is to effectively utilise older workers. While older persons are likely to remain in the labour force, they tend to retire from their main career by age 55. Indeed, the average employment tenure peaks in the 45-to-49-age group – well below most other OECD countries where the peak is in the 55-to-64-age group – and then falls sharply. About three-quarters of departing employees become self-employed, primarily in services with low productivity. As a result, a third of workers over age 50 are self-employed, compared to 13% of those under that age. As for workers still employed past 50, more than two-thirds in 2007 worked in firms with less than 100 workers and a majority were non-regular workers.

The importance of seniority in determining wage levels is a major reason for the early departure of employees. For example, a worker with 25 years of tenure in a company is paid almost three and a half times more than a newly-hired employee despite having less education on average. Companies in which wages are closely linked to seniority hire fewer older workers (Lee, 2008). In 2005, 85% of firms with more than 300 workers set mandatory retirement below the age of 60 recommended by law. Mandatory retirement enables firms to dismiss older workers as their seniority-based wages surpass their productivity and, given the difficulty of dismissing regular employees, helps firms adjust their workforces to the business cycle.

A second factor promoting the early departure of older workers from enterprises is the retirement allowance. By law, firms must pay a lump sum of at least one month of wages to each departing employee for each year worked, although many pay about twice that amount in practice. Given that the lump sum is based on the employee's final wage, which rises sharply with seniority, it creates a disincentive to keep older employees. The allowance is not a secure source of income, as it is only partially funded, making payments dependent on the firm's survival. Moreover, this payment has lost its link to retirement income as most workers receive such lump sums a number of times during their working life.

In addition, many older workers lack the skills necessary in Korea's increasingly knowledge-based economy. The share of the 55-to-64-age cohort with a tertiary education was only 11% in 2007, compared to 56% for the 25-to-34-age cohort, the highest in the OECD. The education gap between older and younger age cohorts is thus the largest in the OECD, leaving older workers at a disadvantage. Indeed, about two-thirds of workers over 50 are in physically-demanding jobs, such as manual work, which tend to be low-paid.

The government's "Basic Plan to Promote Employment of the Aged", which runs through 2021, aims at increasing the employment rate of the 55-to-64-age group from 59% in 2005 to at least 63% (OECD, 2008) through a number of policy initiatives. *First,* the government is encouraging firms to raise their mandatory retirement age, with a goal of eventually eliminating it altogether.[14] *Second,* government programmes are supporting the re-employment of older persons who left firms involuntarily because of the mandatory retirement age or dismissal. *Third,* the government is introducing new wage subsidies. For example, the government subsidises firms for up to five years if they guarantee employment to workers until their retirement age, extend their retirement age or offer re-employment programmes to retirees.

Instead of wage subsidies to reduce the cost of older workers relative to younger ones, it is important to achieve wage flexibility so that older workers remain affordable. Such flexibility would allow more opportunity for "continuous employment" at the same firm, which is more attractive than self-employment or non-regular work, thus encouraging older workers to remain in the labour force. One priority is to require companies to set mandatory retirement at an age closer to the pension eligibility age – or forbidding the use of mandatory retirement altogether – thereby helping to change the seniority-based wage system. Firms agree to steep seniority-based wage profiles on the condition that they can force older workers to leave. Without mandatory retirement, firms would insist on wage systems that more closely reflect productivity.

In addition, the retirement allowance system should be abolished in order to reduce firms' incentives to retire older workers, as well as to enhance labour mobility. The company pension system introduced in 2005 in workplaces with at least five employees would provide better income security for retired workers. This requires labour and management to agree on a defined-benefit (DB) or a defined-contribution (DC) scheme. However, progress in introducing company pensions has been hindered by the disagreement between employers and employees as to which type of plan to introduce. Workers tend to favour DB plans, which are similar to the current retirement allowance in guaranteeing the benefit paid, while employers tend to favour DC plans. The introduction of a company pension while maintaining the retirement allowance reflects the difficulty of phasing out the latter, which is popular with workers. To accelerate the transition to company pensions, the government should end the preferential tax treatment for

retirement allowances, which allows the lump sum to be taxed over a number of years at low rates, a more favourable arrangement than that granted to company pension systems. Moreover, the government should encourage DC plans in order to promote pension portability and thereby labour mobility.

Finally, greater emphasis on lifelong learning and training would likely improve the job prospects for older workers more than employment subsidy programmes. Government expenditures on lifelong learning, including vocational training, amounted to only 0.1% of GDP in 2007 and less than one-third of adults participate in lifelong education. The rate rises with the level of education, making it important to focus more on less-educated persons. In addition, training has to be carefully targeted on the needs of enterprises to be effective. Such training could be financed by reducing wage subsidies, which tend to delay structural change and to distort the composition of the labour force by changing the relative cost of older workers relative to younger ones.

Policies to promote growth and sustainability

Korea's strong recovery from the global financial crisis is expected to continue, as explained above, raising the question of the appropriate timing and speed of the exit from exceptional fiscal and monetary policy, which is discussed in Chapter 2. Given rapid population ageing and the potential cost of closer economic integration with North Korea, maintaining a sound fiscal position is a priority in Korea. Moreover, falling behind the curve on withdrawing monetary stimulus raises the risk of higher inflation that would necessitate a substantial tightening of the monetary policy stance, which could undermine the expansion.

Korea's financial sector, examined in Chapter 3, appears to be in relatively sound shape following the global financial crisis. However, there is also the question of an exit strategy from the exceptional support provided to financial institutions to help them cope with the crisis, and from the measures to encourage lending to SMEs. Korea faces the longer-term issue of how to reduce its vulnerability to external shocks. In addition, there are a number of other policy challenges, such as containing the risks of mortgage lending while not stifling residential investment, the appropriate role of securitisation and improving corporate governance. The government's reform plans, aimed at reducing segmentation, also raise questions as the post-crisis financial framework evolves.

Rising public spending on health and long-term care is one of the fiscal challenges facing Korea. While it is still low compared to other OECD countries, as explained in Chapter 4, rapid population ageing and expansion of the relatively limited National Health Insurance will put significant upward pressure on spending in coming years. There are important issues of how to increase efficiency to limit the rise in spending and how to best finance such expenditures. The heavy reliance on patients' out-of-pocket payments raises issues of adequate access to health care for low-income persons and those with chronic illness. In addition, while there is dissatisfaction with the quality of health care, there is reluctance to boost spending, given fears that it will simply increase the income of health suppliers without raising quality.

Korea has proclaimed "Low Carbon/Green Growth" as the nation's vision to guide development during the next 50 years and launched a five-year programme costing 10% of GDP to promote it, as discussed in Chapter 5. The ambitious plans raise questions of how the government can promote the growth of new industries without creating distortions in

resource allocation and wasteful spending. Green growth includes the objective of climate change mitigation and Korea's commitment to cut its greenhouse gas emissions by 30%, relative to a business-as-usual baseline, by 2020. Given the ambition of these goals, measures to achieve them in a cost-effective manner are essential.

Notes

1. The size of a country's decline in exports between the third quarter of 2008 and the first quarter of 2009 was linked to its concentration in medium and high-technology products (OECD, 2009b).
2. Korea recorded an 8% rise in its export performance in 2009 (defined as export volume growth divided by the weighted average of import growth in Korea's export markets), well above the OECD average of 3% in 2009 and Korea's 2.3% annual average increase between 2002 and 2008.
3. One advantage of comparing changes since the fourth quarter of 2008 is that it was the quarter with the sharpest output decline for the OECD area as a whole, as well as for most of the OECD member countries.
4. The won depreciated by 35% relative to the Chinese renminbi between the first quarters of 2008 and 2009.
5. However, the increase in output by the fourth quarter of 2009 relative to the pre-crisis peak was higher in Poland (2.6%) and Australia (1.9%) than in Korea (1.2%).
6. In 2009, an estimated 801 thousand persons participated in these public employment programmes, which lasted between three and 12 months, with the annual average at 504 thousand.
7. The government assumes that 40% of the additional public jobs crowded out private-sector employment creation, thus reducing the net additional employment effect to 165 thousand (60% of the 276 thousand rise in public employment in 2009).
8. These comparisons are based on exchange rates of 10 May 2010, the rates used in the projections.
9. At 100, the number of consumers who are optimistic about the future matches the number who are pessimistic.
10. The contribution from stockbuilding is projected at zero in each of the remaining quarters of 2010 and in 2011, although the carry-over from 2009 makes a positive contribution of 2.2 percentage points to growth in 2010.
11. The self-employed account for one-third of total employment in Korea, the fourth highest in the OECD.
12. To be classified as a SME in the service sector, the maximum sales ceiling was quadrupled from 5 billion won to 20 billion won in finance, insurance, IT, and medical and welfare services.
13. Of Korea's 1 083 business lines (of which 529 are in services), three are entirely closed to FDI, while restrictions apply to another 26 (primarily in services).
14. In 2008, the government enacted a law which will prevent unjustified discrimination against older persons in recruitment or employment from 2009 and age discrimination with regard to working conditions such as wages and welfare from 2010 (KOILAF, 2008).

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ANNEX 1.A1

The 2008 crisis: a case of déjà vu *for Korea?*

The rapid depreciation of the won in 2008 brought back memories of the 1997 crisis, when Korea, along with two other Asian countries, turned to the IMF to avoid defaulting on their external debt. Indeed, the won declined by 39% in effective terms between the first and fourth quarters of 2008, recalling the 66% drop between the third quarter of 1997 and the first quarter of 1998 (Figure 1.A1.1). In 1998, output collapsed by 7.8% (quarter-on-quarter) in the first quarter, its largest fall since the beginning of Korea's national account statistics in 1970. In 2008, it recorded the second-worst drop of 4.5% in the fourth quarter. There was criticism that the government, corporate and financial sectors had failed to reform sufficiently following the 1997 crisis, forcing Korea to repeat the painful adjustment process only one decade later (Huh, 2009).

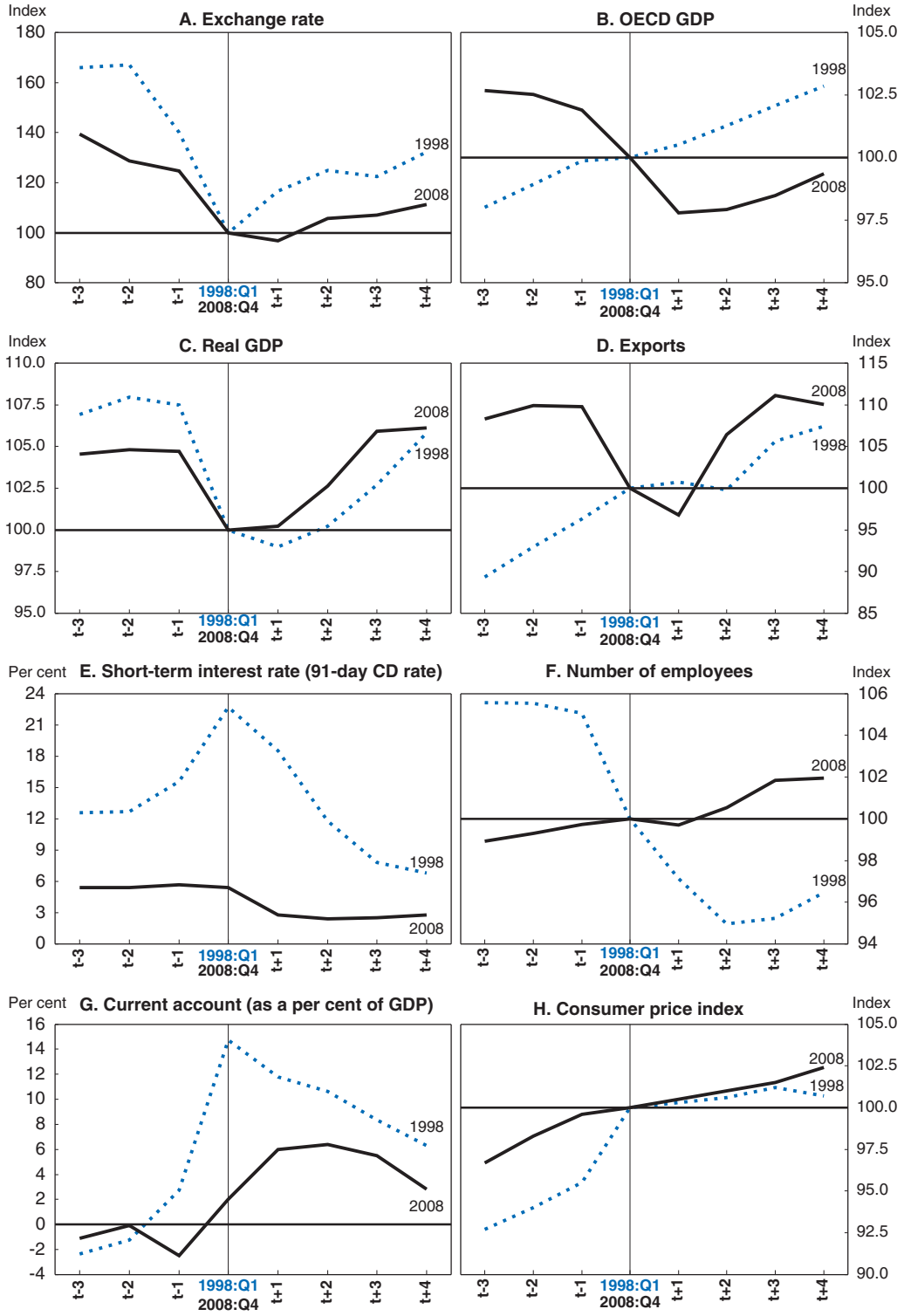
However, the underlying causes of the two crises in Korea were very different. The 1997 crisis was triggered by the implosion of the internal financial market, while the 2008 crisis was mainly triggered by the collapse of the external financial market (Cho, 2009). The different origins of the 1997 and 2008 crises are evident in the divergent paths of the world economy during the two episodes. The 1997 crisis was Korea and Asia-specific, while failing to disrupt strong growth in the OECD area at a 3.3% annual rate between 1996 and 1999 (Figure 1.A1.1, Panel B). In contrast, the 2008 crisis was a global shock that led to the deepest downturn in the OECD area in many decades.

In 1997, foreign investors lost confidence in Korea as a result of weaknesses in its corporate and financial sectors. Profitability was very weak in the 1990s, even before the economy started slowing, and the debt-to-equity ratio was nearly 400% in the manufacturing sector in 1997 (Table 1.A1.1). Such high leverage lowered the interest-coverage ratio to close to 100%, indicating that the average company barely covered its interest expenses – let alone principal – with the cash flow from its operations. The precarious state of the corporate sector led to a sharp rise in the bankruptcy ratio from 0.1% in 1996 to 0.4% in 1997.

The corporate-sector problems were reflected in the banks that lent to them. Banks went into the crisis with insufficient capital as a result of consistently low or negative earnings and the burden of large non-performing loans, which amounted to 4% of their lending in 1996. In addition, Korea's short-term foreign debt doubled to USD 76 billion between 1994 and 1996, reflecting a regulatory framework that favoured short-term over long-term borrowing. Much of the borrowing was by "merchant banks", wholesale financial institutions that operated in a regulatory blind spot. Short-term debt before the crisis erupted in 1997 was more than double Korea's foreign exchange reserves, which had been squandered by the government's futile attempts to defend the won's exchange rate (Figure 3.8).

Figure 1.A1.1. **Comparison of the economic recoveries from the 1997 and 2008 crises**

1998 first quarter and 2008 fourth quarter[1] are set at 100



1. These quarters were chosen as they recorded the largest output declines and won depreciation.

Source: OECD Economic Outlook Database.

StatLink http://dx.doi.org/10.1787/888932302549

Table 1.A1.1. **Corporate and financial-sector indicators**

	1996	1997	2006	2007
A. Corporate sector				
Return on assets (in per cent)				
All firms	0.5	–0.9	6.8	7.3
SMEs	0.7	–0.6	3.3	3.5
Debt-to-equity ratio in manufacturing (in per cent)				
All firms	317.1	396.3	98.9	97.8
SMEs	387.4	418.4	132.6	129.1
Interest-coverage ratio (in per cent)[1]				
All firms	112.0	129.1	439.3	469.8
SMEs	100.9	99.0	282.9	267.9
B. Banking sector[2]				
BIS capital ratio	9.1	7.1	12.8	12.3
Return on assets (in per cent)	–0.9	–3.3	1.1	1.1
Non-performing loan ratio as per cent of total lending	4.1	6.0	0.7	0.6

1. The ratio of operating profits to interest expenses.
2. Commercial banks in 1996-97. All banks in 2006-07. As a per cent of total lending.
Source: Financial Supervisory Service.

The corporate and financial sectors were in far better shape by the time of the 2008 crisis. Firms had sharply boosted their profitability and reduced their average debt burden to below 100%, helping to push up their interest-coverage ratio. The improved financial situation enabled the corporate sector to overcome the 2008 crisis without the wave of bankruptcies that occurred during the first episode. Meanwhile, the banking sector was better capitalised, more profitable and had lower non-performing loans, putting it in a much better position to cope with the much smaller impact from the second crisis. The difference between the two crises is illustrated by the amount of public funds needed for restructuring. By the end of 2000, the Korea Asset Management Corporation (KAMCO) had spent 37 trillion won (7% of 1997 GDP) to purchase impaired assets, while the Korea Deposit Insurance Corporation had spent 54 trillion won (11%) to recapitalise financial institutions and reimburse depositors in failed institutions. In contrast, only 7 trillion won (0.7% of 2009 GDP) has been spent thus far to recapitalise financial institutions and purchase impaired assets following the 2008 crisis (Chapter 3).

Despite the depressed global environment, the Korean economy grew slightly more during the four quarters following the 2008 shock (6.1%) than during the four quarters from early 1998 (5.8%) (Panel C). One factor was a somewhat stronger rebound in exports following the 2008 crisis (Panel D), despite the smaller depreciation of the won. This may reflect the increased concentration of Korean exports in medium and high-technology products and closer trade ties with China. Indeed, China's share of Korean exports (including Hong Kong, China) tripled from 10% in 1997 to nearly 30% in 2009.

A second major difference between the two crises was the policy response. During the first crisis, the Bank of Korea raised its policy rate to as high as 30% in an attempt to reverse the won's depreciation, leading to sharp spike in short-term rates (Panel E). The impact of such high rates on a highly leveraged economy was devastating, resulting in the bankruptcy of 58 large corporations in 1997 alone. In contrast, the central bank responded to the 2008 crisis by cutting its policy rate to a record low of 2%. There was also a major difference in the fiscal policy response. In 1997, the government initially cut spending and raised taxes in a misguided attempt to balance the budget that was only reversed once the severity of the downturn became evident. In 2008, the government responded promptly

with the largest fiscal stimulus package in the OECD area. This included a significant number of additional public employment jobs, helping to support household income and consumption. Indeed, the number of employees increased by 2% in the year from the fourth quarter of 2008, compared to a drop of nearly 4% during the 1997 episode (Panel F), which lifted the unemployment rate to above 8%. In contrast, the unemployment rate remained below 4% in 2009.

Thanks to government policies, domestic demand has been stronger in the wake of the 2008 crisis. Consequently, the spike in the current account surplus – which reached 14% of GDP in the first quarter of 1998 – was smaller in the 2008 episode (Panel G). In addition, the inflation performance has been different. Consumer prices increased by 2.4% in the year from the fourth quarter of 2008, compared to almost no change in the earlier episode (Panel H).

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Chapter 2

Macroeconomic policy: the exit from fiscal and monetary stimulus

Korea's strong recovery from the global financial crisis stems in part from an effective macroeconomic policy response. The prompt withdrawal of fiscal stimulus in 2010 will help meet the medium-term fiscal plan for reducing budget deficits. Given the increase in government spending in the past, making the targets in the plan more binding is important to help achieve the fiscal target. In addition, the broadening of tax bases would be beneficial in this regard. While such policies would help limit government debt, it is also necessary to contain the rapidly rising debt of public corporations, in part by further progress in the 2008 privatisation programme. Monetary stimulus has also supported the recovery. Given the expected strength of output growth in 2010, it is important that the Bank of Korea not fall behind the curve in withdrawing monetary stimulus. Korea should continue its flexible exchange rate policy.

Given the strong economic recovery, thanks in part to effective fiscal and monetary stimulus, the appropriate timing and pace of an exit strategy is a more urgent question in Korea than in most other OECD countries. On the fiscal side, Korea's legacy of sound spending and tax policies has kept the government in a strong financial position. Nevertheless, the pressures related to rapid population ageing, as well as the potential cost of economic integration with North Korea, make fiscal consolidation a priority. As for monetary policy, the Bank of Korea has kept the policy interest rate at a record low 2% since early 2009, while inflation has fallen back within the target zone in the wake of the crisis. Given uncertainty about the world economic outlook, the Bank has been cautious about withdrawing monetary policy stimulus. However, waiting too long to start normalising interest rates would have adverse consequences for consumer and asset price stability. This chapter considers the appropriate fiscal and monetary policies in an uncertain economic environment. Recommendations are summarised in Box 2.3 in the concluding section.

Fiscal policy

The large and prompt fiscal response to the crisis is being scaled back in 2010

The government responded to the sharp economic downturn resulting from the global financial crisis with a fiscal stimulus package of 6.1% of GDP, the largest among the 26 OECD countries adopting explicit crisis-driven stimulus programmes (Table 2.1). Moreover, the stimulus was implemented in a timely manner. Additional expenditure was included in a September 2008 supplementary budget and in the 2009 budget, along with temporary tax cuts. Another supplementary budget followed in April 2009. In addition,

Table 2.1. **Composition of fiscal packages in the major countries**[1]

Announced or implemented over the period 2008-10 as a share of 2008 GDP

	Net effect	Tax measures					Spending measures					
		Total	Individuals	Firms	Consumption	Social contributions	Total	Final consumption	Investment	Transfers to households	Transfers to firms	Transfers to sub-national government
Canada	–4.1	–2.4	–0.8	–0.3	–1.1	–0.1	1.7	0.1	1.3	0.3	0.1	. .
France	–0.7	–0.2	–0.1	–0.1	0.0	0.0	0.6	0.0	0.2	0.3	0.0	0.0
Germany	–3.2	–1.6	–0.6	–0.3	0.0	–0.7	1.6	0.0	0.8	0.3	0.3	0.0
Italy	0.0	0.3	0.0	0.0	0.1	0.0	0.3	0.3	0.0	0.2	0.1	0.0
Japan	–4.7	–0.5	–0.1	–0.1	–0.1	–0.2	4.2	0.2	1.2	0.6	1.5	0.6
Korea	**–6.1**	**–2.8**	**–1.4**	**–1.1**	**–0.2**	**0.0**	**3.2**	**0.0**	**1.2**	**0.7**	**1.0**	**0.3**
United Kingdom	–1.9	–1.5	–0.5	–0.2	–0.6	0.0	0.4	0.0	0.4	0.2	0.0	0.0
United States	–5.6	–3.2	–2.4	–0.8	0.0	0.0	2.4	0.7	0.3	0.5	0.0	0.9
OECD average[2]	**–3.9**	**–1.9**	. .	. .	. .	. .	**–2.1**	. .	. .	. .	. .	. .

1. The amounts shown in the total columns do not always match the sum of the columns shown because some components either have not been clearly specified or are not classified in this breakdown.
2. Weighted average of countries that adopted positive stimulus programmes.

Source: OECD (2009), *OECD Economic Outlook*, No. 85, OECD, Paris.

personal and corporate income tax rates were permanently cut in 2009-10. Korea's legacy of fiscal soundness, which had contained government spending and debt at relatively low levels, gave the authorities ample room for manoeuvre to respond to the crisis.

The stimulus is almost evenly divided between additional expenditure (3.2% of GDP) and tax cuts (2.8%). On the spending side (Table 2.2), additional public investment (1.2% of GDP) was driven in part by the "Green New Deal Policy" announced in January 2009, which included major infrastructure projects, notably the Four Major Rivers Restoration Project and railroad construction (Chapter 5). Such projects were a key factor boosting short-term public employment by 276 thousand in 2009, thereby limiting the rise in unemployment and supporting private consumption (Chapter 1). In addition, transfers to local governments also financed such jobs. Short-term public employment in 2010 is slated to remain well above its 2008 level. A second major spending category was transfers to businesses (1% of GDP), particularly small and medium-sized enterprises (SMEs). There were also large transfers to public financial institutions to cope with financial-sector problems and provide more lending to SMEs (Chapter 3).

Table 2.2. **Fiscal stimulus in Korea**

Announced or implemented over the period 2008-10 as a share of 2008 GDP

Spending measures	Per cent of 2008 GDP	Tax cuts	Per cent of 2008 GDP
Total[1]	**3.2**	**Total**	**2.8**
Public investment	1.2	For individuals	1.4
Transport	0.4	Targeted on low-income groups	0.6
Energy	0.2	Increased personal tax allowance	0.1
Other[2]	0.6	Oil tax rebate	0.5
		Reductions in housing-related taxes	0.4
		Personal income tax cut	0.3
Transfers to households	0.7	For businesses	1.1
Pensions	0.3	Tax relief associated with new spending:	0.4
Unemployment benefits	0.2	R&D	0.1
Lengthening benefit duration	0.1	Investment	0.3
Loosening eligibility criteria	0.2	Corporate income tax cut	0.7
Other income-related transfers	0.1		
Transfers to businesses	1.0	On consumption	0.2
Small and medium-sized enterprises	0.4	Cuts in general consumption taxes	0.1
For public financial institutions	0.3	Cuts in car-related taxes	0.1
To job-creating companies	0.2		
Construction and transport sectors	0.1		
Other	0.1	Other	0.2
Transfers to sub-national governments	0.3		

1. The government increased spending in FY 2008 through a supplementary budget of 4.6 trillion won passed in September 2008. For FY 2009, spending was boosted by 11.4 trillion won in December 2008 and by a supplementary budget of 17.2 trillion won that was passed in April 2009.
2. Includes 0.1% of GDP each for agriculture, education, public services, environment protection, defence and housing and health.

Source: OECD Secretariat.

On the tax side (Table 2.2), about half of the cuts were targeted on households. Most of the tax reductions were temporary measures for low-income households and cuts in housing-related taxes. On the business side, tax reductions were aimed at boosting R&D and investment. Finally, consumption taxes were lowered, including those on cars, thus

helping to boost car sales in Korea by 20% in 2009. In addition to these temporary measures, there were permanent cuts in income tax rates:

- The three lower personal income tax rates were reduced in 2009-10 by 2 percentage points from a range of 8-26% to 6-24%. The cut in the top rate of 35% was delayed until 2012.
- The corporate income tax rate (national and local) was cut from 25% to 22% in 2009, pushing it well below the OECD average of 28%. The planned reduction to 20% was delayed until 2012.
- The corporate income tax rate for SMEs was reduced from 11% in 2008 to 10% in 2010.

The discretionary fiscal measures, coupled with cyclical revenue losses, had a significant impact on the fiscal balance in 2008 and 2009 (Table 2.3). The additional outlays in 2008 expanded the deficit in the consolidated central government budget (excluding the social security surplus) from a projected 1.1% of GDP to 1.5%.[1] With the stimulus packages, government spending in 2009 increased by 14.3%, while tax revenue as a share of GDP fell by another ½ percentage point as a result of weak economic growth and tax cuts. Consequently, the deficit widened further in 2009 to 4.1% of GDP, the largest since 1998.

The government scaled back fiscal stimulus in the 2010 budget by cutting spending by 4.2% relative to 2009 (including the supplementary budget).[2] Such a large fall in outlays will reduce their share of GDP to the 2008 level. Even with tax revenue growth limited by rate cuts, the budget deficit (excluding the social security surplus) is projected to fall

Table 2.3. **Consolidated central government budget**[1]

	2006	2007	2008		2009		2010
	Outcome[2]	Outcome[2]	Initial budget[3]	Outcome[2]	Initial budget[3, 4]	Outcome[2]	Initial budget[3]
A. Total							
Revenue	209.6	243.6	247.2	250.7	253.9	255.3	262.3
Growth (per cent)	9.5	16.2	9.8	2.9	2.7	1.8	3.3
Per cent of GDP	23.1	25.0	24.1	24.5	24.0	24.0	23.2
Expenditures	205.9	209.8	230.2	238.8	275.9	272.9	264.3
Growth (per cent)	9.6	1.9	8.1	13.8	19.9	14.3	–4.2
Per cent of GDP	22.7	21.5	22.5	23.3	26.0	25.7	23.4
Balance	3.6	33.8	17.0	11.9	–22.0	–17.6	–2.0
Per cent of GDP	0.4	3.5	1.7	1.2	–2.1	–1.7	–0.2
of which:							
Social security balance	26.4	30.2	28.1	27.5	29.1	25.6	28.1
Per cent of GDP	2.9	3.1	2.7	2.7	2.7	2.4	2.5
Privatisation revenues	0.7	0.0	1.0	0.0	0.0	0.0	0.7
Per cent of GDP	0.1	0.0	0.1	0.0	0.0	0.0	0.1
Financial-sector restructuring costs	12.0	0.0	0.0	0.0	0.0	0.0	0.0
Per cent of GDP	1.3	0.0	0.0	0.0	0.0	0.0	0.0
B. Alternative measures of the balance							
Excluding social security	–22.8	3.6	–11.1	–15.6	–51.0	–43.2	–30.1
Per cent of GDP	**–2.5**	**0.4**	**–1.1**	**–1.5**	**–4.8**	**–4.1**	**–2.7**
Excluding social security, privatisation and financial-sector restructuring costs	–11.5	3.6	–12.0	–15.6	–51.0	–43.2	–30.8
Per cent of GDP	–1.3	0.4	–1.2	–1.5	–4.8	–4.1	–2.7

1. In trillion of won unless specified otherwise, and on a GFS basis.
2. Growth rate is relative to previous year's outcome.
3. Growth rate is relative to previous year's initial budget.
4. Including the April 2009 supplementary budget.

Source: Ministry of Strategy and Finance.

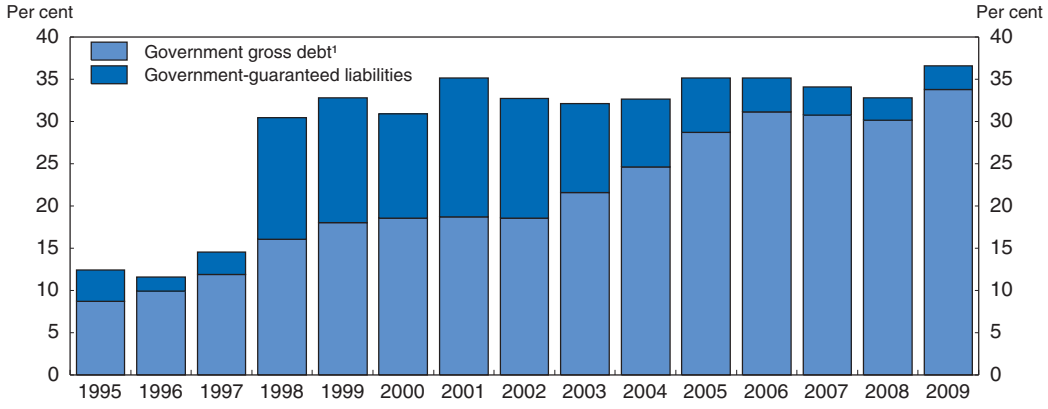
to 2.7% of GDP in 2010. To reduce spending, the government eliminated some of the projects funded by the stimulus packages that appeared to be less effective. The largest cut by spending category in 2010 is a 30.8% fall in industry, SMEs and energy, where much of the fiscal stimulus had been concentrated. Significant spending reductions are also planned for the environment (5.3%), general public administration (4.1%) and education (3.6%). This will be partially offset by a 7.1% rise in R&D spending, in line with the mid-term plan to boost public R&D by 50% between 2008 and 2012. The investment will be concentrated in basic science, new growth engines and green technologies (MOSF, 2009).

The impact on public debt

Gross government debt was 32% of GDP in 2008 (general government basis) in Korea, the sixth lowest in the OECD area and well below the OECD average of 79%. Nevertheless, the ratio had tripled from less than 10% in 1996, primarily due to the 1997 crisis (Figure 2.1). Indeed, gross debt jumped to 16% in 1998, with an almost equivalent amount of government-guaranteed debt, which was issued by public institutions and used to restructure the financial system by re-capitalising financial institutions and purchasing non-performing assets (Chapter 3). The sum of government debt and government-guaranteed debt remained stable at between 30% and 35% of GDP during the decade from 1998. However, the composition changed as 49 trillion won of government-guaranteed debt was replaced by government debt between 2003 and 2006.

Figure 2.1. **Government gross debt and guaranteed liabilities**

Per cent of GDP



1. On a GFS basis including local government debt.

Source: Ministry of Strategy and Finance.

StatLink http://dx.doi.org/10.1787/888932302568

Gross government debt reached a record high of 34% of GDP in 2009 (Figure 2.1), although the four percentage-point increase was relatively small compared to the average of 11 points in the OECD area.[3] Moreover, the rise in the debt ratio in Korea in 2009 was relatively modest compared with its 1996-98 experience. In addition, this time Korea avoided a sharp expansion in government-guaranteed debt, as the need for public money for financial restructuring was much smaller (Chapter 3). The medium-term fiscal plan (see below) shows the debt ratio peaking at 37.6% of GDP in 2011 before falling back to 35.9% in 2013.

However, the debt of Korea's 24 public corporations – which is not included in government debt – more than doubled from 84 trillion won in 2004 to 177 trillion won in 2008, boosting its share of GDP from 10.2% to 17.2% (Table 2.4). The list of public corporations includes major enterprises, such as the Korea Land and Housing Corporation, the Korea Expressway Corporation and the Korea Electric Power Corporation. Rising debt boosted public corporations' debt-to-capital ratio from 85% in 2004 to 133% in 2008. Public corporations have become saddled with increasing amounts of debt over the years in part because they have been mobilised to undertake a number of infrastructure development projects. For example, the Korea Water Resources Corporation planned to spend 8 trillion won (0.8%) of GDP between 2009 and 2012 on the Four Major Rivers Restoration Project (Chapter 5) and 2 trillion won between 2009 and 2011 to build a canal linking Seoul and Incheon. In addition, some public corporations have provided overly generous compensation packages to their executives.

Table 2.4. **The debt and assets of public corporations and agencies**[1]

Trillion won and per cent of GDP

	2004	2005	2006	2007	2008	Annual growth (%)
Debt of public corporations and agencies						
In trillion won	241	248	254	276	321	7.4
Per cent of GDP	29.1	28.7	28.0	28.3	31.3	
Debt of public corporations						
In trillion won	84	99	119	138	177	20.6
Per cent of GDP	10.2	11.4	13.1	14.2	17.2	
Debt of public agencies						
In trillion won	157	149	135	138	144	–2.3
Per cent of GDP	19.0	17.2	14.9	14.2	14.0	
Assets of public corporations and agencies						
In trillion won	355	416	455	491	532	10.6
Per cent of GDP	42.9	48.1	50.1	50.4	51.8	
Assets of public corporations						
In trillion won	182	215	241	267	310	14.2
Per cent of GDP	22.0	24.8	26.5	27.4	30.2	
Assets of public agencies						
In trillion won	173	201	214	224	222	6.5
Per cent of GDP	20.9	23.2	23.5	23.0	21.6	
Debt/capital (in %) for public corporations and agencies	212	149	126	128	152	
Debt/capital (%) for public corporations	85	86	98	107	133	
Memorandum items:						
General government debt[2]						
In trillion won	177.1	231.8	273.5	296.1	331.0	16.9
Per cent of GDP	21.4	26.8	30.1	30.4	32.2	
General government assets[3]						
In trillion won	412.1	483.2	544.6	617.9	643.0	11.8
Per cent of GDP	49.8	55.8	59.9	63.4	62.6	

1. Includes 270 public agencies and 24 public corporations, which are defined as public entities that generate more than half of their revenue themselves. Three publicly-owned banks are excluded.
2. Does not include the debt of public corporations and agencies. These figures are derived on the basis of SNA93.
3. Does not include the assets of public corporations and agencies. These figures are derived on the basis of SNA93.

Source: Ministry of Strategy and Finance and OECD.

The rising debt of public corporations has been partially offset by a decline in the debt of 270 public agencies since 2004. Nevertheless, the combined debt of public corporations and public agencies reached 31.3% of GDP in 2008.

Appropriate corporate governance of public enterprises is a major challenge in many countries, given that such enterprises are protected from bankruptcy and takeover, two major threats that discipline the management of private firms. The OECD's "Guidelines on Corporate Governance of State-Owned Enterprises" presents a number of principles that would improve the performance of public corporations (OECD, 2005). *First,* the government should not automatically guarantee public corporations' liabilities, as doing so may shelter them from a crucial source of market monitoring and pressure, thereby distorting their incentive structure. Automatic guarantees tend to encourage excessive indebtedness, wasted resources and market distortions, to the detriment of both creditors and taxpayers. *Second,* it is important to observe high standards of transparency by making public corporations subject to the same level of accounting and auditing standards as listed companies, thus requiring them to disclose financial and non-financial information. *Third,* the government should not be involved in the day-to-day management of public corporations. Instead, it should allow them full operational autonomy to achieve their defined objectives and recognise the independence of their boards. In the case of Korea, public corporations should not take on public infrastructure projects that exceed their ability to generate revenue, thus forcing them to rely excessively on debt. Moreover, the five-year financial management plans of public corporations should be subject to increased oversight by the National Assembly.

Although Korea sold eight important public enterprises in the wake of the 1997 crisis, privatisation stalled after 2002. The government announced a plan in October 2008 to privatise 24 state-owned institutions, including the Korea Development Bank and the Industrial Bank of Korea. However, the major network industries, such as electricity, gas and water companies, were not included in the plan. By March 2010, six of the designated institutions had been privatised.[4] The 2008 plan also called for streamlining the other public institutions. By March 2010, 36 institutions had been merged into 16.[5] In addition, 129 institutions were restructured to improve efficiency, reducing employment by 22 thousand, a 12.7% decline.

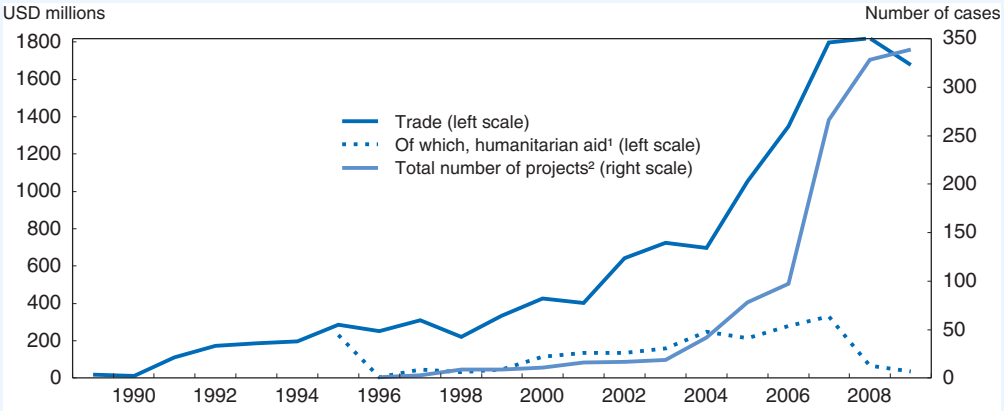
Korea's medium-term fiscal plan

Maintaining a sound fiscal position in Korea is a priority given spending pressures, including those stemming from population ageing (Chapter 3) and the potential cost of intensified economic co-operation with North Korea (Box 2.1). In 2004, Korea implemented a series of fiscal reforms to enhance the efficiency of public spending. The most important measure was the introduction of the National Fiscal Management Plan, which aimed at controlling fiscal risk and facilitating efficient resource allocation by integrating a medium-term perspective into budgeting.[6] The plan serves as a baseline for the fiscal balance and the sectoral allocation of expenditure. In the past, budget formulation focused on a single year, resulting in weak prioritisation of resources. Since 2007, the government is required to submit the medium-term fiscal plan to the National Assembly, even though the plan is not legally binding. The plan is presented to the legislature each October, along with the budget for the following fiscal year.[7]

Box 2.1. **Economic co-operation with North Korea**

North-South trade fell by 8% in 2009, the first decline since 2004 (Figure 2.2), and is only 0.2% as large as the South's international trade. Nevertheless, the South remained the North's top export destination at USD 932.3 million, ahead of China at (USD 793 million), thanks to a rapid expansion of trade related to economic co-operation projects.[1] Economic factors have increasingly driven North-South exchanges, even though political factors remain an obstacle.[2]

Figure 2.2. **Inter-Korean economic relations**



1. Includes both public and private assistance, primarily for food.
2. The cumulative number of approved private economic co-operation projects including those in the Gaesong Industrial Complex.

Source: Ministry of Unification.

StatLink http://dx.doi.org/10.1787/888932302587

The Mt. Geumgang resort, which was built in the late 1990s by a South Korean company with government subsidies, was suspended after a South Korean tourist was killed near the resort in July 2008. While the North has requested a resumption of the project, the South demanded three prerequisites: *i)* a joint investigation of the 2008 incident; *ii)* safeguards to prevent a similar incident; and *iii)* the creation of institutions to guarantee security. The North recently froze private South Korean assets at Geumgang and confiscated five South Korean government-run facilities there, threatening to resume the tours with a new business partner. In addition to the problems in government-initiated ventures, private-sector economic co-operation, which had tripled in terms of the number of approved projects between 2006 and 2008, has stalled (Figure 2.2).

In the wake of the sinking of a South Korean vessel, President Lee suspended trade and investment with the North in May 2010, although the Gaesong Industrial Complex, which was established in 2004 as a site for South Korean SMEs, will continue to operate. It now accounts for more than 55% of inter-Korean trade, as Gaesong-related trade increased by 16% in 2009 despite unfavourable political factors.[3] The growing importance of Gaesong reflects its success in combining the capital and technology of the South with land and labour in the North. For SMEs, Gaesong, located 60 kilometres north of Seoul, offers a solution to high wages and labour shortages in the South. Infrastructure, including rail and road links, electricity and communications, is provided by the South Korean government and the firms involved, while a public financial institution provides low-interest loans and insurance. North Korean workers employed in Gaesong are paid an average of USD 82.6 per month,[4] less than 5% of the average manufacturing wage in South Korea. As of February 2010, the complex contained 118 factories employing about 43 400 North Korean workers and 930 South Koreans. However, the North has been demanding wage hikes and higher land-use fees since 2009, creating an uncertain atmosphere for business. Moreover, the North recently has indicated that it would look for new business partners.

Box 2.1. **Economic co-operation with North Korea** *(cont.)*

Following two years of contraction, the North Korean economy is estimated to have grown by 3.7% in 2008. However, currency reform in November 2009 triggered severe economic problems. The South Korean economy is now about 38 times larger than the North's and 18 times larger on a per capita basis (Table 2.5). The long-term decline of the North is illustrated by the latest population census, which reported that the infant mortality rate increased from 14.1 in 1993 to 19.3 per 1 000 in 2008, compared to 4.1 in the South. Moreover, average life expectancy has dropped by 3 years, to 69.3, for women.[5] The large gap in income and health will boost the eventual cost of economic integration, although some argue that the large scope for convergence will promote high growth in the South (Kwon, 2009). The expansion of trade driven by private-sector firms in the South, in line with the government's strategy of limiting co-operation to projects that are economically viable and that do not overburden taxpayers in the South, provides the best hope for limiting the gap.

Table 2.5. **Comparison of North and South Korea in 2008**

	(A) North Korea	(B) South Korea	(A/B) Comparison (%)
Population (millions)	23.3	48.6	47.9
GDP (billion USD)	24.7	928.7	2.7
GDP per capita (USD)	1 060.5	19 105.6	5.6
Total trade (billion USD)	3.8	857.3	0.4
Exports	1.1	422.0	0.3
Imports	2.7	435.3	0.6
Inter-Korean exports (million USD)	932.3	888.1	105.0
Commercial exports[1]	931.0	768.8	121.1
Non-commercial exports[2]	1.3	119.3	1.1
Industrial statistics			
Power generation (billion kWh)	255.0	4 224.0	6.0
Steel production (million tonnes)	1.3	53.3	2.4
Cement production (million tonnes)	6.4	51.7	12.4
Agricultural production			
Grains (million tonnes)	4.3	5.5	78.3
Fertilizer (million tonnes)	0.5	3.2	15.0

1. Economic co-operation projects account for more than half of commercial trade.
2. Mostly includes humanitarian aid in the form of commodities such as rice and fertiliser.

Source: Bank of Korea and Ministry of Unification.

1. Inter-Korean trade is divided into commercial and non-commercial (including aid). Commercial trade is classified into general trade, processing-on-commission trade and economic co-operation projects. The composition of trade varies between the different classifications. Traditional commodities, such as agricultural products, are predominant in general trade, while textiles and electric and electronic products are the main items in the other categories.
2. For example, the North unilaterally suspended land routes from the South on 9 and 13 March 2009.
3. In particular, the North limited access to and the stay of South Korean workers in Gaesong in December 2008 and detained some South Korean employees. These problems were later resolved after bilateral talks.
4. In addition to wages, there is a social insurance contribution that averaged USD 9.20 per employee in December 2009.
5. The 2008 population census was conducted by the Central Bureau of Statistics of North Korea in collaboration with the United Nations Population Fund.

The medium-term plan was accompanied by the introduction of top-down budgeting. Under this approach, the Cabinet meets in May, before the line ministries submit their spending proposals, to discuss the economic outlook, fiscal targets and policy priorities. Building a consensus on fiscal policy and resource allocation at an early stage of the budget process was not possible under the bottom-up approach of the past. Once sectoral and ministerial spending ceilings are determined by the Cabinet, each line ministry is allowed to autonomously formulate their respective budgets, thereby increasing efficiency. In addition, the government fully reviews all budget programmes and projects using a zero-base approach.

The 2004 medium-term plan projected that spending would rise at a 6.3% annual average rate through 2008, increasing it from 23.7% of GDP to 24.4%.[8] In the event, expenditure rose at a 7.0% rate, increasing its GDP share to 25.1%. The consolidated central government budget, excluding the social security surplus, recorded a deficit of 1.5% of GDP in 2008 rather than the balance shown in the 2004 medium-term plan (Table 2.6). The extra 0.7% of GDP in spending in 2008 (from 24.4% to 25.1%) thus explained about one-half of the budget deficit.

Table 2.6. **The budget balance in the National Fiscal Management Plan**[1]

Per cent of GDP

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
2004 plan	–0.9	–1.0	–0.6	–0.3	0.0					
2005 plan		–1.5	–1.3	–1.1	–1.0	–0.9				
2006 plan			–1.7	–1.5	–1.2	–1.0	–0.8			
2007 plan				–1.6	–1.1	–1.0	–0.9	–0.6		
2008 plan					–1.1	–1.0	–0.9	–0.5	0.0	
2009 plan						–5.0	–2.7	–2.3	–1.3	–0.5
Outcome	–0.6	–1.0	–1.3	0.4	–1.5	–4.1				

1. The balance of the consolidated central government budget, excluding the social security surplus and the cost of financial-sector restructuring.

Source: Ministry of Strategy and Finance.

Fiscal stimulus lifted government spending further to 28.4% of GDP in 2009, while the revenue share has fallen in the wake of the crisis. As a result, the 2008 medium-term fiscal plan's target of a budget balance by 2012 is no longer realistic. Accordingly, the 2009 plan included a less ambitious target of a 1.3% of GDP deficit in 2012, falling to 0.5% in 2013 (Table 2.7). Meeting these targets will still be challenging, given that the government expects that the cuts in income tax rates will reduce revenue by 1% of GDP. Narrowing the deficit from the expected 2.7% of GDP in 2010 (Table 2.3) to 0.5% by 2013 would require limiting the annual growth of government spending to around 4%, a significant slowdown from the 7% rate between 2004 and 2008.

The completion of many of the stimulus projects included in the 2008-09 budgets will make it easier to achieve the spending targets for 2013. The introduction of new projects is conditional on self-financing or resources made available from savings on other projects. There are a number of other measures to encourage spending discipline: *i*) the objectives of preliminary feasibility studies for large-scale projects will be expanded and the assessment criteria will be strengthened to avoid wasteful spending; *ii*) the government will urge the National Assembly to require committees to consult with the Special Committee on Budget

Table 2.7. **The 2009 National Fiscal Management Plan for 2009-13**

Trillion won unless noted otherwise[1]

	2009					
	Original budget	Including the supplementary budget	2010[2]	2011	2012	2013
2009 plan						
GDP growth rate (in per cent)	4.0	–2.0	4.0	5.0	5.0	5.0
Revenue (A)	291.0	279.8	287.8	309.5	337.6	361.7
Expenditure (B)	284.5	301.8	291.8	306.6	322.0	335.3
Balance	6.5	–22.0	–4.0	2.9	15.6	26.4
Per cent of GDP	0.6	–2.1	–0.4	0.2	1.2	1.9
Balance excluding social security	–24.8	–51.0	–32.0	–27.5	–16.1	–6.2
Per cent of GDP (C)	–2.4	–5.0	–2.9	–2.3	–1.3	–0.5
Government debt (as per cent of GDP)	34.1	35.6	36.9	37.6	37.2	35.9
2008 plan						
Revenue (D)	–	295.0	314.7	339.2	367.0	–
Expenditure (E)	–	273.8	290.9	308.7	326.7	–
Balance excluding social security	–	–10.4	–9.7	–6.6	0.0	
Per cent of GDP (F)	–	–1.0	–0.9	–0.5	0.0	–
Difference between the plans						
Revenue (A – D)	–	–10.2	–26.9	–29.7	–29.4	–
Expenditure (B – E)	–	28.0	0.9	–2.1	–4.7	–
Balance (C – F)	–	–4.0	–2.0	–1.8	–1.3	

1. The numbers differ from Table 2.3, which includes government net lending in spending. In this table, government gross lending is included in spending while the repayment of government loans is shown in revenues, thereby boosting reported spending.
2. The final budget approved by the National Assembly included revenue of 290.8 trillion won, expenditure of 292.8 trillion won and a budget balance (excluding the social security surplus) of 2½ per cent of GDP.

Source: Ministry of Strategy and Finance.

and Accounts before passing budget-related bills; *iii)* upgrading performance evaluation systems will allow their greater use in the budget formulation process; and *iv)* the accrual accounting system will be applied to government accounts from 2012.

In April 2010, the government amended the National Finance Act to improve the effectiveness and comprehensiveness of the medium-term fiscal plan. *First*, the government has to submit to the National Assembly the evaluation and analysis reports of the previous year's medium-term plan, the Government Debt Management Plan, the Government Guaranteed Liability Management Plan, and the Mid- and Long-Term Plan of Public Funds Management. *Second*, the plan should include more information on the economic assumptions, including their impact on revenues, underlying the target for the consolidated budget balance. *Third*, the plan will classify spending into mandatory and discretionary expenditures. *Fourth*, when supplementary budgets or revisions to annual budgets are submitted to the National Assembly, they will have to include a report on its impact on the medium-term plan. *Fifth*, the medium-term plan will be submitted to the relevant standing committee in the National Assembly for review before it is formally submitted to the National Assembly in October of each year.

While these reforms are likely to make the plan more effective, they should be accompanied by steps to make the medium-term fiscal plan more binding on the government. Empirical evidence suggests that a combination of budget balance and spending rules produces the best results for fiscal consolidation (Guichard *et al.*, 2007).

While simple budget balance rules are inherently pro-cyclical, spending rules work best during economic upturns due to their counter-cyclical nature. Violations of a spending rule are generally more transparent and incontrovertible, thus promoting compliance (Anderson and Minarik, 2006). Almost all OECD countries have budget balance targets and 11 also have spending targets. In nearly three-quarters of member countries, a medium-term budget framework must be presented to the legislature. However, in most countries, including Korea, there is no legal obligation for the medium-term fiscal plan to be formally approved by the legislature (Lienert and Jung, 2004). The key to an effective medium-term fiscal plan is its power to bind annual budgets to the outcomes contained in the plan in order to achieve the fiscal target.

As noted above, Korea's medium-term plan contains targets for both the budget balance and the level of spending. However, the plan has no legally binding power on annual budgeting. Given that credibility and accountability are critically important to the success of a medium-term framework, Korea needs to establish fiscal rules by law or by a Cabinet decision. Furthermore, consensus building and communication of the fiscal plan across the government is vital for its credibility, requiring strong commitment at the very top of government and discipline across ministries. In this regard, the Cabinet meeting chaired by the President each May at the beginning of the annual budget process should play an important role in strengthening the commitment for fiscal consolidation.

Tax reform to enhance efficiency and to raise additional revenues

Tax reform is essential to enhance efficiency by reducing the distortions stemming from taxation and to boost revenue to meet the medium-term plan of cutting the deficit to 0.5% of GDP by 2013. With the reductions in the personal and corporate income tax rates, the main option for raising revenue is broadening the tax bases by eliminating tax expenditures. For the personal income tax, tax expenditures numbered 96 in 2006 and amounted to 22.7% of personal income tax revenue, while the 84 tax expenditures in the corporate tax system amounted to 17.2% of revenue. In addition, strengthening the local property holding tax would provide more tax revenue from a relatively non-distortionary levy while helping to limit upward pressure on housing prices. Indeed, a tax on property holding is more favourable for growth than other taxes as it has less impact on decisions to supply labour, produce, invest and innovate (Johansson *et al.*, 2008). The recommendations in the 2008 *OECD Economic Survey of Korea* for a fundamental tax reform are still relevant. Box 2.2 summarises those recommendations, as well as progress toward implementing them.

Monetary and exchange rate policy

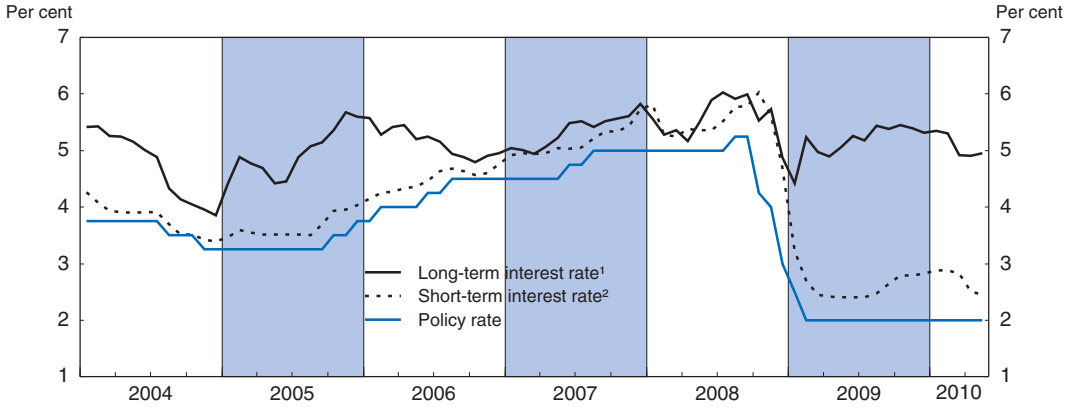
After raising the policy interest rate to 5¼ per cent in August 2008, just one month before the Lehman shock, the Bank of Korea quickly reversed course. Between October 2008 and February 2009, it cut the policy interest rate six times to a record low of 2%, where it has remained since (Figure 2.3). In addition, the Bank of Korea provided 28 trillion won (2.7% of GDP) to alleviate a credit crunch by increasing open market operations and broadening the range of assets eligible for them, raising the upper limits on its credit ceiling programme, paying interest to banks on their required reserve balances and contributing to the Bond Market Stabilisation Fund and the Bank Recapitalisation Fund (Chapter 3).

Box 2.2. **Taking stock of structural reforms: reforming the tax system**

Recommendations in the 2008 *OECD Economic Survey of Korea*	Actions taken or proposed by the authorities
Corporate income tax	
Lower the statutory rate to promote the international competitiveness of firms, thereby reducing the share of corporate taxes in direct taxation.	The standard rate was cut to 22% in 2009 and that for SMEs was cut from 11% in 2008 to 10% in 2010.
Phase out quasi-taxes.	Quasi-taxes are being streamlined by restructuring various contributions, penalties and commissions.
Broaden the tax base by reducing tax expenditures.	New tax expenditures were introduced in 2008 in response to the crisis (Table 2.2).
Avoid reliance of local governments on corporate income taxes.	No action taken.
Personal income tax	
Reduce the income tax rate to facilitate FDI, entrepreneurship and education.	The lower three income tax rates were reduced from 8-26% to 6-24% during 2009-10, while the top rate of 35% will be cut to 33% in 2012.
Reduce the tax incentives for the lump-sum retirement allowance scheme.	No action taken.
Broaden the personal income tax base.	Deductions on comprehensive income and on education expenses were increased, thus narrowing the tax base. A number of small steps to broaden the base were taken.
Further increase compliance of the self-employed by improving enforcement and hiking penalties for tax evasion.	Steps were taken to increase the transparency of self-employed income by encouraging bookkeeping by small businesses and extending the requirement to file electronic tax invoices.
Expand the Earned Income Tax Credit that was introduced in 2008.	The eligibility requirement was eased from two children to one and the maximum amount of payment was boosted from 0.8 million won to 1.2 million won.
Increase the taxation of fringe benefits.	No action taken.
Encourage the autonomy of local governments to change tax rates.	The government will change the local inhabitant tax into a local income tax, but the rate and base will remain unchanged for the next three years.
Value-added tax and other consumption taxes	
Rely on the VAT for increased revenue.	No action taken.
Use a single VAT rate.	No action taken; Korea continues to provide a VAT exemption on some products.
Maintain a broad tax base for the VAT.	Korea maintains a broad base for the VAT.
Phase out individual consumption taxes.	No action taken. However, the purpose of these taxes has been changed from offsetting the regressivity of the VAT to addressing externalities.
Phase out earmarked taxes.	No action taken.
Strengthen environment-related taxes.	No action taken.
Reduce special treatment of SMEs.	No action taken.
Avoid a local VAT as it would widen the gap between regions while failing to enhance local government autonomy.	A local VAT was introduced in 2010, with the rate aimed at reducing the fiscal gap between localities.
Property taxes	
Increase local property holding taxes.	The tax base brackets and rates were reduced in 2009 to the level of 2007.
Further reduce taxes on transactions.	No action taken.
Base the capital gains tax on the size of the gain rather than the number of houses owned.	The capital gains surtax on those owning two or more homes has been temporarily suspended.
Phase out the nation-wide Comprehensive Property Tax (CPT) over the medium term.	The government decided in principle to transform the CPT into a local tax.

Consumer price inflation fell from a peak of nearly 6% in mid-2008 to 2% in the third quarter of 2009 (Figure 2.4). In contrast to the concern about actual or potential deflation in a number of OECD countries, inflation in Korea has stayed above 2%, reflecting in part the higher starting point. Faster inflation in Korea also reflects the large depreciation of the won, which boosted import prices, in addition to promoting exports, helping to spark the strong and early recovery. The inflation rate for the first quarter of 2010 reported an increase,

Figure 2.3. **Interest rates in Korea**



1. Ten-year government bonds.
2. The 91-day CD rate.

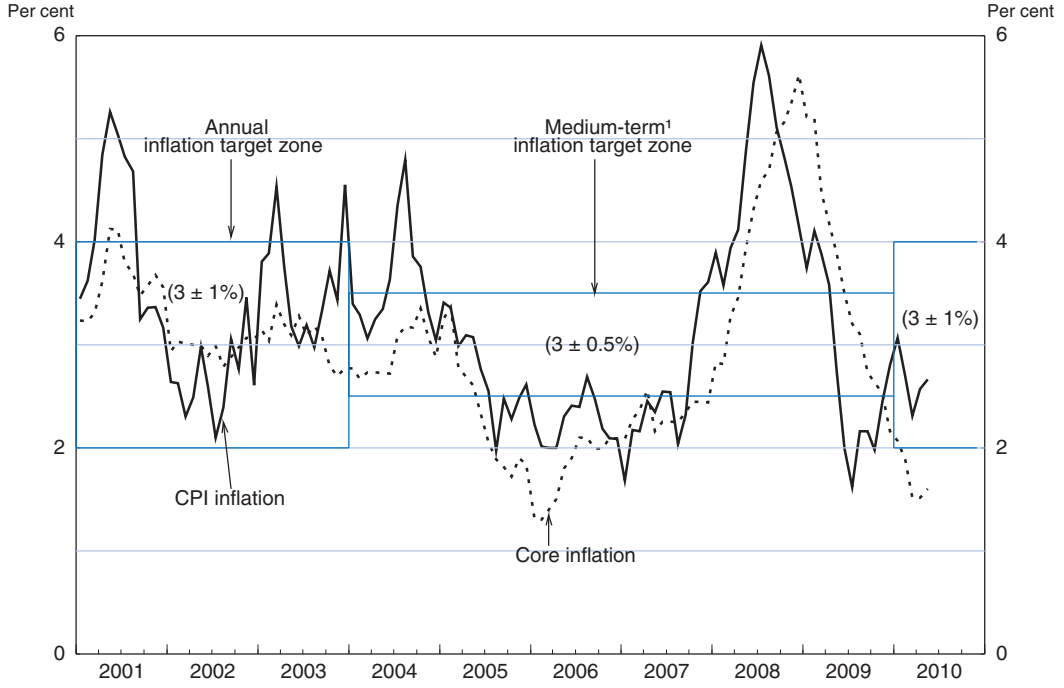
Source: Bank of Korea.

StatLink http://dx.doi.org/10.1787/888932302606

although it is still below the midpoint of the target zone, which was widened in January 2010. Consumers' inflation expectations for the coming 12 months have followed actual inflation with a lag, falling from 4.5% in mid-2008 to 3% by March 2010.

Figure 2.4. **Inflation targets and outcomes**

Year-on-year percentage change



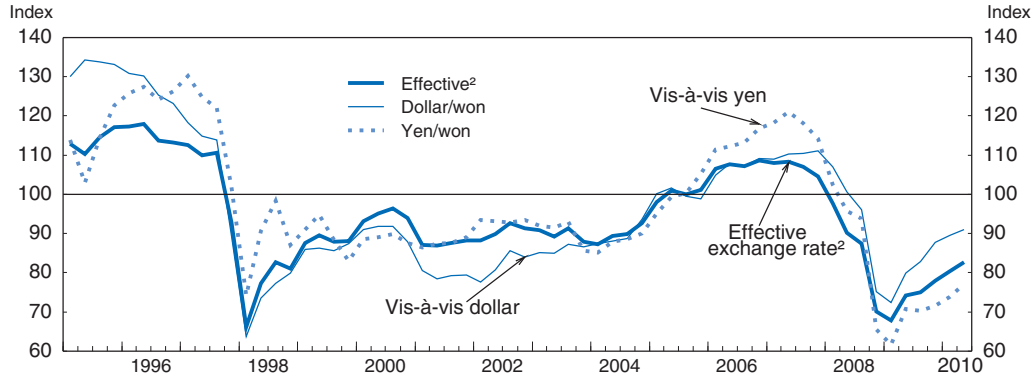
1. Since 2004, the target has been a medium-term objective and, in 2007, it was changed from core to overall CPI.

Source: Bank of Korea.

StatLink http://dx.doi.org/10.1787/888932302625

Figure 2.5. **Exchange rate trends**[1]

2005 = 100



1. A rise indicates an appreciation of the won. For the second quarter of 2010, the rate of 10 May (1 131.8 won per dollar) – on which the *OECD Economic Outlook*, No. 87 projections are based – is shown.
2. Calculated *vis-à-vis* 41 trading partners.

Source: OECD Economic Outlook Database and Bank of Korea.

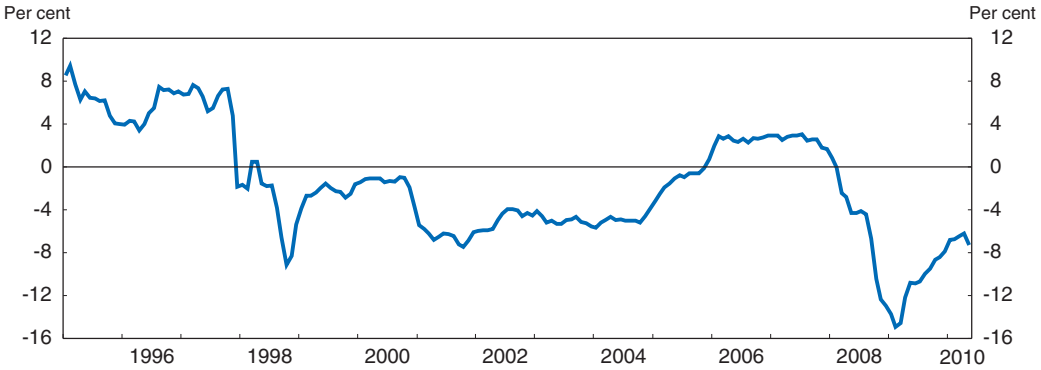
StatLink http://dx.doi.org/10.1787/888932302644

While the short-term policy rate has been steady for more than one year, monetary conditions have tightened somewhat due to the appreciation of the exchange rate (Figure 2.5). After falling 35% in effective terms between mid-2007 and February 2009, the won had rebounded almost 19% by the first quarter of 2010. The appreciation of the exchange rate has tightened monetary conditions (Figure 2.6). Nevertheless, conditions remained exceptionally relaxed, roughly comparable to the situation in 1998 in the wake of the Asian financial crisis, given the low interest rate and the weaker won, which remains about 25% below its 2007 peak in effective terms.

The relaxed monetary conditions after five quarters of positive economic growth (including strong growth in the first quarter of 2010) raises questions about the appropriate timing for normalising the policy interest rate. While the government has moved promptly to remove fiscal stimulus, it has stressed that conditions for raising the policy interest rate

Figure 2.6. **Monetary conditions in Korea**

Percentage difference with respect to the average since 1995[1]



1. An increase indicates a tightening of monetary conditions. The OECD calculates the index using a weight of 1 on the real short-term interest rate (91-day CD rate), deflated by core inflation, and a weight of 0.3 on the real effective exchange rate.

Source: OECD Economic Outlook Database and Bank of Korea.

StatLink http://dx.doi.org/10.1787/888932302663

were not yet met, arguing that the private sector has not achieved a full-scale recovery, the labour market remains weak and the level of household debt is worrisome. In the April meeting of the Monetary Policy Committee (MPC), the policy rate was left unchanged for the 14th straight month. In its statement, the MPC stated that "domestic economic activity has sustained a trend of recovery", which "is expected to be maintained". However, it cited overseas risk factors as creating uncertainty about growth going forward. At the same time, the Bank raised its growth projection for 2010 from 4.6% to 5.2% in April.

The real policy interest rate is negative and monetary conditions remain exceptionally relaxed at this stage of the recovery, suggesting that it is time to begin gradually normalising interest rates. Moreover, growth of more than 5% in 2010 would quickly exhaust remaining slack, particularly given evidence that potential growth rates in the OECD area have fallen in the wake of the financial crisis. Several OECD countries, as well as some non-OECD Asian countries, have already begun to raise policy interest rates. As Korea is a frontrunner in the world recovery, there is a clear case for it to follow suit. This is also important, alongside central bank independence, to uphold the credibility of monetary policy and anchor inflation expectations, which are both essential to the effectiveness of monetary policy (Minegishi and Cournède, 2010).

Korea's exchange rate flexibility has served it well, particularly during the 2008 crisis. Given the global forces putting downward pressure on the won, intervention would have been costly and ineffective. Korea thus avoided the 1997 mistake of using up foreign exchange reserves in the midst of a liquidity crisis (Cho, 2009). The crisis also demonstrated that foreign exchange reserves, which were the sixth largest in the world at nearly USD 260 billion (31% of GDP) in mid-2008, were adequate to overcome a severe crisis, including by facilitating the establishment of swaps arrangements with other countries. Although reserves did fall to USD 200 billion in late 2008, they have since rebounded to USD 268 billion, suggesting it is unnecessary to increase them further, against the backdrop of multilateral efforts to strengthen international financial safety nets (Chapter 3).

Conclusion

The priority for macroeconomic policy is to continue to support a sustainable and durable recovery from the global economic crisis. Given the pace of the upturn, the planned withdrawal of fiscal stimulus in 2010 appears appropriate and needs to be followed by more spending restraint compared to the past. Additional revenue could be obtained by broadening tax bases without worsening distortions. The withdrawal of monetary policy stimulus has been on hold, given concerns about the strength of the domestic and world economy. While there is uncertainty, it is important not to let inflationary expectations and pressures build for too long, making it important to begin normalising interest rates. Specific recommendations are summarised in Box 2.3.

Box 2.3. **Summary of recommendations for macroeconomic policy**

- Make the spending targets in the medium-term fiscal plan more binding in order to slow the pace of government spending and achieve the target of reducing the deficit in the consolidated central government budget (excluding the social security surplus) to 0.5% of GDP by 2013.
- Keep the growth in the debt of public corporations in check.
- Move ahead with the privatisation of the remaining 18 public institutions as scheduled in the 2008 plan.
- Reduce tax expenditures, particularly in the personal and corporate income tax, to limit revenue losses.
- Strengthen the local property holding tax, in part to limit upward pressure on housing prices.
- Start normalising interest rates to keep consumer and asset price inflation in check.
- Maintain the flexible exchange rate policy, which proved effective in overcoming the 2008 crisis.

Notes

1. The government's preferred fiscal measure excludes the social security surplus as this is intended to cover the future liability of public pensions, as well as the cost of financial-sector restructuring between 2002 and 2006. Korea uses the GFS measure of the government budget. General government data on a SNA93 basis are available through 2008, when it reported a surplus of 3.0% of GDP, compared to deficit of 1.7% for the consolidated central government budget, including the social security surplus (Table 2.3). The difference reflects the fact that the GFS measure does not include local government, but does include net lending items, some of which are financial in nature.
2. However, the 2010 budget is 6.6% more than the 2009 initial budget that was planned before the intensification of the global economic crisis.
3. On a general government basis, gross government debt increased from 32% in 2008 to 35% in 2009.
4. Three were listed on the stock exchange (Grand Korea Leisure Company, Korea Power Engineering Company and Korea District Heating Corporation) and three were sold outright (Farmland Improvement Company, Ansan City Development Company and Korea Asset Trust Company).
5. Most importantly, the Korea Land Corporation and Korea National Housing Corporation were merged in October 2009.
6. The National Fiscal Management Plan (NFMP) was a big improvement over the Medium-Term Fiscal Plan (MTFP) that was in effect from 1998-2003: *i)* the NFMP covers the consolidated budget, including public funds, while the MTFP focused on the general account; *ii)* the NFMP presents quantitative goals, while the MTFP only set broad directions; *iii)* the NFMP is used in budget formulation by ministries and announced publicly, while the MTFP was primarily a reference for the Ministry of Planning and Budget; and *iv)* the NFMP is revised annually while the MTFP was revised only periodically.
7. Since 2007, the medium-term fiscal plan has been more stable, as its budget targets for a given year show less variation in successive plans.
8. The medium-term plan is based on government gross lending and thus differs from Table 2.3, which is based on government net lending. The difference between these two measures is explained in the footnotes to Table 2.7.

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Chapter 3

The Korean financial system: overcoming the global financial crisis and addressing remaining problems

The intensification of the global financial crisis in late 2008 led to large capital outflows from Korea and turmoil in its capital markets. However, the prompt response by the government and the central bank stabilised Korea's financial sector in early 2009 and recovery followed relatively quickly. In contrast to 1997, financial institutions have overcome the crisis without significant damage. Increased assistance for small and medium-sized enterprises has played a large role in overcoming the crisis, but should be scaled back to avoid supporting non-viable firms and to expand banks' capacity for risk appraisal, leading to a more market-oriented financial system. As a small open economy, Korea also needs to reduce its vulnerability to sudden capital outflows. In addition, it is important to use prudential regulations effectively to limit the risk of mortgage lending, upgrade the corporate governance of financial institutions and develop securitisation by ensuring transparency.

The recent global financial crisis profoundly tested Korea's financial system. The September 2008 shock, which hit as the Korean economy was already slowing, prompted capital flight and a plunge in the exchange rate, rekindling memories of the 1997 crisis that had brought the country close to economic and financial collapse.[1] In the event, the financial system and the economy weathered the shock quite well, thanks in part to a prompt and effective policy response. The crisis response was much better than a decade earlier, as the institutional framework had been strengthened following the 1997 crisis. Moreover, financial institutions emerged stronger from the post-1997 crisis restructuring, helping them to resist contagion this time. A number of indicators suggest that the financial system stabilised by March 2009 and continued to improve thereafter, in tandem with the real economy, although non-performing loans (NPLs) remain above the pre-crisis level.

This chapter begins by examining the impact of the global financial crisis on Korea and the policies that enabled the financial sector to recovery quickly. The third section analyses the current state of Korean financial institutions, followed by a discussion on how to cope with Korea's continued vulnerability to capital outflows. The following section looks at the challenges that Korea is now facing, notably the problems of small and medium-sized enterprises (SMEs) and concerns about housing prices. A summary of recommendations is in Box 3.3.

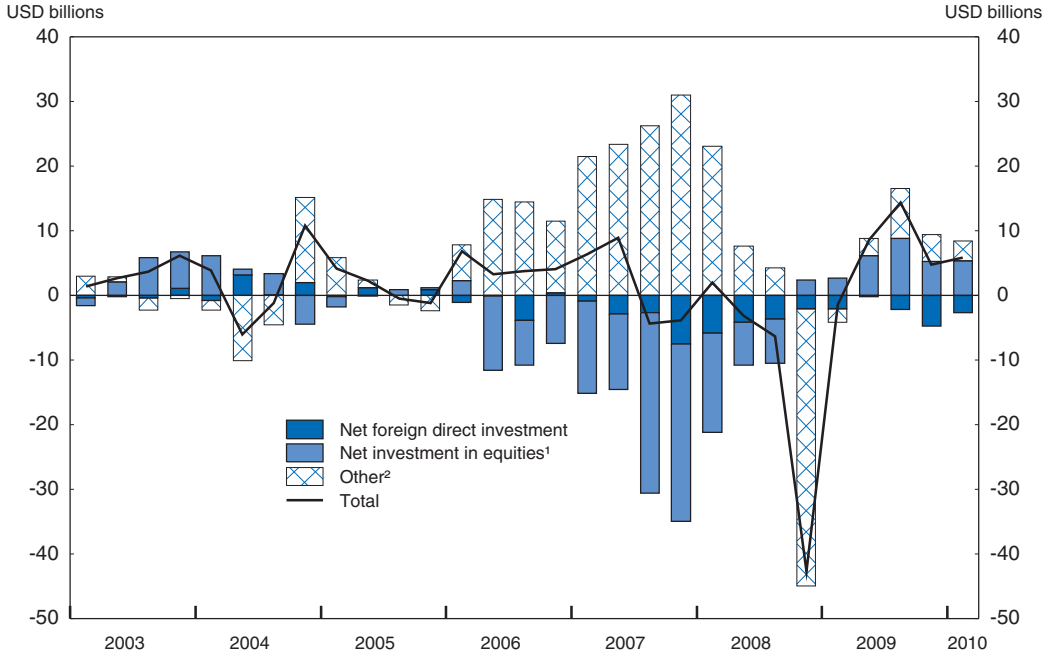
The impact of the global financial crisis on the Korean financial sector

Large capital outflows in late 2008…

The origins of the vulnerability of Korea's financial sector to the global financial crisis can be traced to 2006, when it recorded a large amount of net borrowing from abroad (Figure 3.1). The increased capital inflow was primarily a result of external borrowing by banks (which appears in the category "other" in Figure 3.1). Indeed, between the third quarters of 2006 and 2008, the gross external liabilities of domestic banks and domestic branches of foreign banks rose by USD 41 billion and USD 47 billion, respectively (Figure 3.2). Inflows were partially offset by increased outflows, as restrictions on overseas investment by Korean firms were eased (Kim *et al.*, 2009) and Korean residents expanded their purchases of foreign equities (2007 *OECD Economic Survey of Korea*).

There are significant differences between the external borrowing and lending of domestic branches of foreign banks and domestic banks. *First*, borrowing was 95% short term (less than one year) for the branches of foreign banks over 2006-08, compared to about half for domestic banks. *Second*, the external lending of branches of foreign banks amounted to only 15% of their external borrowing over that period, compared with 60% for domestic banks. These factors suggest that the external borrowing of the branches of foreign banks was more closely linked to carry trade, *i.e.* borrowing short-term from abroad to invest in domestic bonds and equities while hedging the exchange rate risk by arbitraging between forward and spot market rates.[2] European banks accounted for almost three-quarters of the increased claims of foreign banks in Korea between the end of 2005

Figure 3.1. **Korea's capital account**



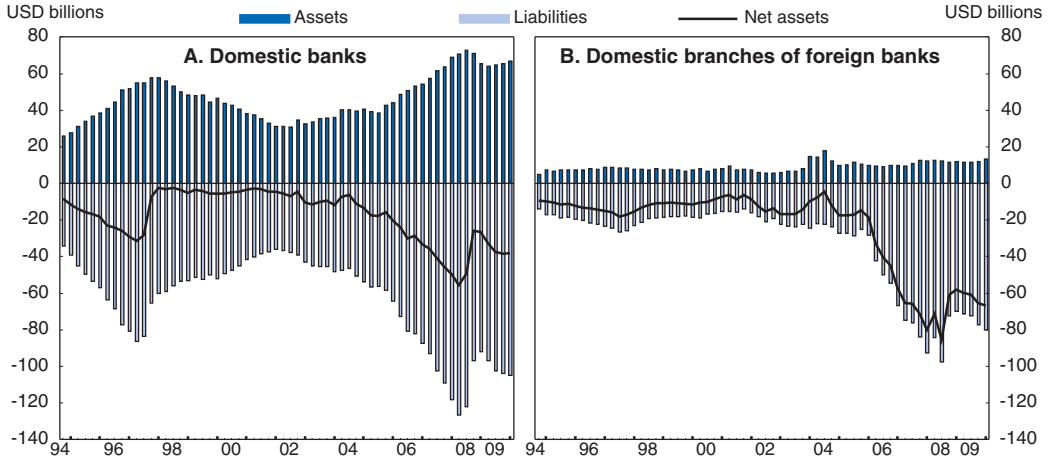
1. A component of portfolio investment.
2. All other capital transfers and flows including the "debt securities" component of portfolio investment, net other investment (including loans and trade credits) and net financial derivatives.

Source: Bank of Korea, *Economic Statistics System*.

StatLink http://dx.doi.org/10.1787/888932302682

and mid-2008 (Figure 3.3). The carry trade helped boost the amount of government bonds held by foreigners from 1% of the total outstanding in the first quarter of 2006 to 12% by the second quarter of 2008. Similarly, foreign holdings of financial debentures soared over the same period, lifting their share to 6% of the total outstanding. The rise in foreigners' holdings of government bonds and financial debentures was partially offset by a fall in their holdings of equities.

Figure 3.2. **External assets and liabilities by type of bank**



Source: Bank of Korea, *Economic Statistics System*.

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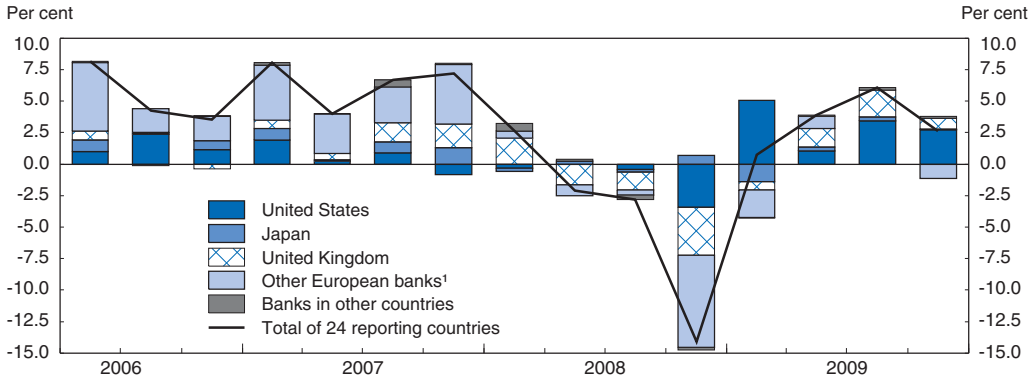
Figure 3.3. **Consolidated claims of foreign banks in Korea**

Changes on an ultimate risk basis from the previous quarter, with contribution in percentage points



1. Domestically-owned banks of countries that report claims on an ultimate risk basis (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom).

Source: Bank for International Settlements.

StatLink http://dx.doi.org/10.1787/888932302720

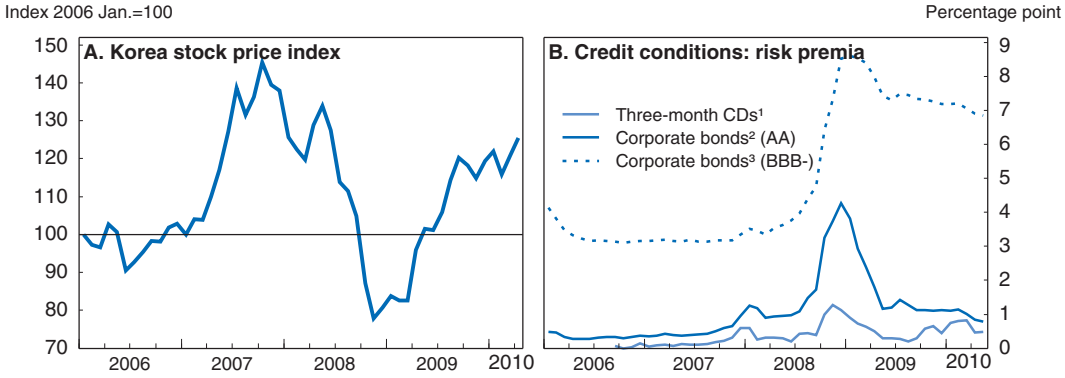
Korea's economy was already slowing prior to September 2008, reflecting the US recession that had begun in December 2007, rising oil prices and tighter monetary policy as the Bank of Korea "leaned against" upward pressure on housing prices. The September 2008 shock prompted a large outflow of foreign capital of USD 42 billion in the fourth quarter (Figure 3.1). During that quarter, the gross liabilities of domestic banks fell by USD 25 billion (Figure 3.2). Problems in rolling over existing loans reduced their borrowing from banks abroad and international money markets, due in part to the financial constraints facing creditors in the context of a global liquidity crisis. The gross liabilities of domestic branches of foreign banks also fell by USD 25 billion, reflecting financial and economic problems in their home countries.[3] European banks accounted for three-quarters of the fall in foreign bank claims in Korea during the final half of 2008, with US banks accounting for most of the rest (Figure 3.3).

… led to a plunge in the won and a deterioration in domestic asset markets and credit conditions…

The exchange rate started to depreciate gradually in effective terms from mid-2007 (Figure 2.5) when the capital account turned negative. The large capital outflows in late 2008 triggered a sharp fall in the won, and by February 2009, it had fallen 25% in effective terms, 27% against the dollar and 38% against the yen relative to August 2008. The depreciation of the won and abrupt changes in capital flows affected domestic asset prices. By February 2009, the equity price index dropped by more than 40% from its October 2007 peak (Figure 3.4). Short-term money markets and corporate bond markets were also disrupted by the global crisis, with risk premia (the gap in interest rates with corresponding publicly-guaranteed instruments) for corporate bonds rated AA and BBB– exceeding 400 and 800 basis points, respectively, in late 2008.

As the crisis squeezed financing through capital markets, firms shifted toward banks for funding. Loan demand in the fourth quarter of 2008 doubled for both large firms and SMEs (Figure 3.5). However, at the same time, the lending attitude of banks toward large firms tightened sharply, while remaining very strict for SMEs, thus creating financial distress in the business sector. The number of companies that wrote dishonoured checks doubled in the fourth quarter of 2008 to almost 1 000.

Figure 3.4. **Equity and bond market developments in Korea**



1. Differential between three-month CD rates and monetary stabilisation bonds.
2. Differential between three-year Korean treasury bonds and corporate bonds rated AA.
3. Differential between three-year Korean treasury bonds and corporate bonds rated BBB–.

Source: Bank of Korea and DataStream.

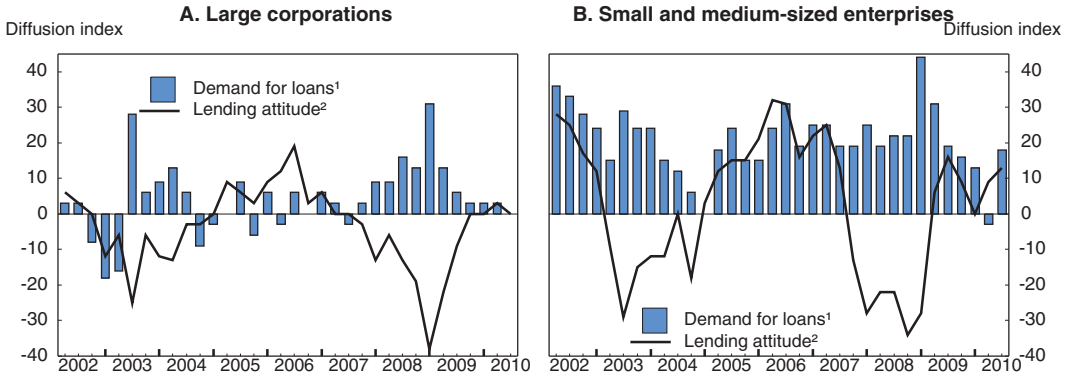
StatLink http://dx.doi.org/10.1787/888932302739

... that stabilised in the first quarter of 2009

The Korean financial system stabilised in early 2009. By the end of the year, it had overcome the September 2008 shock without the type of damage that occurred in the wake of the 1997 crisis, which saw a large number of bankruptcies in the financial sector, a huge run-up in non-performing assets and a lack of capital in the banking sector that required significant injections of public money. Following the large outflows in late 2008, the capital account returned to balance in the first quarter of 2009, followed by significant surpluses in the following quarters (Figure 3.1). Net investment in equities accounted for most of the inflows in 2009. Foreign borrowing by banks also resumed but external liabilities at the end of 2009 remained below their 2008 peak (Figure 3.2).[4]

Figure 3.5. **Credit conditions in Korea**

Results of the senior loan officer opinion *Survey* in Korea



1. Diffusion index = (significant increase) × 1.0 + (moderate increase) × 0.5 – (significant decrease) × 1.0 – (moderate decrease) × 0.5.
2. Diffusion index = (significantly relaxed) × 1.0 + (somewhat relaxed) × 0.5 – (significantly restrictive) × 1.0 – (somewhat restrictive) × 0.5.

Source: Bank of Korea, *Survey on Lending Practices of Financial Institutions*.

StatLink http://dx.doi.org/10.1787/888932302758

The turnaround in the capital market has had a positive impact on the currency, equity and bond markets and credit conditions for large firms:

- The Korean won has risen by 20% in effective terms since its trough in February 2009, and by 21% against the yen and 25% against the dollar (Figure 2.5). Nevertheless, it is still about a quarter below its peak in mid-2007 in effective terms and 41% below relative to the yen.
- The equity price index has rebounded 50% since the end of 2008, thanks to the early economic recovery and the restoration of business confidence, although it remains 17% below its 2007 peak (Figure 3.4). The recovery in equity prices was in large part driven by foreign investors whose share of equities rose from 28% in the first quarter of 2009 to 32% by the third quarter.[5]
- As the economy stabilised, the risk premium on AA corporate bonds declined to around 130 basis points by mid-2009, although that is still higher than in 2006 (Figure 3.4, Panel B). A more serious problem remains in lower-rated bonds. Although the risk premium for bonds rated BBB– has declined from the peak in late 2008, it is still close to 700 basis points, more than twice the 2006 level. The high risk premia for those firms, reflecting increased risk aversion of creditors as well as greater risk, will have a negative impact on the economic recovery.
- Lending attitudes towards large corporations have returned to neutral, although loan demand has faltered as capital markets normalised (Figure 3.5). The number of firms that wrote dishonoured checks fell by half during 2009.
- Banks' lending attitudes toward SMEs improved significantly in early 2009 (Figure 3.5, Panel B), reflecting the impact of government measures, notably the advice to banks to automatically roll over loans to SMEs (excluding those already delinquent on existing loans) and the expansion of public credit guarantees (see below). However, lending attitudes *vis-à-vis* SMEs, in contrast to large firms, tightened in the second half of 2009. This may slow the economic recovery.

A prompt and effective policy response

The authorities' response was timely and comprehensive, including an easing of monetary and credit conditions and policies to cope with external debt, strengthen financial institutions, support SMEs and assist financially-distressed households. Fiscal stimulus also contributed to the rapid stabilisation of the financial system by prompting an early and strong economic recovery (Chapter 2). The success in responding to the crisis was due in part to the experience gained during the 1997 crisis and the institutions that were created to deal with it (Box 3.1). In contrast to 1997, the government response was transparent.[6] At the same time, the government affirmed its commitment to continue corporate governance reform, liberalise financial markets and improve government financial and regulatory institutions.

Easing monetary and credit conditions

The Bank of Korea sharply eased monetary policy by cutting the policy interest rate six times from 5.25% in October 2008 to the current level of 2% (Chapter 2). In addition, it provided 28 trillion won (2.7% of GDP) to alleviate a credit crunch by increasing open market operations, broadening the range of assets eligible for open market operations,

Box 3.1. **The legacy of the 1997 Asian financial crisis**

The swiftness and magnitude of the economic and financial distress during the 1997 Asian crisis, which forced Korea to seek a USD 58 billion loan from the IMF, made the weakness of the financial system and the need for regime change apparent to the Korean authorities. They responded with: *i)* institutional redesign of regulatory institutions, resulting in improved prudential regulation; *ii)* resolution of the NPL problem; and *iii)* recapitalisation and restructuring of the financial system. The closure of non-viable institutions and the merger of many of the remainder reduced the number of financial institutions by a quarter between 1997 and 2000 (OECD, 2001).

Four institutional reforms of the regulatory system in the wake of the 1997 crisis provided a foundation to deal with the capital flight, won depreciation and loss of confidence in the financial system resulting from the 2008 shock:

- The establishment of the Financial Supervisory Commission (FSC) in 1998 and the Financial Supervisory Service (FSS) in 1999 greatly improved prudential regulation by increasing capital standards, introducing a meaningful system of classifying NPLs and reducing the politicisation of bank credit allocation. The government also established a prompt corrective action framework to move aggressively against troubled financial institutions, imposed a variety of prudential regulations regarding loans to individuals and business groups, improved corporate governance by requiring an outside director system for many financial institutions (including permitting foreigners to serve as directors), and enhanced accounting standards.
- The formal independence of the Bank of Korea was enhanced in 1998 and 2003 (Cargill, 2001 and 2010). The introduction of an inflation-targeting framework focused monetary policy on price stability and reduced political influence on central bank credit allocation policies. The 2003 reforms also provided the Bank of Korea with greater flexibility to support the payment system and function as a lender of last resort.
- The Korea Deposit Insurance Corporation (KDIC) was given the task of insuring the deposits of banks, securities companies, insurance companies, merchant banks and savings banks, thereby limiting systemic risk. This explicit form of government deposit guarantees is more transparent and less sensitive to political pressures than the previous implicit system.
- The Korea Asset Management Company (KAMCO), a public financial institution, was reorganised to deal with NPLs, which increased significantly as a result of the 1997 crisis.

Korea spent 38.5 trillion won (8% of 1997 GDP) of public money to purchase NPLs, primarily through KAMCO (Table 3.1), rapidly reducing NPLs for both banks and non-banks. KAMCO's success in resolving the NPL problem was due to its role as a "garage sale" institution rather than a warehouse, indicating that the response to the crisis would not be based on forgiveness and forbearance, as in some countries. Instead, public funds were used for a rapid resolution of the problem. KAMCO disposed of NPLs by bulk or pooled asset-backed securities (ABS) sales, individual sales, foreclosure and public auction, and joint partnerships. The pooled or ABS sales contributed to the development of Korea's money and capital markets (He, 2004).

The Korean government injected 82 trillion won (16% of 1997 GDP) in public funds to recapitalise financial institutions (Table 3.1). Five banks that did not meet the 8% BIS capital adequacy standard were closed in 1998, nine were merged into four in 1999 and two of these were merged in 2000. The government encouraged mergers even among the healthy banks. The privatisation of the eight banks that were nationalised opened the door to foreign investors. As a result, foreign-owned banks have become a permanent and competitive part of the Korean financial system (Byrne, 2005). All nationalised banks have been privatised except Woori Bank, where the KDIC remains the major shareholder. In the non-bank sector, the government closed 29 merchant banks, 15 securities companies, 15 asset management companies and 22 insurance companies between 1998 and June 2007.

Box 3.1. **The legacy of the 1997 Asian financial crisis** *(cont.)*

Table 3.1. **The financial-sector restructuring programme**

November 1997 to June 2009, in trillion won

	Equity participation	Capital contributions	Deposit payoffs	Asset acquisition	NPL purchases	Total
A. Outlays by type of financial institutions						
Banks	34.0	13.9	–	14.4	24.6	86.9
The non-bank sector	29.5	4.7	30.3	3.3	11.5	79.3
Merchant banks	2.7	0.7	18.3	–	1.1	22.8
Securities/investment trusts	10.9	0.4	–	2.1	8.5	21.9
Insurance	15.9	3.1	–	0.3	1.8	21.2
Credit unions	–	–	4.7	0.2	–	4.9
Saving banks	–	0.4	7.3	0.6	0.2	8.5
Foreign institutions	–	–	–	–	2.4	2.4
Total	**63.5**	**18.6**	**30.3**	**17.7**	**38.5**	**168.6**
B. Outlays by source of financing						
Bond issuance	42.2	15.2	20.0	4.2	20.5	102.1
Recovered funds	8.0	3.2	7.4	6.9	17.0	42.5
Public money	13.2	–	–	6.5	–	19.7
Other	–	0.2	2.9	0.1	1.1	4.3
Total	**63.5**	**18.6**	**30.3**	**17.7**	**38.5**	**168.6**

	KDIC	KAMCO	Government	Total
C. Recovery of expenditure				
1998	–	2.4	–	2.4
1999	4.3	9.7	–	14.0
2000	6.0	8.9	–	15.0
2001	4.1	5.3	–	9.4
2002	2.7	3.8	6.6	13.1
2003	5.6	2.4	1.1	9.1
2004	5.7	1.4	0.2	7.3
2005	3.6	2.1	0.1	5.8
2006	3.4	4.8	0.2	8.4
2007	4.4	0.8	0.2	5.4
2008	2.4	0.7	0.3	3.4
2009 (August)	0.9	0.3	–	1.2
Total	**43.1**	**42.7**	**8.8**	**94.5**

Source: Public Funds Oversight Committee.

Total outlays of public funds for financial-sector restructuring from November 1997 through June 2009 totaled 168.6 trillion won (32% of 1997 GDP), with about two-thirds disbursed between 1997 and 2000. The amount was higher than the cost of financial-sector crises in two other OECD countries.* The recovery rate of public funds used for financial restructuring, primarily through the sale of NPLs by KAMCO and the sale of government holdings in financial institutions, was 56% (Table 3.1). While the cost of resolving the financial crisis was exceptionally high, it resulted in stronger and more commercially-based financial institutions and more stable financial markets. The prompt and effective resolution of the financial crisis was an important factor in the resumption of output growth at a 5.4% annual rate in the decade from 1998, although new problems appeared, notably the collapse of the credit card bubble in 2003.

* The cost was 9.8% of GDP in Japan between 1992 and 2009 (OECD, 2009b) and 4% of GDP in the United States from 1984 to 1991 (Laeven and Valencia, 2008).

Table 3.2. **Liquidity provision by the Bank of Korea to stabilise financial markets**

Trillion won as of March 2009

	Amount
Open market operations, including repo purchases	18.5
Increase in aggregate credit ceiling loans	3.5
Payment of interest on reserves	0.5
Support for the Bond Market Stabilisation Fund	2.1
Support for the Bank Recapitalisation Fund	3.3
Contributions to the Korea Credit Guarantee Fund	0.1
Total	**28.0**

Source: Bank of Korea.

raising the upper limits on its credit ceiling programme,[7] paying interest to banks on their required reserve balances and contributing to the Bond Market Stabilisation Fund and the Bank Recapitalisation Fund (Table 3.2).

Accordingly, the Bank's assets increased at an unusually rapid pace in 2008 (Figure 3.6, Panel A). Central bank loans mainly went to commercial banks and other financial corporations in the fourth quarter of 2008 (Panel B). By the third quarter of 2009, loans to banks had declined to less than 10 trillion won, while those to other financial corporations and the government remained above that level. On the liabilities side, the central bank initially expanded currency and deposits to provide liquidity (Panel C), reflecting banks' need to maintain large liquid assets, as well as an unusual liquidity demand from non-residents (Panel D). The Bank shifted to greater reliance on issuing bonds, rather than printing money in mid-2009, when the stabilisation of the economy and markets allowed banks and non-residents to release liquid assets.

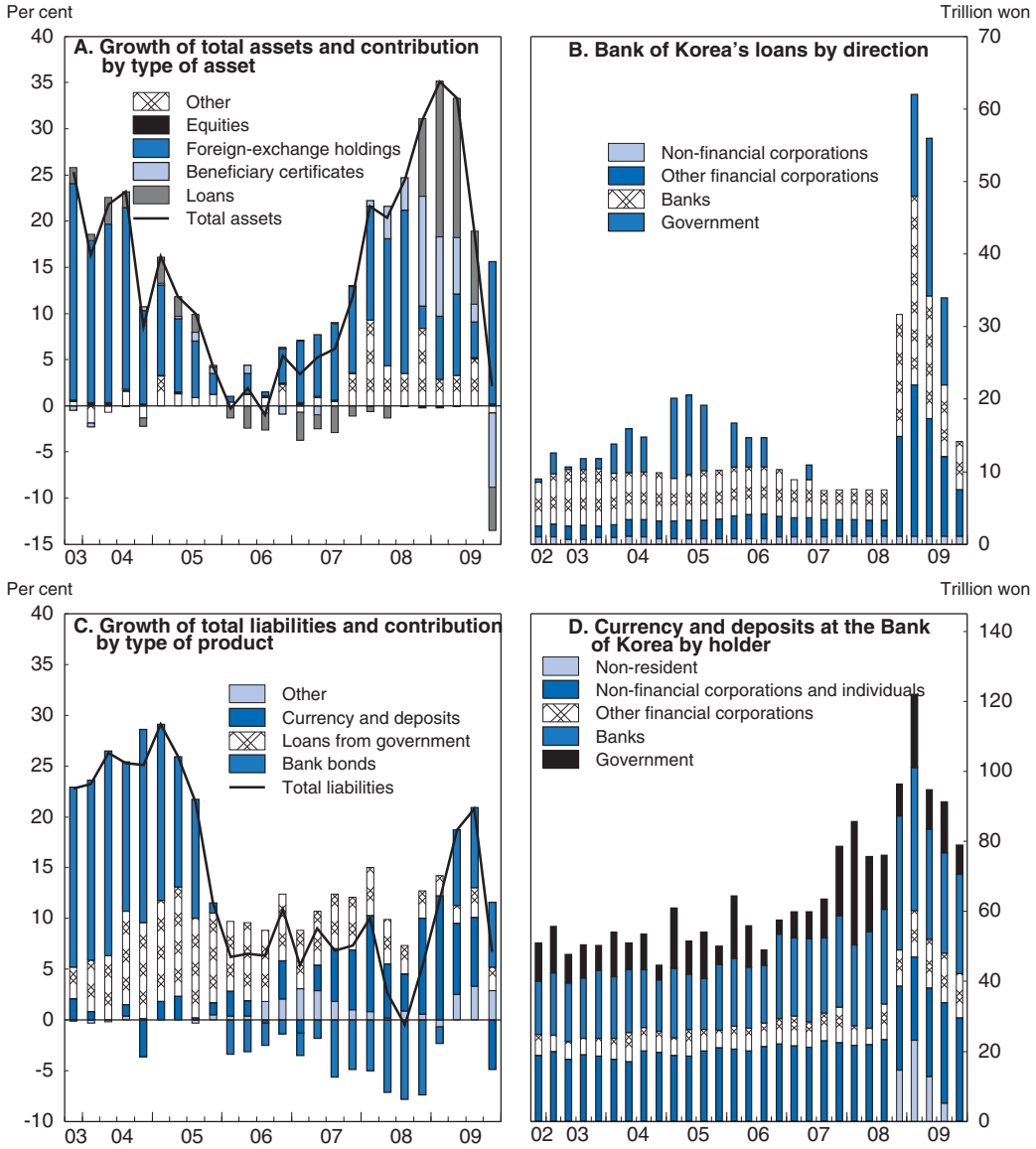
Additional liquidity was provided through the 10 trillion won (0.9% of GDP) Bond Market Stabilisation Fund funded by the government and public organisations. Its objective was to supply liquidity to the real sector through the bond market from December 2008. By October 2009, the Fund had purchased corporate bonds and credit-specialised financial company bonds worth 4.3 trillion won. While these purchases may have helped curb risk premia, the premia on low-graded bonds remain high (Figure 3.4).[8]

Finally, the Korea Exchange (which includes the Korea Stock Exchange, Korea Futures and KOSDAQ), the Korea Exchange Financial Investment Association and the Korea Securities Depository jointly created a 515 billion won fund to invest in the stock market for three years beginning in November 2008. The fund was aimed at alleviating anxiety among investors during the crisis. It invested in the stock price index and yielded a return of about 38% in its first year. Given its size, the fund may not have had much impact on the stock market, but allowing a stock exchange to intervene with the aim of supporting equity prices raises concerns.

Coping with external debt

Given the difficulties that banks experienced in rolling over their foreign loans, the Bank of Korea provided them with foreign currency loans. Moreover, the government announced that it was guaranteeing USD 100 billion of banks' short-term liabilities in October 2008, when they were estimated to be about USD 80 billion, to ease pressure on banks from abroad. To receive a guarantee, banks had to sign a memo of understanding

Figure 3.6. **The Bank of Korea's balance sheet**



Source: Bank of Korea, *Flow of Funds*.

StatLink http://dx.doi.org/10.1787/888932302777

(MOU) with the FSS, pledging to facilitate liquidity provision to SMEs. In May 2009, the guarantees were extended to cover newly-acquired foreign liabilities through the end of 2009.

To ease the severe downward pressure on the won and the difficulties in obtaining US dollar funding, the Bank of Korea also entered into a number of international agreements:

- A swap agreement with the US Federal Reserve was signed in October 2008, giving the Bank of Korea access to up to USD 30 billion in US dollar funds in exchange for won. In December 2008, USD 4 billion of this amount was auctioned to banks. The agreement expired in February 2010.

- A three-year swap agreement with the People's Bank of China in December 2008 provided the Bank of Korea with up to 180 billion RMB (38 trillion won). The two sides agreed to explore the possibility and extent of converting swap currencies into reserve currencies.
- The same month, the Bank of Korea reached an agreement with the Bank of Japan to increase the maximum amount of the bilateral won-yen swap arrangement from the equivalent of USD 3 billion to USD 20 billion. This agreement expired at the end of April 2010.

Strengthening financial institutions

Korean financial supervisors had already implemented several measures to strengthen the soundness of banks prior to the recent crisis. The most important, in December 2007, was boosting provisioning requirements for normal corporate loans from 0.7% to 0.85% (0.9% for cyclically-sensitive sectors such as construction, real estate, wholesale and retail and restaurants) to guard against a possible increase in loan insolvency. In addition, the government provided guidelines for stronger risk management.[9]

As the crisis intensified, short-term measures to provide liquidity to the economy were accompanied by a fund to inject capital in banks through the Bank Recapitalisation Fund. It was established in December 2008 with 20 trillion won (2% of GDP). The major objective is to strengthen the capital base of banks to allow them to continue lending to non-financial firms, notably SMEs. In order to qualify for funding, a bank must sign an MOU with the government, which then conducts monthly evaluations of the bank's restructuring efforts and their support for SMEs. In March 2009, the Fund purchased hybrid bonds (3.5 trillion won) and subordinated bonds (0.5 trillion won) issued by eight financial institutions. The government has announced no additional plans to inject capital into banks.

In addition to the direct injection of capital, the government took measures to raise the capital-adequacy ratio of banks. *First*, Korea extended the period in which parallel calculations of capital requirements based on Basel I and Basel II are allowed to prevent a decrease in BIS ratios, which would reduce banks' lending capability. Through the end of 2009, the FSS applied the higher of the two capital ratios calculated under Basel I and Basel II in their supervisory activities. *Second*, the FSS changed the criteria for assets and liabilities included in the calculation of the won liquidity ratio from those with remaining maturity of "less than three months" to those with remaining maturity of "less than one month" in October 2008. This was aimed at reducing the demand for debenture issuance and stabilising market interest rates. *Third*, the FSS raised the scope for recognition of hybrid bonds as BIS Tier 1 capital from 15% to 30% in December 2008. These transparent measures to relax capital requirements within the framework of BIS I at a time of financial stress were appropriate and effective.

The government is also strengthening financial institutions by buying their assets directly. It established a 40 trillion won (4% of GDP) Corporate Restructuring Fund to address the NPL and bad asset problem. As during the 1997 crisis, KAMCO is playing a leading role in purchasing non-performing assets through the Fund. As of October 2009, KAMCO and the Fund had invested 3.1 trillion won. Most of this amount was used to purchase NPLs (2.3 trillion won by KAMCO and 0.6 trillion won by the Fund). The remainder was used for the purchase of physical assets and to support corporate restructuring.[10]

Supporting small and medium-sized enterprises and other firms

An important policy priority in Korea has been to protect SMEs during the crisis through a wide range of programmes to encourage continued bank lending and prevent large-scale bankruptcy. Credit guarantees by two public institutions – the Korea Credit Guarantee Fund (KODIT) and the Korea Technology Finance Corporation (KOTEC) – increased sharply. In 2009, they reached 59.4 trillion won (5.6% of GDP), a 34% rise from 2008 (Table 3.3). Moreover, the credit guarantee ratio on SME loans was raised from 85% to 95%. A 100% guarantee scheme was introduced for firms in core sectors, including exports, green growth, high technology and start-ups, up to a ceiling of 10 billion won. Finally, direct government spending to support SMEs almost doubled in 2009 (Figure 3.7).

Table 3.3. **Credit guarantees for small and medium-sized enterprises**

Trillion won[1]

	A	B	B/A	Net loss
	Balance of guarantees	Defaults	Default rate (%)	
1997	17.0	1.2	6.9	1.2
1998	32.8	3.0	9.2	2.6
1999	30.9	1.9	6.0	1.3
2000	35.1	1.2	3.4	0.8
2001	47.4	1.6	3.4	1.5
2002	49.0	1.4	2.8	1.1
2003	49.5	2.7	5.5	2.3
2004	47.1	3.3	7.1	2.3
2005	42.6	2.4	5.6	1.6
2006	40.8	1.2	2.8	0.7
2007	40.2	1.2	3.1	0.8
2008	44.3	1.5	3.5	1.0
2009	59.4	2.0	3.4	–

1. Guarantees are provided by the Korea Credit Guarantee Fund (KODIT) and the Korea Technology Finance Corporation (KOTEC).

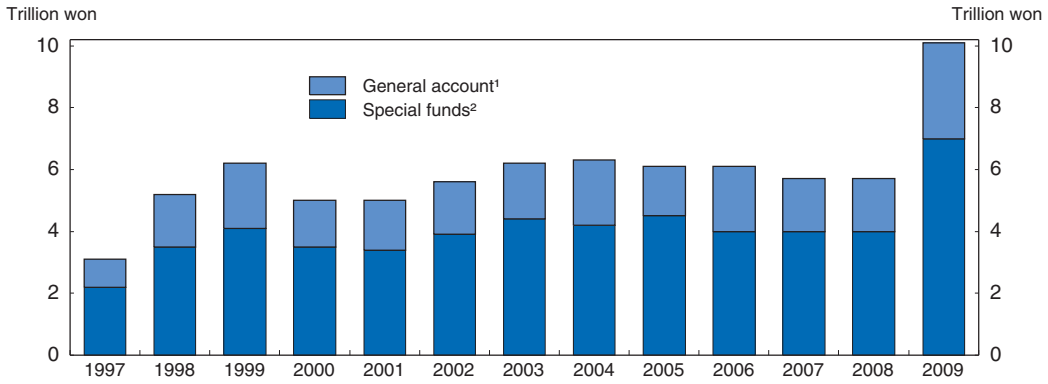
Source: Small and Medium Business Administration.

Two new initiatives – the Fast Track and the Win-Win Guarantee programmes – were launched to aid viable SMEs facing financial stress. The Fast Track programme, which was created in October 2008, provided 18 trillion won (1.7% of GDP) to nearly 10 thousand SMEs by mid-2009 and was extended through the end of 2009. Under the programme, firms apply to their banks, which classify the firms based on credit evaluations. Eligible firms are provided with liquidity support through: *i)* the extension of new bank loans; *ii)* swapping debt for equity; *iii)* rolling over existing loans at lower interest rates; and *iv)* extending the deadline for settling losses from holding bonds or KIKO.[11]

The Win-Win programme is a way for large firms to support key SMEs that supply them with intermediate products. It is based on agreements between the large firms, public credit guarantee institutions (KODIT and KOTEC) and banks. The large firms and banks make special contributions to KODIT and KOTEC, which match them one-to-one. These funds are used to provide 100% guarantees on loans to the recommended SME suppliers. For example, in the first Win-Win guarantee in January 2009, three large corporations (Hyundai Motor, POSCO and Hynix) and three banks (IBK, Shinhan and Woori) contributed a total of 42 billion won to KODIT and KOTEC. The two public institutions then guaranteed 351 billion won (USD 310 million) of liquidity support from the three banks and

Figure 3.7. **Government spending to support small and medium-sized enterprises**

In trillion won



1. The budget of the Small and Medium Business Administration (SMBA) includes transfers to credit guarantee funds.
2. This includes SMBA funds to promote and create SMEs. While the SMBA is a government agency, some of its budget is transferred to funds that are outside of the general account.

Source: Ministry of Strategy and Finance.

StatLink http://dx.doi.org/10.1787/888932302796

the large corporations to their SME suppliers. Firms affiliated with the largest *chaebol* are not eligible for such guarantees in principle.[12] The local Win-Win guarantee programme also involves local governments.[13]

The government also encouraged credit to SMEs by advising banks in 2009 to automatically roll over their loans to SMEs, which typically have a maturity of one year. As of June 2009, the rollover rate consistently exceeded 90%. The government justified this approach on the grounds that banks were not capable of making an accurate assessment of the viability and solvency of borrowers during the crisis. However, banks were required to make such assessments, for example, in the case of the Win-Win programme. Automatic rollovers, if continued, would institutionalise the "ever-greening" of bad loans. The MOUs to increase lending to SMEs, which the banks had to sign with the government in order to receive guarantees on their external debt or injections of public capital (see above), also helped to increase credit to SMEs. In October 2008, the government set a target of a 32.2 trillion won rise in lending to SMEs in 2009, which would account for 50.4% of the expected total increase in loans (FSS, 2010). In the event, loans to SMEs increased by 33.8 trillion won, accounting for 67.6% of the overall expansion in bank lending. By year-end, domestic banks carried 444 trillion won in SME loans, accounting for 46% of their total lending.

Supporting financially-distressed households

Around 7 to 8 million persons, about one-fifth of the adult population, have low credit scores and thus are not eligible for bank loans. The problem is not so much their lack of access to bank lending but rather their excessive debts from past borrowing, for example from consumer finance companies. Indeed, it is estimated that 15% to 20% of total household loans (which amount to 60% of GDP) had been extended to borrowers with low credit scores. Government initiatives to help financially-distressed households with low income and credit scores achieved the following results during the first ten months of 2009:[14]

- The Credit Recovery Fund (a private entity funded by contributions from financial institutions) and the Credit Counselling and Recovery Service restructured debt held by individuals. The Fund purchased loans of less than 50 million won (USD 44 thousand)

more than three months overdue from creditors (financial institutions) to reduce the burdens of debtors by offering interest relief and allowing amortisation. The almost 750 thousand loans purchased through the Fund amounted to 5.2 trillion won (0.5% of GDP) between December 2008 and November 2009.

- The Fund also helped people with low credit scores to convert loans with interest rates of more than 20% to bank loans with an average rate of 12%. More than 13 thousand loans, amounting to 143 billion won, were converted.
- The Credit Counselling and Recovery Service (CCRS) carried out individual debt restructuring by adjusting interest rates or providing debt relief through workouts for 87 thousand individuals in 2009.[15]
- Under the guidance of the supervisory authorities, banks have eased the burden of debtors, for instance by extending maturities and carrying out workout programmes. Between November 2008 and August 2009, the maturity on loans of 117.5 trillion won (11% of GDP) was extended, while debt workouts reached 1.1 trillion won.

A number of conditions were attached to these programmes to mitigate moral hazard problems in debt rescheduling and the provision of refinancing guarantees. For example, a debt rescheduling agreement is invalidated if an individual is found to have hidden properties or fails to repay a debt obligation on time. These schemes also refuse guarantees to individuals with excessive debts or income above a certain level. Nevertheless, there appear to be serious moral hazard problems resulting from these programmes.

The sound condition of Korean financial institutions made it easier to weather the crisis

Thanks to the restructuring and improved regulatory framework in the wake of the 1997 crisis, banks and non-bank financial institutions appeared to be in good shape overall at the time of the September 2008 shock: profitability, return on assets, ratio of substandard or below loans, delinquency rates for SME and household loans and the BIS capital adequacy ratio all indicated a sound financial system. The relatively strong position going into the crisis allowed an early stabilisation of the financial sector. However, given the automatic rollover of loans to SMEs, which includes non-viable firms, there is a risk of a marked increase in NPLs.

Korea's financial system remains primarily based on indirect finance, of which the banking sector is the primary source.[16] The nation-wide banks, which account for about 90% of total bank deposits and loans, are in good condition despite some increase in their NPLs. Indeed, substandard or below loans[17] doubled from 0.7% of total loans in 2007 to 1.6% by June 2009, before falling back to 1.2% in December 2009 (Table 3.4). Loan-loss reserves have increased significantly since 2007, as a result of the stricter provisioning rules noted above. Consequently, they were 40% higher than substandard or below loans in December 2009, even after writing off 3 trillion won of NPLs in the second half of 2009. After-tax profits and return on equity and assets were relatively low in 2008 and 2009, while remaining positive, in large part due to large loan-loss reserves. The BIS capital adequacy ratio has increased since 2007, reaching 14.6% in December 2009, the highest since 2002. The rising ratio reflects the infusion of public funds, banks' own efforts to raise capital and the decline in their loans. In addition, the regulatory changes discussed above helped to boost the reported capital adequacy ratios.

Table 3.4. **Indicators for the banking sector**

Nation-wide banks, in trillion won

	2002	2004	2006	2007	2008	June 2009	December 2009
Net profits (before tax)	9.0	12.8	2.2	16.5	14.6	6.5	12.1
Net profits minus loan-loss provisioning (before tax)	3.7	6.0	1.3	13.8	7.4	1.9	5.1
After-tax profits	2.9	5.9	8.1	9.4	5.2	1.5	4.2
Return on equity (%)	10.95	18.23	15.52	16.04	8.31	2.28	6.12
Return on assets (%)	0.56	0.89	1.06	1.09	0.51	0.13	0.38
Total loans (A)	432.2	473	591.3	670.9	784.7	778.5	770.3
Substandard loans or below[1] (B)	10.6	9.4	5.3	4.9	9.1	12.2	9.0
Ratio to total loans (%) (B/A)	2.4	2.0	0.9	0.7	1.2	1.6	1.2
Loan-loss reserves (C)	8.8	9.1	8.4	9.3	12.9	14.3	12.6
Ratio of reserves to substandard loans or below (%) (C/B)	83.5	96.6	160.1	197.0	146.5	121.7	139.8
Capital adequacy ratio (BIS ratio)	10.5	11.3	12.4	12.0	12.8	14.3	14.6
Number of branches	4 304	4 333	4 623	4 723	4 866	4 704	4 721

1. Includes loans classified as substandard and doubtful, plus estimated loss.
Source: Financial Supervisory Service.

Overall, the loan-to-deposit ratio does not suggest a heavy reliance on borrowing by banks. Indeed, the ratio at the end of 2007 and 2008 was 104.4% and 101.6%, respectively, if deposits include CDs (excluding CDs, it was 123.9% and 118.8%). The performance of the two largest specialised banks, Korea Development Bank and Industrial Bank of Korea,[18] was similar to that of nation-wide banks in 2009 with respect to loan quality, loan-loss reserves and capital adequacy. Meanwhile, local banks, which account for 7% of total bank loans and deposits, have remained more profitable than nation-wide banks.

Other types of financial institutions remain financially healthy overall. Although securities companies suffered losses from principal investments in 2008, their net profits remained positive and their net capital ratios stayed above 500%. Insurance companies saw their net profits wiped out by early 2009. As financial markets stabilised, their net profits bounced back, boosting their solvency margin ratio to 262% by September 2009. The performance of other non-bank financial institutions – mutual savings banks, credit unions, merchant banks, credit card companies, leasing companies, finance companies and venture capital companies – is comparable to that of banks (Table 3.5). Although net profit declined in 2009 and loan growth slowed, substandard loans rose only modestly, from 3.4% in 2007 to 4.0% in mid-2009, which is below the 5.2% average recorded

Table 3.5. **Indicators for the non-banking sector**[1]

Date	Loans in trillion won	Per cent change	Substandard loans or below to total loans	Net profit in trillion won
2002	189		5.2	3 280
2003	177	–6.5	6.2	–9 905
2004	180	1.9	5.3	–198
2005	202	12.2	5.2	3 056
2006	230	13.6	4.1	5 096
2007	266	15.6	3.4	5 380
2008	278	4.6	3.6	3 765
June 2009	297	6.9	4.0	2 310

1. Includes mutual savings banks, credit unions, merchant banks, credit card companies, leasing companies, finance companies and venture capital companies.
Source: Financial Supervisory Service.

between 2002 and 2006. However, the aggregate statistics for non-bank financial institutions mask a problem in the savings banks, which along with non-bank credit card companies, have been the weak players in the non-bank sector. Savings banks are saddled with a high delinquency rate, reflecting the large share of low-credit individuals and SMEs among their borrowers.

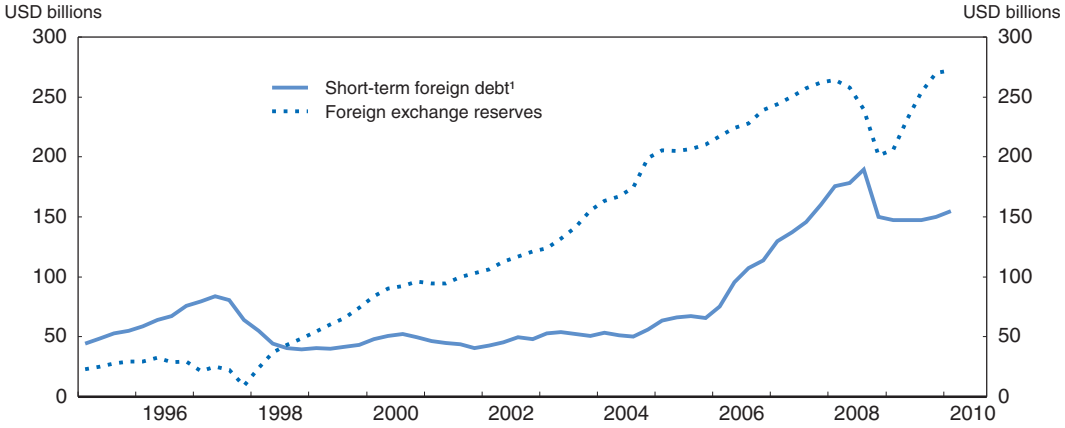
In sum, the September 2008 shock reduced loan growth at all types of Korean financial institutions and generally lowered loan quality. Even so, bank capital adequacy increased, bank reserves exceed loans rated substandard or below, and institutions were profitable by the end of 2009. However, financial institutions will have to cope with the withdrawal of government funds and guarantees to stabilise financial markets and institutions and there is a risk of a significant rise in NPLs.

How to cope with Korea's vulnerability to capital outflows

The chance of prolonged won depreciation as a result of the 2008 shock appeared smaller than a decade earlier (FSC, 2008 and FSS, 2008). In addition to the sound condition of financial institutions and the improvement in the financial sector since 1997, Korea had large holdings of international reserves and a significant amount of its foreign debt had low risk. While total foreign debt amounted to USD 420 billion in June 2008, almost one-third was not subject to repayment burdens.[19] Foreign exchange reserves in June 2008 were USD 258 billion, exceeding short-term foreign debt of USD 177 billion (Figure 3.8). Moreover, most reserves were held in bonds rated AA or above, and the government was transparent about its holdings of international reserves. At the time of the 1997 crisis, in contrast, useable foreign exchange reserves were less than USD 30 billion, well below the more than USD 60 billion in external short-term debt.

Despite this apparently sound position, the crisis revealed Korea's vulnerability primarily due to the banking sector's short-term foreign debt holdings (Figure 3.2). The external debt of banks jumped by 66% between the end of 2006 and September 2008, reaching USD 159 billion and making Korea a net debtor nation for the first time since 2000. Subsequently, Korea experienced large capital outflows and a sharp depreciation of the

Figure 3.8. **Korea's foreign exchange reserves and short-term debt**



1. Maturity of less than one year.

Source: Bank of Korea.

StatLink http://dx.doi.org/10.1787/888932302815

won in the wake of the September 2008 shock, as noted above. In sum, the rising external debt of the banking system was a major factor that brought Korea to the brink of a 1997-type crisis.

As an export-oriented and non-reserve currency country with an open capital account, Korea is sensitive to external shocks, whether financial or real. Consequently, the economy remains susceptible to capital flight and rapid currency depreciation, as shown during the 1997 and 2008 crises. This vulnerability to external shocks presents policy makers with serious problems, making it important to limit the risk of sudden capital outflows. A number of long-term policies would help limit such susceptibility. *First*, faster growth of domestic demand and services may help re-orient the economy away from excessively export-based growth, thus reducing vulnerability. Reforms to promote productivity growth in services would thus be helpful (Chapter 1). *Second*, continuing to build a transparent and sound financial system would help maintain foreign confidence and enable the financial system to better absorb external shocks.

While such long-term measures would help, the vulnerability of the Korean economy to external shocks, with large effects on the exchange rate and asset prices, raises questions about what could be done in the short run to mitigate their impact. There are essentially three options. *First*, Korea could reintroduce controls on short-term capital. However, this would limit Korea's growing integration in the world economy, which has driven its remarkable development. Reintroduction of capital controls is also subject to disciplines under the OECD Code of Liberalisation of Capital Movements to which Korea adheres. *Second*, Korea could increase its foreign exchange reserves. However, the 2008 crisis does not suggest that foreign exchange reserves were inadequate. Indeed, they remained above USD 200 billion throughout and were thus always well above Korea's short-term foreign debt. By February 2010, foreign exchange reserves had reached USD 271 billion (33% of 2009 GDP), exceeding the pre-crisis level. A substantial increase in foreign exchange reserves would thus be ill-advised, as there are significant costs associated with large foreign exchange reserves (Rodrik, 2006).[20] Moreover, there are risks in placing a large share of national wealth in volatile foreign assets.

The third, and preferable option, would be to internalise the risk of foreign borrowing by financial institutions by providing incentives to monitor this source of funds more carefully. The FSC recently launched an initiative to strengthen risk control guidelines on foreign liabilities by focusing more on individual institutions rather than on the sector as a whole (Box 3.2). Such regulations should be used to increase transparency about foreign borrowing. In addition, deposit insurance premiums could be adjusted on the basis of banks' foreign borrowing to provide incentives to manage such borrowing more prudently.

As noted above, capital account volatility was partially a result of the activities of foreign bank branches in Korea, which accounted for 40% of the banking sector's foreign debt in mid-2008, of which relatively little was balanced by foreign assets (Figure 3.2). Foreign institutions are not subject to liquidity regulations imposed by Korean authorities, as is the norm in banking regulation. However, a recent report by the Basel Committee on Banking Supervision raises the issue of how liquidity and leverage regulations could be applied to foreign branches (BCBS, 2009) and this issue is being discussed by the G20 and the Financial Stability Board. Korea should actively participate in these discussions in order to promote a framework that takes better account of the risks. At the very least, it is important to ensure that there is adequate information on the liquidity position of foreign bank branches to allow the authorities to respond quickly. At the same time, foreign bank

Box 3.2. **Measures to enhance the soundness of domestic financial institutions**

In November 2008, the FSC and FSS announced a plan to reduce financial institutions' foreign exchange risks.

Revision of the regulation on the foreign currency liquidity ratio

The maturity mismatch between banks' foreign currency assets and liabilities is addressed through the minimum foreign exchange liquidity ratio, which applies on a seven-day, one-month and three-month basis. The ratio had been based on the assumption that all assets are recoverable at any given time irrespective of an asset's marketability, *i.e.* all weights are 100%. However, the ratios remained comfortably above recommended levels, even during the 2008 crisis (Table 3.6). The new plan proposes differentiated weights by type of financial asset to reflect its recoverability, which should make this a more useful indicator.

Table 3.6. **Foreign exchange soundness ratio**

End of period in per cent based on old weights

Indicator	Recommended level	2007	2008	March 2009	June 2009	September 2009	December 2009	March 2010
Foreign exchange liquidity ratio	(≥ 85%)	102.7	98.9	102.7	105.2	105.0	105.1	105.5
Seven-day mismatch ratio	(≥ –3%)	3.7	3.2	2.1	2.8	3.1	2.8	2.2
One-month mismatch ratio	(≥ –10%)	2.9	0.4	0.2	1.6	1.6	1.1	2.7

Source: Financial Supervisory Service.

Mandatory possession of riskless foreign currency assets

Financial institutions are required to hold a minimum amount of riskless foreign currency assets to prepare for a possible shortage of foreign currency liquidity. Safe foreign exchange assets are defined as government and corporate bonds rated higher than single A and deposits in the central banks of countries with sovereign credit ratings higher than single A. Financial institutions have a choice between holding 2% of total foreign currency-denominated assets in risk-free instruments or opting for a formula that may reduce the level.

Revision of the regulations on mid- to long-term foreign currency borrowing management

The definition of mid- to long-term borrowing was changed from "one year or longer" to "more than one year", in line with international standards. Also, the required level of mid- to long-term funding was raised from 80% of mid- to long-term lending to 90%. The FSC plans to gradually raise the ratio to 100% or more in the first half of 2010.

Establishment of foreign currency liquidity risk management standards

Financial institutions are required to establish internal control standards to build a foreign currency liquidity risk management system. The new standards will set mandatory guidelines on *inter alia* currency-specific liquidity risk management, an early warning system, limits on capital outflow during crises and contingency funding plans.

Establishment of foreign currency derivatives-related risk management standards

Financial institutions are required to establish internal control standards to manage risks associated with the trading of foreign currency derivatives. This reform limits foreign exchange forward transactions to a maximum of 125% of physical trade in order to prevent institutions from engaging in excessive hedging. In cases where an upward adjustment in the fixed ratio is deemed necessary, prior approval will be required from the Risk Management Committee in the financial institution. As part of credit risk management, the standards of "Derivatives Execution Best Practices" will apply to all institutions dealing in foreign currencies, except non-bank financial institutions.

Measures to encourage more appropriate foreign exchange hedging by asset management companies

Stronger information disclosure to clients on the cost and effectiveness of foreign exchange hedging will be encouraged. In addition, investment products with different foreign exchange hedging ratios will be introduced. In this connection, the Korea Financial Investment Association revised the Working Rules on Standard Investment Recommendation to require "mother funds" to have various types of "son funds" with different hedge ratios.

branches play an indispensable role in financing and investing, making it important for Korea to establish a globally-harmonised regulatory framework that strikes an appropriate balance between stability and growth.

Nevertheless, any prospective regulations emerging from the Basel Committee on the role of foreign bank branches are unlikely to be sufficient to fully eliminate Korea's susceptibility to sudden capital outflows. This suggests that the bilateral currency swap arrangements described above will remain an important tool to cope with instability. However, such agreements tend to be negotiated at the last moment in times of crisis. Such an approach should be supplemented by a more formal multilateral safety net, as advocated by the Korean government. One step in this direction is the Chiang Mai Initiative Multilateralisation agreed in December 2009, in which Korea is scheduled to provide USD 19.2 billion of the USD 120 billion fund as a safeguard against short-term liquidity problems. However, this does not provide any protection for Korea because withdrawals would be limited to the USD 19.2 billion that it provided to the fund.

Addressing remaining problems in the financial sector

Policies such as the injection of public funds, guarantees, government purchases of bank subordinated debt and expanded support for SMEs have helped to overcome the crisis. However, these measures would further increase moral hazard and competition problems if kept in place for too long. The greater the government role in supporting the financial system, the less likely institutions will be to adopt market principles and the weaker the incentive to rationally allocate resources. The success in overcoming the crisis should not be used as a reason to pursue interventionist policies, which would hinder the autonomous development and efficiency of the financial sector. Rather, the restructuring programmes should be improved and gradually phased out. In addition, Korea still faces a number of longer-term challenges related to: *i)* problems in the SME sector; *ii)* how to cope with housing prices; *iii)* weak corporate governance in financial institutions; *iv)* the ability of financial institutions to absorb shocks in asset values; and *v)* achieving the objective of enhancing Korea's standing in the global financial market.

Improving the current restructuring programmes

Improvements are needed in two areas. *First*, in the capital injection scheme implemented in 2009, banks' access to public capital was contingent on maintaining a certain level of lending to SMEs. While this helped borrowers to survive, it hinders bank-led corporate restructuring. Strengthening the capital of weak banks should be done based on conditions that encourage, rather than discourage, corporate-sector restructuring. Otherwise, festering problems may lead to a renewed need for capital injections.

Second, public financial institutions, particularly KAMCO, have played an important role in reducing banks' holdings of NPLs and in co-ordinating corporate restructuring of borrowers. While bailouts through public entities are necessary as a safety net, banks and other financial institutions should be first in line to push for corporate restructuring in their role as creditors. Of course, banks have an incentive to avoid recognising bad loans and selling them to others, to avoid showing a loss. This incentive is often compounded by banks' bullish expectations on the outlook for asset prices.[21] After analysing the soundness of asset classification in March 2009, the authorities directed financial institutions to reform their loan classification systems by focusing them more on substandard loans with relatively large credit risk.

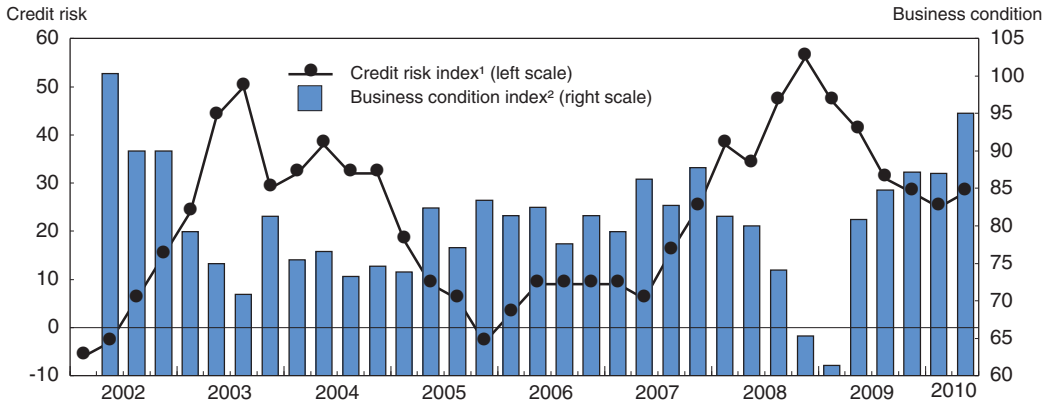
Addressing problems in the small and medium-sized enterprise sector

The risk of moral hazard is greatest in the SME sector, which accounts for half of manufacturing output and one-third of exports. The large *chaebol*-affiliated corporations were the focal point of corporate reform after 1997 because they were at the centre of the factors causing that crisis. Consequently, the *chaebol* were forced to adopt more commercially-based corporate governance structures and to restructure aggressively. In contrast, the government essentially bailed out SMEs through increased public subsidies and guarantees (Claessens and Kang, 2008). Moreover, this support was not fully scaled back once the crisis had passed (Table 3.3 and Figure 3.7). Consequently, the SMEs have not been as aggressive in reforming their business model and their performance has increasingly lagged that of large firms.

In short, the differential approach to restructuring, combined with generous government support for the SME sector, generated a moral hazard problem that continues to the present. It was exacerbated by the expansion of support during the recent crisis, increasing SMEs' reliance on public assistance. The expanded financial support to SMEs prevented some bankruptcies and helped to sustain employment. Nevertheless, it is essential to phase out this assistance – particularly the automatic rollover of loans and extra guarantees to SMEs – and to promote the restructuring of SMEs as the economic recovery takes hold and credit risk and business conditions normalise. In the second quarter of 2010, the business conditions index for SMEs reached its highest level since 2002 (Figure 3.9). A good exit strategy would be to announce the scaling back of SME support over the next five years, and to let non-viable SMEs fail, accompanied by adequate labour market measures to cope with the social consequences. Otherwise, the continued existence of non-viable firms will remain a drag on Korea's growth potential.

The problems in the SME sector are an issue not only for the firms themselves but also for the banking system, as domestic banks' loans to SMEs account for around half of their total lending. The share of bank loans to large companies has steadily declined since the early 1990s as large firms took advantage of expanding capital markets and the *chaebol*

Figure 3.9. **Business conditions and credit risks of small and medium-sized enterprises**



1. The "Business Health Index" by the Korea Federation of Small and Medium Business is for the manufacturing sector. Quarterly figures are simple averages of monthly data.
2. The "Survey on Lending Practices of Financial Institutions" by the Bank of Korea.

Source: Bank of Korea, *Economic Statistics System* and the Korea Federation of Small and Medium Business.

StatLink http://dx.doi.org/10.1787/888932302834

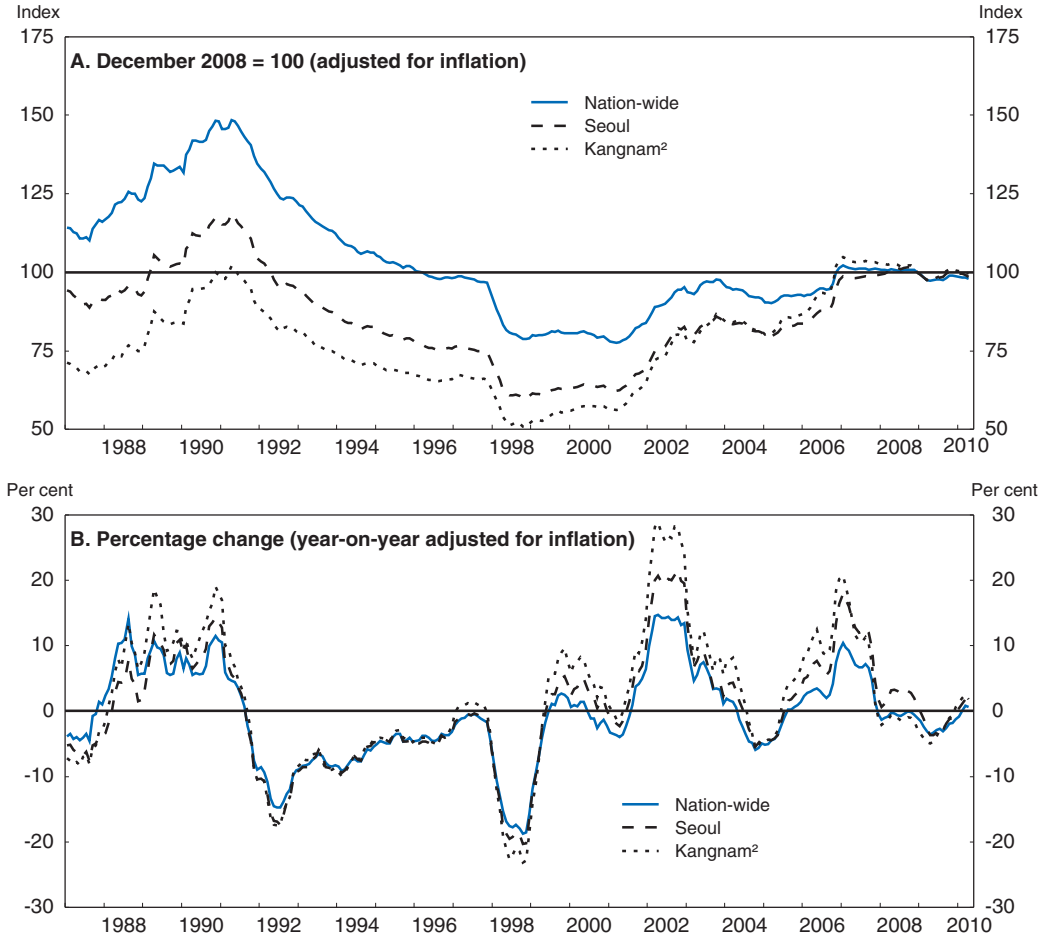
deleveraged. More recently, with large companies relying more on internal sources of funds and tighter regulations on lending for housing, the share of bank loans to SMEs has steadily increased. Indeed, SME credit risk is a more serious problem than mortgage debt. Reducing the moral hazard risk requires changing the longstanding emphasis on the social responsibilities of banks (Lee, 2006). Government pressure on banks to lend to SMEs should be relaxed, and the focus should shift to their primary objective of allocating their lending so as to maximise their returns. Any necessary support to SMEs should be provided through more transparent fiscal measures.

Housing prices and the financial sector

After falling during most of the 1990s, nation-wide housing prices began to increase in real terms in 2000, though with considerable volatility (Figure 3.10).[22] However, overall housing price increases over the past decade were small compared to other countries. Indeed, the ratio of housing prices to income rose only 7% in Korea between 2000 and 2007, versus more than 30% in ten OECD countries (Figure 3.11). In addition, housing price

Figure 3.10. **Trends in housing prices**

Housing purchase price composite index in real terms[1]

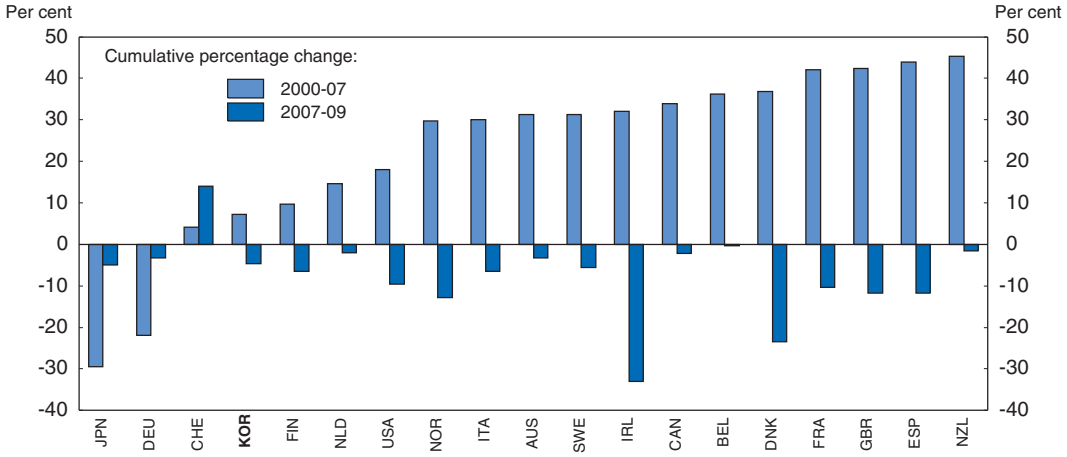


1. Includes single-family homes and apartments. The index is deflated by the overall consumer price index.
2. A district of Seoul.

Source: Kookmin Bank, *National Housing Price Survey*.

StatLink http://dx.doi.org/10.1787/888932302853

Figure 3.11. **An international comparison of the change in the ratio of housing prices to income**



Source: OECD Economic Outlook Database.

StatLink http://dx.doi.org/10.1787/888932302872

increases were concentrated in the capital region, particularly in the Kangnam area of Seoul, while prices in the rest of the country were more stable. The government is particularly sensitive to prices in the capital region, given the distributional implications as well as the risk that they will spread to other parts of the country. Housing prices in the capital region are influenced by regional policies dating back to the 1960s. Indeed, large-scale construction in the capital region, including factories, universities and other facilities that induce population concentration, is prohibited or controlled. However, a number of exceptions, such as for SMEs, foreign-owned companies and high-technology firms, have to some extent undermined such restrictions. Indeed, the share of the population in the capital region, which accounts for 12% of Korea's area, has risen from 15% in 1970 to almost 50%.

The modest housing price increase that did occur in Korea cannot be attributed directly to monetary policy (Song, 2008). Instead, the Bank of Korea "leaned against" the expansion in housing lending by increasing the base rate from 3.25% in October 2005 to a peak of 5.25% in August 2008. The most important step, though, was the 2002 introduction of a ceiling on the loan-to-value (LTV) – the ratio of bank lending relative to the value of a residence. This ceiling was set at a very low 40% in speculative zones – defined as areas where housing price increases were the most rapid and appeared to be driven more by expected price increases than fundamentals – and 60% elsewhere. In 2003, 53 regional districts (23% of the total) were designated as speculative zones. The LTV ceiling in Korea has been the lowest in the OECD area, helping to explain why Korea was able to avoid the housing bubble (Table 3.7). Indeed, in many countries, LTV ceilings were as high as 80% to 100%, or absent altogether. The LTV ceiling was supplemented in 2005 by debt-to-income (DTI) regulations, which shift the focus from the value of the collateral to the ability of the borrower to repay the loans. The ceiling on DTI – the ratio of payments of principal and interest to the borrowers' income – was limited to between 40% and 65%, depending on where the house is located, its value and which type of institution is lending the money.

Housing prices have been affected by a wide range of other government policies. In 2005-06, when prices began to increase (Figure 3.10, Panel B), the authorities launched five packages aimed at controlling housing prices (OECD, 2007).These included a large

Table 3.7. **International comparison of loan-to-value ratios on mortgage lending**

	Property valuation method	Restrictions on valuation method	Regulatory limits on loan-to-value	Link with capital adequacy
Australia	OMV	Yes	80% (100% if insured)	50% weight, subject to insurance if loan is above 80% limit
Belgium	OMV/MLV	No	None	50% weight, subject to prudent valuation of collateral
Canada	OMV (or variant)	No	75% (95% if insured)	50% weight if loan is up to 75% limit; 0% weight if CMHC-insured
Denmark	n.a.	n.a.	80%	None
Finland	n.a.	n.a.	None	None
France	OMV	Yes	60% to be eligible for mortgage-backed securities	None
Germany	MLV	Yes	60% to be eligible for mortgage securities	50% weight for first mortgages if loan is up to 60% limit
Ireland	OMV	No	80% (only for building societies)	None
Italy	OMV	No	80% (100% if guaranteed)	50% weight if loan is up to 80% limit
Japan	n.a.	No	None	50% weight for first mortgages
Korea	**OMV**	**Yes**	**40-60%**	
Netherlands	OMV	No	None	50% weight for part of the loan up to 75% of collateral; 0% weight if NHG-insured
Norway	OMV/LTV	No	None	35% weight if LTV is less than 80%; 75% weight if LTV is above 80%
Spain	Prudent valuation certified by appraiser	Yes	80% to be eligible for mortgage-backed securities	35% weight, subject to prudent valuation of collateral
Sweden	OMV	No	None	50% weight if loan is up to 100% of collateral
Switzerland	Mortgage lending value	n.a.	80% for owner-occupiers	50% weight up to $^2/_3$ of market value; 75% weight above that limit
United Kingdom	OMV	No	None	50% weight if loan is up to 90% of collateral; 60% weight above that limit
United States	OMV	No (but appraisers need to be certified)	85% if not guaranteed	50% weight if loan is up to 90% of collateral; 100% weight above that limit

Note: OMV = Open market value. MLV = Mortgage lending value. The MLV must be based on a prudent assessment of the market value (in Germany the typical adjustment factor is 20/25 per cent).
Source: Catte *et al.* (2004) and OECD Secretariat.

number of measures, such as imposing price ceilings on new houses, requiring builders to disclose their construction costs, tightening restrictions on reconstructing apartments,[23] requiring purchasers to report to the authorities how they will finance new homes, banning the re-sale of new homes purchased in the capital region for five to seven years and a 50% quasi-tax[24] on development gains. In addition, the government planned to increase the number of public rental units and houses for sale by public companies, secure additional land for housing by relaxing regulations, and expand the National Housing Fund. In the event, housing investment as a share of nominal GDP fell from 5.3% of GDP in 2005 to 4.1% in 2008 and further to 3.9% in 2009.

With the onset of the crisis, housing prices began to fall, prompting the government to ease a number of regulations. In particular, the restrictions on 69 zones that had been designated as speculative zones were removed in November 2008, leaving only three such zones in the Kangnam district of Seoul. Accordingly, LTV and DTI ceilings were relaxed in much of the country outside of Seoul. In addition, regulations on the reconstruction of apartments were liberalised in January 2009 and the regulation on the "floor area ratio" was eased in April 2009. In addition, the government provided liquidity to the real estate and construction sector.[25]

As a result of policy changes and the economic recovery, land prices stabilised in real terms in 2009. Consequently, the policy pendulum moved back towards greater restriction. The FSS tightened the LTV ceiling in the capital region (Seoul, Incheon and parts of Gyeonggi Province) from 60% to 50% for apartment loans of less than ten years by banks in July 2009 and for non-banks (which supply 25% of housing lending) in October 2009 (Table 3.8). In addition, DTI ceilings, which had applied only to speculative zones, were extended to all of Seoul (Table 3.9).

Table 3.8. **Loan-to-value regulation in Korea**[1]

Banks and insurance companies (mutual finance companies, mutual savings banks and specialised financial companies shown in parentheses)[2]

Loan maturity	Speculation zones		Other parts of the capital region (Seoul, Gyeonggi, Incheon) except for speculation zones		Other areas (%)
	House (%)	Apartment (%)	House (%)	Apartment (%)	
Three years or less	50	40	50 (70)	50 (60)	60 (60)
Three to ten years	60	40	60 (70)	50 (60)	60 (60)
More than 10 years					
Collateral value: more than 600 million won	60	40	60 (70)	50 (60)	60 (60)
Collateral value: less than 600 million won	60	60	60 (70)	60 (60)	60 (60)
Amortisation schedule of more than ten years[3]	70	70	70 (70)	70 (60)	70 (70)

1. Ratios in the table are the maximum levels allowed.
2. The LTV regulations were revised in July 2009 for banks and in October 2009 for the other financial institutions show in this table.
3. These figures apply to mortgages that will either be sold to the Korea Housing Finance Corporation within one year or those mortgages with fixed interest rates that have plans for securitisation.

Source: Financial Supervisory Service (2009a and 2009b).

Table 3.9. **Debt-to-income regulation in Korea**

Banks (other financial institutions, such as mutual finance companies, mutual savings banks and specialised financial companies, are shown in parentheses)

Collateral value	Loan amount	Speculative zones (%)	Seoul, excluding speculative zones (%)	Incheon and Gyeonggi (%)
More than 600 million won (holding title for 3 months or less)	More than 50 million won	40	50	60
More than 600 million won	More than 100 million won	40	50	60
(holding title for more than 3 months)	50 million won-100 million won	50		
Between 300 million won and 600 million won	More than 100 million won	40	50	60
	50 million won-100 million won	50		
300 million won or less				
Surface area in excess of 85 m^2	More than 100 million won	40 (45)	50 (55)	60 (65)
	50 million won-100 million won	50 (55)		
Surface area less than 85 m^2	More than 100 million won	50 (55)	50 (55)	50 (65)

Source: Financial Supervisory Service (2009a and 2009b).

In sum, the authorities should rely on appropriate prudential regulation through LTV and DTI ceilings, while phasing out other restrictions in use, particularly in speculation zones. Moreover, they should avoid frequent changes in prudential regulations, as fine-tuning could increase the volatility of housing prices (OECD, 2007). The rationale for differentiating the LTV and DTI ceilings based on the location of the house and its value appear to be targeted at housing prices rather than on the soundness of financial institutions. It would also be helpful to review the level of the DTI, which appears rather high at 60% in some areas, and of the LTV ratio, which in contrast is relatively low. Increasing property holding taxes, which are relatively low in Korea and were reduced in 2009, would

help contain housing prices while encouraging efficienct use of land (OECD, 2007). In addition, the contradiction between the regulations aimed at limiting concentration in the capital region and the concern about housing prices in the capital region should be addressed. A number of factors, including the economies of agglomeration and the availability of high-quality education, drive demand for housing in the capital region, putting upward pressure on housing prices. To stabilise housing prices, the government should consider addressing more effectively the factors boosting concentration in the capital region.[26] At the same time, concern about rising housing prices could be met by greater efforts to increase the supply of housing by relaxing regulations. Even in the city of Seoul alone, nearly one-third of land is classified as agricultural or forest, suggesting scope for increased supply of housing if the controls aimed at achieving balanced regional development by limiting new construction in the capital region were to be relaxed.

Improving corporate governance in financial institutions

One aspect of establishing a robust financial system and improving the competitiveness of the financial sector is upgrading governance of financial institutions. In the wake of the 1997 crisis, a number of reforms were introduced, notably the introduction of outside directors and audit committees and allowing foreigners as directors of banks. But progress appeared to stall by around 2005. A 2007 study showed Korea to be well below regional averages for rules and practices, the political regulatory environment and audit and accounting rules despite some improvement (CLSA, 2007). Indeed, there were complaints that outside directors had no real power and that managers directed banks in the context of diffuse ownership. The government should improve corporate governance in line with the guidance of the Basel Committee on Banking Supervision (BCBS, 2006), which follows the OECD principles.

One lesson from the global crisis is that there has been excessive reliance on credit rating agencies (CRAs) in financial regulation and investment decisions, thus weakening the cautiousness of investors (Rousseau, 2009). The CRAs played a role in the crisis by giving ratings to complex and risky products that turned out to be unwarrantedly optimistic. The "issuer pays" model of rating has led to the under-pricing of risk, suggesting a market failure in the form of a captive market (OECD, 2009b). In Korea, the ratings of four CRAs are used in capital market regulation.[27] CRAs have been regulated since 2001 by the Credit Information Act, which sets rules related to entry, scope of business and disclosure. In addition, CRAs are required to prepare internal control standards to improve their business practices since October 2009. However, it would be better to reduce the reliance on CRAs in financial regulation so as to improve the risk management systems of financial institutions, including board oversight and internal controls.

Strengthening the ability of financial institutions to absorb shocks in asset values

Another key to enhancing the Korean financial sector is the development of an asset-backed securities (ABS) market. Although in its unbridled, opaque form, it is regarded as a key factor in the financial crisis (BCBS, 2009 and Shin, 2010), securitisation can benefit asset owners, such as banks and investors, by exchanging income flows from assets to meet respective liquidity needs. Given the shortage of bank deposits against loan demand in Korea, securitisation is an effective tool to reduce pressure on bank balance sheets, which tends to overly encourage foreign borrowing. Despite a decline in issues by the private sector during the financial crisis, total issuance of ABS in Korea rose by 74.6% in 2009, as both publicly-offered ABS bonds and beneficiary certificates more than doubled (Table 3.10).

Table 3.10. **Issuance of asset-backed securities in Korea**

In trillion won[1]

	2004	2005	2006	2007	2008	2009
Total issuance amount	2.7	2.9	2.3	2.0	2.1	3.6
Percentage increase		6.0	–18.8	–14.9	4.2	74.6
Publicly-offered ABS bonds		1.7	1.4	1.0	0.8	1.9
Publicly-offered beneficiary certificates[2]		0.4	0.3	0.4	0.4	1.1
Private		0.7	0.6	0.6	0.8	0.6
Number of issues	170	236	183	106	81	138

1. ABS issued pursuant to the Asset-backed Securitisation Act and the Korea Housing Finance Corporation Act (in terms of registered securitisation).
2. The Korea Housing Finance Corporation issued publicly-offered MBS and SLBS.

Source: Financial Supervisory Service.

Mortgage-backed securities (MBS), including those issued by the Korea Housing Finance Corporation (KHFC), were the largest contributor to the increase. The KHFC plans to issue MBS worth around five to six trillion won each year from 2010 to 2012 to develop the market, which is still small. Indeed, at the end of 2008, the share of ABS outstanding among total bonds in Korea was 1.8%, far below the 34.5% share in the United States. Reviving the private-sector market for ABS requires enhancing transparency. As proposed by the Basel Committee on Banking Supervision, it is important that banks have a comprehensive understanding, on an ongoing basis, of the risk characteristics of their individual exposures to securitised products, both on and off-balance sheet. For securitisation to make a useful contribution to the financing of the Korean economy without generating risks of instability, another important requirement is that detailed information on the quality of underlying assets should be made available to prospective buyers of ABS.

The government's agenda for financial-sector development

The FSC announced an agenda for financial policy in 2010 that consists of five objectives (FSC, 2009c): *i)* funding economic revitalisation; *ii)* expanding support for low-income households and making financial markets more accessible to mid- to low-income households; *iii)* establishing a robust financial system; *iv)* improving the competitiveness of the financial sector; and *v)* enhancing Korea's standing in the global financial market. In particular, under the 2009 Capital Markets Consolidation Act, Korea is reducing segmentation in the financial sector, in contrast to other OECD countries that are considering moves in the opposite direction. The new act integrates seven laws, thereby allowing a single firm to provide a broader range of services, with a view to promoting the emergence of domestic investment banks. In effect, given the different starting points between Korea and many other OECD countries, there appears to be some convergence to middle ground.

While the banking system has grown and become more concentrated over the past decade (Hahm, 2008), there are still no Korean banks among the top 100 in the world. However, this is not necessarily a disadvantage as there is little evidence of efficiency gains in banks above USD 300 million in assets, a very small size by modern banking standards (Wheelock and Wilson, 2001). Given the experience of large banks during the recent global financial crisis, not having large banks may be an advantage for Korea. Indeed, other countries are considering reducing the size of financial institutions to ensure that none are too big to fail. While it may be reasonable to consolidate small banks in Korea to raise efficiency, a large global bank may not be necessary for a well-functioning capital market.

Conclusion

Korea's response to the financial crisis was effective in countering the severe effects of capital outflows, exchange rate depreciation and sharp falls in asset prices. The outcome demonstrates the success of the restructuring of the financial sector implemented in the wake of the 1997 crisis. With the economy and the financial-sector recovering, attention should turn to phasing out emergency support, in particular the policies to assist SMEs. It is important to continue progress toward a more market-based financial sector with appropriate prudential regulation, including for mortgage lending, and banks with better-developed credit analysis skills. In addition, Korea will need to devise policies to reduce its vulnerability to sudden capital outflows. Recommendations that deal with these issues are summarised in Box 3.3.

Box 3.3. **Summary of recommendations for the financial sector**

Managing external shocks

- Adjust deposit insurance premia based on foreign borrowing to provide incentives for banks to manage such borrowing more prudently, while effectively implementing revised foreign exchange and liquidity regulations.
- Apply foreign exchange and liquidity regulation on foreign bank branches, by taking into account international regulatory practices and ongoing discussions in the G20 and the Financial Stability Board.
- Participate in multilateral currency swap arrangements to reduce vulnerability to sudden capital outflows.

Strengthening financial intermediaries and corporate restructuring

- Limit the moral hazard problems in policies to help highly-indebted households.
- Avoid using lending to SMEs as a condition for banks to receive assistance, such as for public capital injections and guarantees.
- Phase out the expanded SME support programmes, including public spending and guarantees, which were introduced during the recent crisis, and promote corporate restructuring based on market incentives.
- Use the LTV and DTI regulations effectively to limit the risk of mortgage lending to financial intermediaries, while not using them to target housing prices in certain areas.
- Avoid frequent changes in the LTV and DTI, which could foster instability, while boosting property-holding taxes.
- Review the level of the relatively high DTI ceiling and of the relatively low LTV limit.
- Phase out other controls on housing, while putting more emphasis on enhancing supply.
- Reform weak financial intermediaries, notably the mutual savings banks, to improve resource allocation.
- Upgrade the corporate governance of financial institutions in line with the principles recommended by the Basel Committee on Banking Supervision and the OECD.
- Reduce the reliance on credit rating agencies in the financial regulatory system to make financial institutions and investors more responsible for their products, decisions and behaviours.
- Promote the development of securitisation through enhanced transparency to reduce pressure on banks' balance sheet due to the shortage of deposits, while ensuring that it does not create new vulnerabilities.
- Avoid the emergence of too-big-to-fail financial institutions.

Notes

1. For example, "South Korea Heads for Black September with Won Problems", *The Times*, 1 September 2008 and "Sinking Feeling", *Financial Times*, 14 October 2008.
2. The carry trade is discussed in Jordà and Taylor (2007), IMF (2007) and MacCauley and Zukunft (2008). The increased carry trade boosted the selling of forward exchange contracts by 76% between 2005-07.
3. One study (Peek and Rosengren, 1997) found episodes showing a link between the situation in Japan and the financing activities of the branches of Japanese banks in foreign countries. A later study (Ji, Alina, and Bang, 2009) found no such links. However, this may reflect the fact that the variable on conditions in the home country does not include asset prices and the definition of the activity of foreign branches is limited to lending. Foreign bank branches tend to behave as an investment vehicle financed by external borrowing.
4. A surge in lending from US banks in early 2009 accounted for most of the rise in foreign lending to Korea.
5. Capital inflows tend to boost stock prices but not land prices (Kim and Yang, 2009).
6. Reports, news releases and conferences with market participants by high-ranking regulatory officials of the FSS, the FSC and the Bank of Korea provided detailed information to the public and especially the foreign sector to assess the condition of the financial system and economy.
7. The credit ceiling programme is a way to increase lending to SMEs. The Bank of Korea allocates a certain amount of funds to banks at a low rate depending on the amount of their loans to SMEs. Consequently, this credit ceiling approach distorts resource allocation.
8. The government also made preparations for a Financial Stabilisation Fund, which would allow it to provide pre-emptive capital support to normal financial institutions with the aim of addressing market uncertainties and calming investor concerns. The "Act on the Structural Improvement of the Financial Industry" was amended in April 2009 but the Fund has not yet been launched.
9. These guidelines, announced in February 2009, covered market risk measurement and strict credit limit management to cope with increased uncertainties in domestic and international financial markets that could lead to drastic declines in interest rates, stock prices and the exchange rate (Angklomkliew *et al*., 2009).
10. For example, the Fund bought 17 ships for 191 billion won to help restructure the shipping industry.
11. KIKO (knock-in, knock-out) are currency-related financial derivatives to hedge against foreign currency risks. They have resulted in sizeable losses for a number of non-financial institutions. The government estimated in August 2008 the KIKO exposures of 517 firms, including 471 SMEs, at USD 7.9 billion, of which USD 2.3 billion were deemed "over-hedged", *i.e.* not backed by prospective foreign exchange revenues. As of May 2009, firms with KIKO-related losses had received more than 4 trillion won (USD 3.1 billion) under the Fast Track programme, accounting for a quarter of its outlays. While the peak of the problem has passed, the excessive use of currency-related derivatives by many firms raises concerns about the role of financial brokers. The FSC and FSS announced improvements in derivatives market supervision in December 2008 in response to the KIKO problem. See Bank of Korea (2008 and 2009a) for a detailed account of this issue.
12. The KFTC has stated that the Win-Win programme does not conflict with the Fair Trade Act as long as the guarantors apply the same standards as those used for SMEs that are independent of large firms or *chaebol*.
13. In April 2009, Incheon and Gyeonggi Province provided 5 billion won each, GM Daewoo and Ssangyong Motor 3.4 billion won and Shinhan Bank and the National Agricultural Co-operative Federation 3.3 billion won each to KODIT and KOTEC. KODIT and KOTEC are providing as much as 240 billion won in guarantees to SMEs supplying GM Daewoo and Ssangyong Motor and operating in Incheon and Gyeonggi Province.
14. Another means of helping financially-distressed households is non-guaranteed loans through the Microfinance Foundation. Microcredit businesses have been launched for people with low credit ratings and low income using dormant accounts at financial institutions and corporate donations.
15. About 2 trillion won in debts are rescheduled each year by the CCRS. In general, rescheduled debts are classified as substandard assets, according to the forward-looking criteria, requiring provisioning of 20%.

16. Non-bank financial institutions' share in indirect financing peaked at around 50% prior to the 1997 crisis. As a result of bankruptcies and M&As, the share of non-bank financial institutions in indirect finance declined to around 30% by 2005, while the share of banks returned to its pre-crisis level (Hahm, 2008).
17. Defined as NPLs, which are loans overdue more by more than three months or for which interest is unpaid, plus doubtful loans, as classified by a bank's subjective credit-rating model.
18. Korea has four specialised banks: Korea Development Bank, Industrial Bank of Korea, National Agricultural Co-operative Federation and the National Federation of Fisheries Co-operatives. These are policy banks supported by the government to target certain sectors of the economy to achieve specific policy objectives. These banks are regulated separately from commercial banks because of the policy loan objectives, although they are subject to the general application of the Banking Act.
19. This includes pre-foreign direct investment funding, foreign exchange forward hedging of pre-contracted future cash flows, and advanced receipts for shipbuilding contracts.
20. For instance, the cost of holding foreign exchange reserves in India is estimated at about 2% of GDP (Gupta, 2008).
21. This is widely recognised as a cause of Japan's failure to address the NPL problem (OECD, 2009b).
22. As in many countries, the national housing price is an unweighted average of all regions. As housing prices have risen more in the capital region, this approach underestimates the overall increase in housing prices.
23. The reconstruction of older apartments allowed an increase in floor space, thereby increasing the price.
24. Quasi-taxes include a wide range of fees, charges and contributions that are not imposed by the tax laws. Most are levied on firms in a discretionary and non-transparent manner for financing off-budget spending. There were some 100 such quasi-taxes in 2006, generating income of 1.4% of GDP.
25. The Korea Housing Guarantee Co., Ltd. bought unsold houses from construction companies under repurchase agreements of up to 2 trillion won and the Korea Land Corporation purchased land owned by real estate developers up to 3 trillion won.
26. This was an objective of the 2004 plan to create a new administrative city in Chungcheong province. However, the plan has been largely abandoned.
27. Three clauses in the Financial Investment Services and Capital Markets Act are based on ratings. *First,* financial investment service providers must get credit ratings from more than two CRAs on the non-guaranteed bonds that they acquire. *Second,* only foreign debt securities rated investment-grade, *i.e.* above BBB, by CRAs can be listed. *Third,* investment traders and brokers are only allowed to sell or broker commercial paper that is rated by more than two CRAs.

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Chapter 4

Health-care reform in Korea

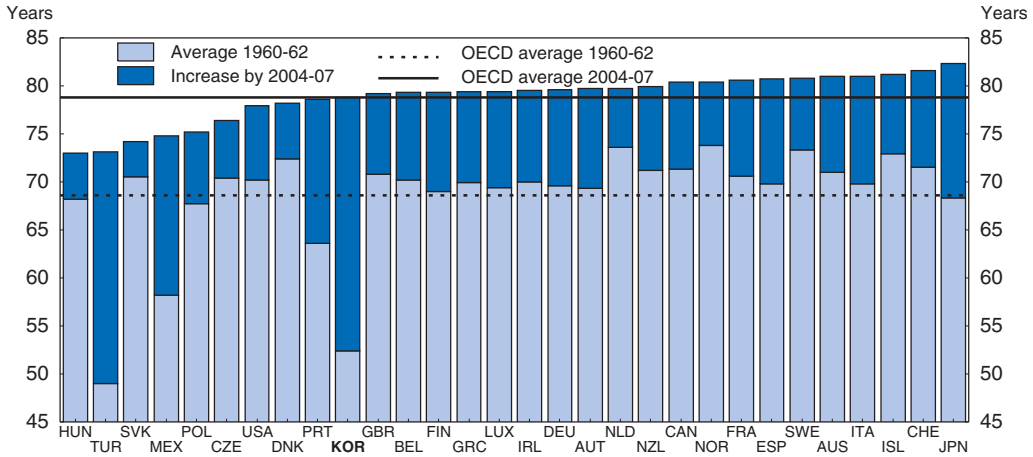
Korea's health-care system has contributed to the marked improvement in health conditions, while limiting spending to one of the lowest levels in the OECD through high patient co-payments and limited coverage of public health insurance. However, spending is now increasing at the fastest rate in the OECD. With continued upward pressure, not least from rapid population ageing, it is essential to boost efficiency by reforming the payment system, reducing drug expenditures, shifting long-term care out of hospitals, promoting healthy ageing and introducing gatekeepers. As the heavy reliance on social insurance payments for health will be an increasing drag on employment as the population ages, it is necessary to raise the share of tax-based financing in conjunction with effective measures to keep spending in check. Measures to ensure adequate access for low-income households are a priority given the high out-of-pocket payments. Quality should be improved by enhancing transparency, promoting restructuring in the hospital sector and expanding the number of doctors.

The expansion of health care in Korea mirrors its rapid economic development. In 1980, publicly-mandated health insurance, which was first introduced in 1977 for employees at large companies, accounted for 20% of total health spending, the lowest in the OECD area. By 1989, health insurance had been extended to the entire population[1] by allowing everyone to receive care at any institution at any time, albeit subject to a co-payment. Universal coverage was rapidly achieved by limiting the range of benefits covered by the National Health Insurance (NHI), although coverage has broadened over time, and by fixing medical prices at low levels.

Expanded access to health care has contributed to an improvement in health conditions and a marked increase in health spending. Indeed, life expectancy, which was the second lowest in the OECD area in 1960, has risen by 28 years to match the OECD average (Figure 4.1), even though Korea ranks 22nd in per capita income among OECD countries. The gain was achieved in part by reducing the infant mortality rate from 45 per 1 000 in 1970 to 4.4, below the OECD average. Meanwhile, the main causes of death shifted from communicable diseases to chronic and lifestyle-related illnesses. These major improvements were achieved while keeping health expenditures well below the OECD average (Figure 4.2).

After an overview of the health system, this chapter addresses the following key challenges: *i)* increasing efficiency to moderate the growth of health spending in Korea, which was the fastest in the OECD area over the past decade and faces continued pressure from rapid population ageing and the expanding coverage of NHI benefits; *ii)* improving the financing of health care to help ensure its sustainability; *iii)* ensuring access to health care

Figure 4.1. **Korea has achieved the largest increase in life expectancy in the OECD area**



Source: OECD Health Database (2009).

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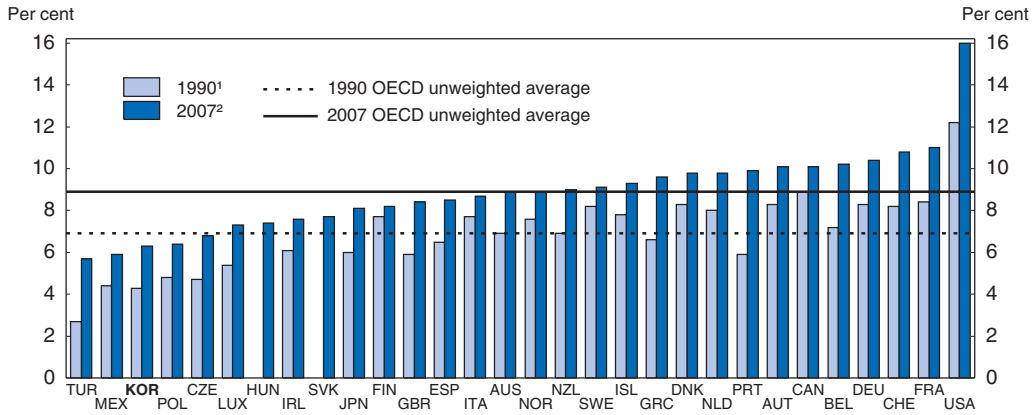
Figure 4.2. **Health-care spending in Korea as a share of GDP is the third lowest in the OECD area**



1. Excludes the Slovak Republic and Hungary, for which data are not available.
2. Except for Turkey (2005) and Japan, Luxembourg and Portugal (2006).

Source: OECD Health Database (2009).

StatLink http://dx.doi.org/10.1787/888932302910

in a system that relies heavily on out-of-pocket payments; and *iv)* upgrading the quality of health services in line with rising income levels. The chapter concludes with a summary of recommendations, which are shown in Box 4.3.

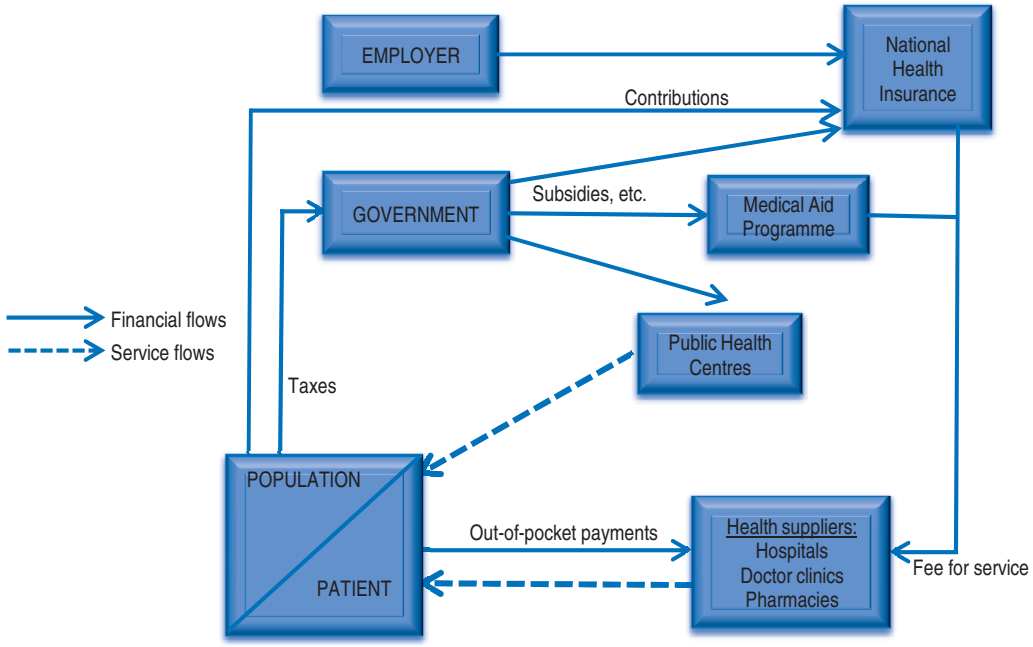
An overview of Korea's health-care system

A large role for private-sector financing

The NHI, a public non-profit organisation, purchases insured health services for the entire population (Figure 4.3). Providers are reimbursed on a fee-for-service basis according to the uniform fee schedule that applies to insured services. Health care is financed in almost equal measure by public funding, through the NHI, and private outlays:

- **Social insurance contributions to the NHI** accounted for 38.6% of total health spending in 2008 (Table 4.1). These include mandatory premium payments by firms, employees and the self-employed. The 5.33% rate for insured employees (62.5% of the population[2]) is split equally between employees and firms. For the insured self-employed and their dependents (34.2% of the population[3]), the premium is based on a formula that takes into account property, income, motor vehicle ownership, age and gender.[4]
- **Government sources** accounted for 16.9%. Government subsidises amount to almost one-half of the premium payments of the self-employed and fully pays those of the 3.3% of the population covered by the Medical Aid Programme for low-income households.
- **Out-of-pocket payments for non-covered services** accounted for 21.0%. Patients pay in full for some services, such as sonograms. Health-care providers have an incentive to introduce new services and high-technology care that are not covered by the NHI and thus not subject to price regulation. Such services are supplied at market-based prices in a competitive setting.
- **Co-payments on covered services** accounted for 13.7% of total outlays. The co-payment rate is set at 20% for in-patient care. Of the ten OECD countries that require co-payments for in-patient care, Korea is one of only two where it is based on a percentage of the cost rather than a fixed payment. Co-payment rates range from 30% to 60% for out-patient care,[5] the highest among the 20 OECD countries that require co-payments.

Figure 4.3. **The Korean health-care system**



Source: Ministry of Health, Welfare and Family Affairs.

- **Private insurance** accounted for 4.4% of total outlays. Insurance for car accidents accounts for about half of this amount. In addition, private insurance can pay up to 80% to 90% of co-payments as well as uninsured services. In 2008, 76% of the population had supplemental private insurance.[6]
- **Voluntary payments by firms** accounted for 4.6% of total outlays.

Table 4.1. **Health-care financing in Korea**

Per cent of total

	1980	1990	2000	2001	2005	2007	2008
Total public sector	20.1	36.5	44.9	51.7	52.1	54.9	55.5
Government sources	15.0	13.3	19.3	24.1	15.9	18.3	16.9
Social insurance payments[1]	5.1	23.2	25.6	27.7	36.1	36.6	38.6
Employers and employees	5.1	15.8	14.7	17.1	26.4	27.9	29.7
Self-employed and others	0.0	7.4	10.9	10.6	9.8	8.8	8.9
Total private sector	79.9	63.5	55.1	48.3	47.9	45.1	44.5
Payment by patients for non-covered services	72.1	47.8	31.4	25.4	25.1	22.0	21.0
Co-payments by patients for covered services	3.4	10.4	14.5	14.4	13.9	13.7	13.7
Private insurance	0.7	2.0	4.7	3.8	3.9	4.1	4.4
Payments by firms	3.2	2.7	4.1	4.2	4.6	4.8	4.6
Non-profit institutions serving households	0.5	0.6	0.5	0.4	0.4	0.4	0.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

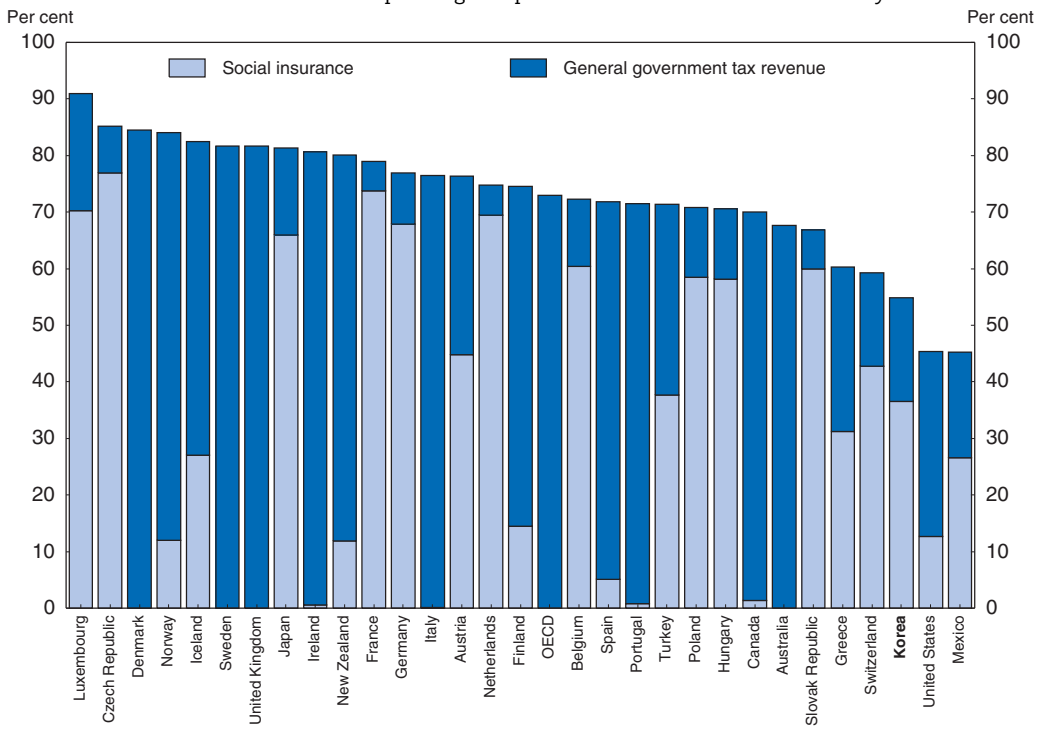
1. Includes only direct premium payments by employees and the self-employed in NHI. All other public funds, including the tobacco tax and "other source for social security fund", are included in "government sources".

Source: *OECD Health Database* (2009) and Jeong (2010) for the year 2008.

Although the public-sector's share – social insurance payments and government subsidies – has risen substantially from 20% in 1980, it was still the third lowest in the OECD area at 55.5% in 2008 (Figure 4.4). The heavy reliance on private financing is explained by several factors. *First*, Korea achieved universal coverage only 12 years after the introduction of the NHI in 1977 by restricting the coverage of the benefit package. In 1980, payments by patients for non-covered services accounted for almost three-quarters of health spending (Table 4.1). The share fell to around one-half as universal coverage was achieved and then to one-quarter, as the NHI benefit package was expanded to cover more services. Nevertheless, payments for non-covered services remain large compared to other countries. *Second*, the co-payment rate is high, as noted above. These two factors, reflecting the tradition of individual responsibility and limited government involvement in social affairs, achieved the government's goal of keeping the contribution rate low to promote rapid economic growth.

Figure 4.4. **The public sector's share of health spending in Korea is one of the lowest in the OECD**

Public-sector health-care spending as a per cent of the total in 2007 or latest year



Source: OECD Health Database (2009).

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In addition, the limited increase in medical fees, which were set each year by the government under the "official notification system" introduced in 1977, restrained the need for higher contribution rates. The notification system was replaced in 2000 in the wake of the Integration Reform (Box 4.1) by negotiations each year between the NHI and representatives of physicians, hospitals, pharmacies and nurses. However, these groups complain that medical fees have been constrained so tightly that they can at best barely cover the cost of providing medical care (Kwon, 2003c). Hospitals and physicians thus have

Box 4.1. **The Integration Reform: creating a single payer**

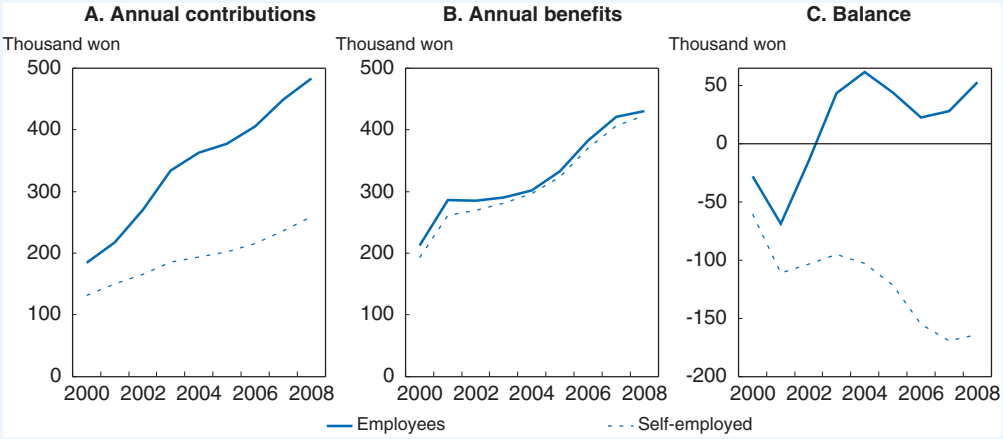
The government launched two major initiatives in 2000, the Integration Reform and the Separation Reform.* Until 2000, the NHI consisted of more than 350 quasi-public health insurers, based either on the workplace (for employees) or on the region (for the self-employed). Each insurer offered the identical statutory benefit package. Insured persons did not have a choice between health insurers, thus eliminating any possibility of competition. This system had a number of problems. *First*, the difference in insurance premiums for identical benefits created horizontal inequity. *Second*, the health insurance schemes for the self-employed faced chronic financial distress. *Third*, the small size of insurers created diseconomies of scale and high administrative costs (Shin, 2006).

In 2000, all health insurers were merged into a single payer in the NHI, thus reducing administrative costs. Before the reform, administrative costs for the health insurers ranged from 4.8% to 9.5% of total costs. By 2006, they were reduced to 4% under the unified NHI (Kwon, 2009c). In addition, a single provider is preferable in terms of the efficiency of risk-pooling. Moreover, a single-payer system provides greater bargaining power as a monopsonistic purchaser of health services. While the monopolistic behavior of a single insurer can decrease efficiency, the absence of consumer choice under the pre-2000 system means that there was no loss of competition.

The Integration Reform promoted equity among employees but not between employees and the self-employed (Kwon and Reich, 2005). Indeed, contributions of employees have increased much faster than those of the self-employed since 2000. By 2008, they were 87% higher than the self-employed compared to 40% in 2000 (Figure 4.5). Meanwhile, benefits for the self-employed (Panel B) rose slightly faster (at a 10% real annual rate) than for employees (9%). As a result, employee contributions substantially exceed the benefits they receive, while for the self-employed, contributions covered only 61% (Panel C), with the difference covered by government subsidies. Although one of the government's objectives in the Reform was to reduce its subsidies, they have doubled in real terms since 2000.

Figure 4.5. **Comparison of the employed and self-employed in the NHI**

In thousand won per person (including dependents) in 2000 prices



Source: National Health Insurance Corporation (2009a).

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* Korea's big-bang approach to health-care reform was made possible by the pro-reform climate in the wake of the 1997 crisis, the leadership of President Kim Dae Jung and the strong support of NGOs. However, a third major reform, the introduction of a Diagnostic-Related Group payment system, was rejected.

an incentive to supply services that are not covered by the NHI and are therefore outside the regulated fee schedule. Moreover, they oppose expanding the coverage of the NHI, as it brings more medical treatments into the regulated price structure.

Health-care providers

The health sector has evolved based on competition among private-sector providers that maximise their profits in practice. More than 90% of physicians work in private clinics or hospitals.[7] In addition, 96% of hospitals and clinics are privately-owned and they account for 90% of beds. They provide essentially the same services as public hospitals, although they supply more uninsured services and charge higher prices for them than their public-sector counterparts. There is also intense competition between hospitals, which run large out-patient centres, and physician clinics, some of which have in-patient care.[8] The number of acute-care hospital beds relative to the population is nearly double the OECD average (Table 4.2). Moreover, the ratio of hospital beds to population has risen by almost 80% since 1996, while it declined in all other OECD countries, except Turkey.[9] The establishment of private hospitals has not been subject to strict control. Another striking feature of Korean health care is the long average length of stay – 10.6 days compared to the OECD average of 6.6 – reflecting the incentives inherent in the fee-for-service payment system.

Table 4.2. **International comparison of health-care services in 2007**[1]

	Number of hospital beds[2]	Average hospital stay (in days)	Number of physicians[2]	Number of medical graduates[3]	Number of nursing personnel[2]	Number of nursing graduates[3]
Korea	**7.1**	**10.6**	**1.7**	**9.0**	**4.2**	**30.1**
OECD average	**3.9**	**6.6**	**3.1**	**9.9**	**9.6**	**35.5**
Highest country	8.2	19.0	5.4	21.7	31.9	85.6
Lowest country	1.0	3.5	1.5	5.5	2.0	8.6

1. Or latest year available.
2. Per 1 000 population.
3. Per 100 000 population.

Source: OECD Health Database (2009).

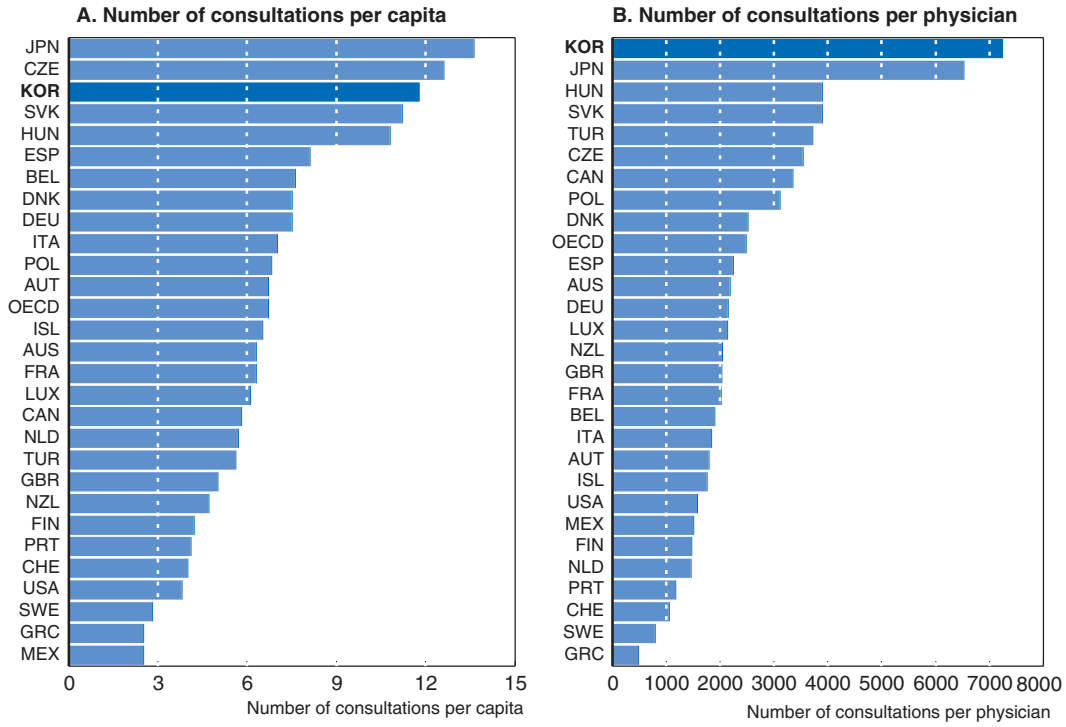
In contrast to the abundant supply of hospital beds, the number of medical personnel is exceptionally low in Korea. Indeed, the number of nurses relative the population is less than one-half the OECD average (Table 4.2). As for physicians, there are only 1.7 per 1 000 population, one of the lowest in the OECD area. Moreover, the number of medical graduates, which is decided by the government, is below the OECD average (relative to population), indicating that the ratio of physicians to Korea's population will remain low for a considerable time to come, particularly outside the capital region, and not least in rural areas. The lack of physicians is aggravated by the high number of consultations: the average number of visits to a physician per person has risen from 3.7 per year in 1978 to almost 12, nearly double the OECD average (Figure 4.6).[10] Consequently, the number of consultations per physician in 2007 exceeded 7 000, more than triple the OECD average, resulting in stress and overwork for physicians.

Pharmaceutical drugs

Expenditures on drugs rose at a 10% annual rate between 2001 and 2006, despite the Separation Reform's objective of reducing drug outlays (Box 4.2). The government introduced the "Drug Expenditure Rationalisation Plan" in 2006 to slow the growth of

Figure 4.6. **The number of consultations with physicians in Korea is exceptionally high**

In 2007 or latest year



Source: OECD *Health Database* (2009).

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spending on drugs. *First*, the addition of new drugs eligible for reimbursement under the NHI was changed from a negative list to a positive list and the criteria for adding drugs were tightened by strengthening the economic evaluation. *Second*, the Health Insurance Review Agency (HIRA) plans to test the cost-effectiveness of all existing drugs over five years, a very ambitious initiative. While the number of reimbursable drugs has fallen from 23 thousand to 15 thousand, the HIRA is behind schedule due to a lack of capacity. *Third*, the pricing of new drugs was shifted from an external reference – the price in major countries – to negotiations between the NHI and pharmaceutical companies. *Fourth*, rules regarding generics were adjusted. When the first generic is listed, the price of the originator drug is reduced by 20% and the price of the generic is set at 68% of the originator drug. The government does not provide any incentives to encourage the use of generics. Substituting a generic for a branded drug requires the consent of the patient and advance approval by the physician. In 2008, the price of generics was 72% of the originals on average, which is high by international standards, and they accounted for 38% of total drug reimbursements, implying they held about half of the market in terms of volume.

Long-term care for the elderly

Public expenditure on long-term care amounted to only 0.2% of GDP in 2007, well below the average of 1.5% in the nine European countries for which data are available. The low level of spending in Korea reflects its relatively young population and the reliance on informal family care. However, the availability of family-based care has fallen as the share

Box 4.2. **The Separation Reform: changing the system of pharmaceutical drugs**

Prior to 2000, physicians received a significant share of their income from selling drugs directly to patients.[1] Indeed, drugs accounted for more than 40% of physicians' income in some specialties, such as family medicine, internal medicine and dermatology (Jeong, 2005), as well as more than 40% of the revenue of hospitals. In principle, the maximum margin between the NHI's reimbursement price and the price that physicians purchased drugs from pharmaceutical manufacturers and wholesalers was 24%, but this was never actively enforced (Kwon, 2003a). Physicians had a financial incentive to sell drugs with the widest margins – those that pharmaceutical companies offered with the largest discounts below the NHI reimbursement price – rather than the most effective and high-quality drugs. Unfair and illegal marketing by pharmaceutical manufacturers and wholesalers, such as price collusion and rebates, was rampant. The 450 domestic pharmaceutical firms, of which two-thirds had less than 100 employees, survived by producing copy drugs and selling them at a discount to physicians (Kwon and Reich, 2005).

However, the financial interest of physicians was not necessarily in the best interest of patients, as it encouraged the misuse and overuse of drugs. Spending on drugs, including prescription and over-the-counter medicines, accounted for 24% of health spending in Korea in 2000, well above the OECD average of 17%. In addition to the wasteful expenditure, the over-use of antibiotics made them less effective in fighting disease. Moreover, the system of combined prescribing and dispensing limited patients' access to information about the medications that they received.

The Separation Reform in 2000 promoted specialisation in health care by limiting the prescribing of drugs to physicians and the dispensing of drugs to pharmacies. Drugs were divided into "professional drugs", which required a physician's prescription to be purchased at pharmacies and "general drugs", which could continue to be sold directly by pharmacies. The objective of the reform was to reduce the over-use of drugs, improve the quality of care, expand patients' rights to information and raise the efficiency of the pharmaceutical industry. Pharmacists favoured the reform as the introduction of the NHI and rising income levels had increasingly led patients to physician clinics and hospitals, rather than relying on drugs sold by pharmacies. Not surprisingly, physicians opposed the reform, staging a series of nation-wide strikes that paralysed the medical system.[2] To reimburse the physicians for their income loss, medical fees were raised by 49% during the 15 months between November 1999 and January 2001, pushing the NHI into financial crisis in 2001-02.[3] In addition, the strikes forced the government to modify the planned reform in favour of physicians by: *i)* increasing the share of prescription drugs relative to nonprescription ones in the NHI; *ii)* protecting physicians' right to prescribe brand-name drugs; *iii)* reversing the plan to include injection drugs in the reform;[4] and *iv)* controlling the pricing of generic drugs. These changes reduced the benefit from the reform.

The Separation Reform did help curb the volume of drug consumption as expected. The percentage of claims from physician clinics containing an antibiotic prescription fell from 56% in 2000 to 30% in 2007, resulting in a 30% decrease in the overall use of antibiotics. Moreover, the total number of drug items per prescription claim dropped from 5.9 in 2000 to 4.1 by 2005 and has remained at that level (Jeong, 2009). Nevertheless, the number of drug items per prescription is much higher than in many other OECD countries, where it is often as low as two (Table 4.3). One reason is the exceptionally high number of drugs prescribed for acute upper respiratory infection in Korea. Moreover, in Korea, the number of drug prescriptions for children is higher than for adults, while the reverse is true in other OECD countries. The number of prescriptions is higher at clinics than at high-level general hospitals, suggesting that a significant share of prescriptions are linked to minor health problems that are typically treated at clinics.

Box 4.2. **The Separation Reform: changing the system of pharmaceutical drugs** *(cont.)*

Table 4.3. **Pharmaceutical drug use in major countries**

Average number of drug items per prescription in 2005 in major countries

	Total average	Acute upper respiratory infection	Number of drug items prescribed to patients under age 18
Australia	2.16	1.33	1.31
France	4.02	3.44	3.08
Germany	1.98	1.71	1.85
Italy	1.98	1.61	1.64
Japan	3.00	2.20	2.02
Spain	2.20	1.78	1.61
Switzerland	2.25	2.08	1.77
United Kingdom	3.83	2.58	1.90
United States	1.97	1.61	1.64
Korea	**4.16**	**4.73**	**4.56**

Source: International Marketing Service.

Nevertheless, drug expenditures have continued to increase at a double-digit rate since 2001, keeping them at close to a quarter of total health spending, well above the OECD average of 14.5%. Rising drug outlays can be attributed to a number of factors, according to a 2007 government study, that more than offset the decline in the number of drugs prescribed per visit: *i)* 55% was a result of an increase in the number of days per prescription; *ii)* 20% was due to an increase in drug spending per prescription day, *i.e.* a shift to higher-priced drugs; *iii)* 18% resulted from an increased number of physician visits; and *iv)* 7% was due to a rise in the number of patients. The shift to higher-priced drugs indicates that physicians are prescribing more expensive branded drugs rather than focusing on those with higher margins as they did when they were allowed to sell drugs. Indeed, the share of high-priced drugs rose from 36% in 2000 to 54% in 2005 (Kim and Ruger, 2008). While there is no direct income gain to physicians from the sale of drugs, the shift to higher-priced drugs may reflect higher illegal rebates from the makers of high-priced drugs.

Given the higher medical fees to compensate physicians for the Separation Reform, total health spending rose from 4.7% of GDP in 2000 to 5.2% in 2001, while boosting the public share of health spending from 44.9% to 51.7% (Table 4.1), as previously uncovered drugs were included in the NHI. Indeed, the public share of drug expenditure jumped from 34% in 1999 to 55% in 2001 (Jeong, 2005). The larger share of drugs covered by the NHI also meant that patients had to go to a physician for a prescription, thereby raising the number of consultations per capita from 8.8 in 1999 before the Separation Reform to 12 in 2007.[5] In short, there was a shift from self-medication using drugs from pharmacies to prescription drugs under the auspices of the NHI. In sum, Korea's experience with the Separation Reform demonstrates that health-care reform can have unexpected consequences.

1. The practice of leaving the physicians' office with the drugs dispensed by the physician is found in other Asian countries, including Japan, reflecting the influence of traditional Asian medicine.
2. The "Doctors' Rights Safeguarding Militant Committee" organised three strikes in 2000. In addition, after the Separation Reform was legally implemented, physicians staged more strikes in 2001.
3. Consultation fees with physicians were raised 12.8% in November 1999, 6.0% in April 2000, 9.2% in July 2000, 6.5% in September 2000 and 7.1% in January 2001. However, physicians' income from higher fees was more transparent and thus more fully subject to income taxes than the income from selling discounted drugs.
4. Drug injections are common in Korea. In 2000, 60% of out-patients in physician clinics were given shots (Jeong, 2009).
5. Hospitals, which play a large role in out-patient care, faced a significant loss as they were no longer allowed to have pharmacies.

of the elderly living with their children declined from more than 80% in 1981 to 29% by 2008 and the female labour force participation rate continues to rise. Given the tradition of family-based care, the availability of formal care is limited. Consequently, the growing need for formal care has been met in part by acute-care hospitals, thus helping explain the relatively long hospital stays in Korea (Table 4.2). Indeed, the elderly, 10.6% of the population in 2009, accounted for 40% of the cost of in-patient care.

In July 2008, Korea became the fifth OECD country to introduce a long-term care insurance (LTCI) system. Elderly persons applying for long-term care are visited by NHI staff, who assess their ability to perform 52 activities of daily living. The appropriate level of care is then determined by the NHI, taking into account the opinion of physicians.[11] With the increasing awareness of the LTCI, the share of the elderly who have applied for benefits reached 12.3% in April 2010, with 45.9% judged to be eligible (Table 4.4). Benefits are provided as services, rather than cash, except where long-term care facilities are unavailable (Kwon, 2009a). The proportion of elderly receiving benefits increased from 1.4% when the LTCI was introduced to 4.4% in April 2010. Of this total, about a third are in institutional care, subject to a 20% co-payment, while the remainder receive home-based services, with a co-payment of 15%.[12] In addition to co-payments, the LTCI is financed by central and local governments (30%) and premium payments (55%). To maintain the stability of the LTCI in the face of the rising number of eligible elderly, the premium was increased by more than half to 0.35% of income in 2010.[13]

Table 4.4. **The expansion of long-term care insurance**

	July 2008	December 2008	December 2009	April 2010
Number of elderly who applied for LTCI benefits	271 298	376 032	596 235	663 741
Per cent of total elderly	5.4	7.5	11.3	12.3
Number of elderly found eligible for LTCI benefits	146 643	214 480	286 907	304 826
Per cent of applicants	54.1	57.0	48.1	45.9
Per cent of total elderly	2.9	4.3	5.4	5.6
Number of elderly receiving benefits from LTCI	70 542	147 801	228 980	236 004
Per cent of eligible	48.1	68.9	79.8	77.4
Per cent of total elderly	1.4	3.0	4.3	4.4

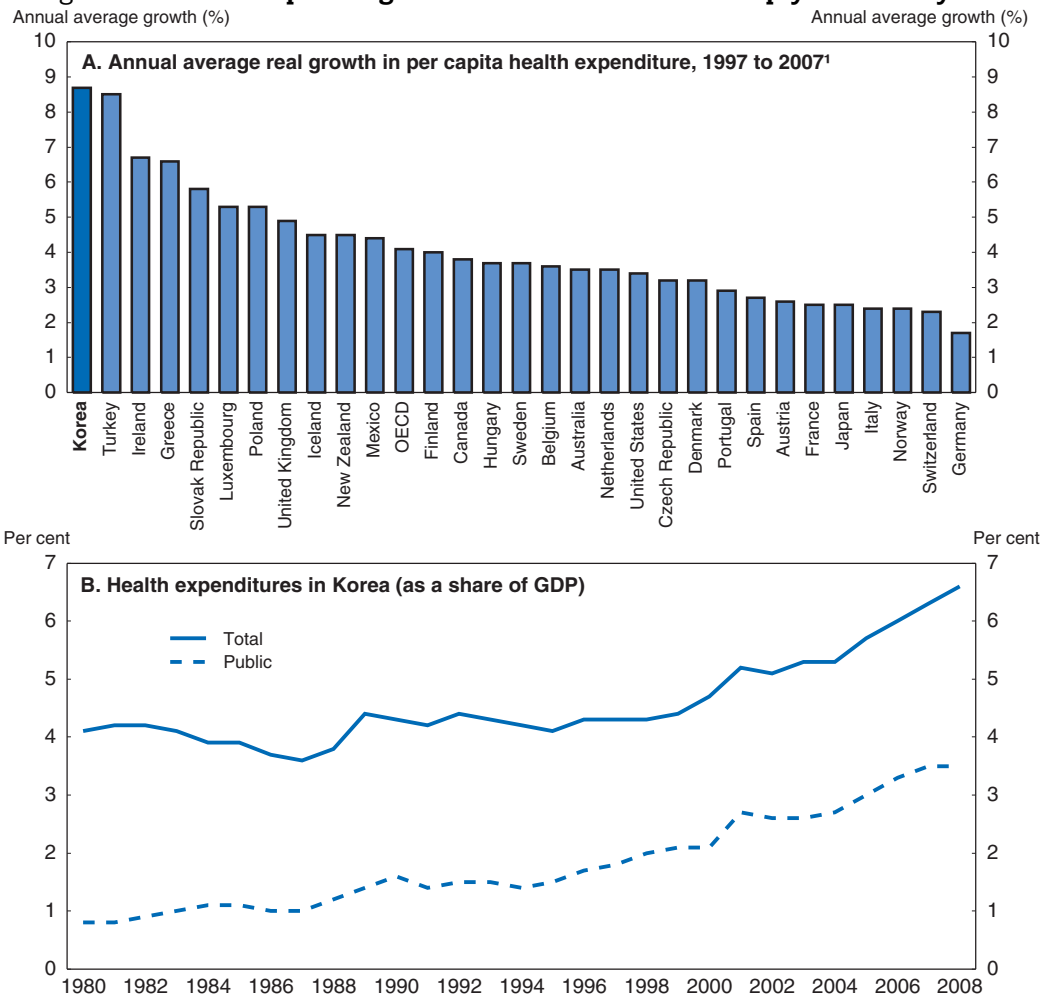
Source: National Health Insurance Policy Research Institute.

The introduction of the LTCI has spurred a substantial expansion in the supply of long-term care for the elderly, particularly by the private sector (Kwon, 2009a). The number of long-term care facilities jumped from 534 at the end of 2005 to 2 455 by the end of 2009, boosting capacity to almost 85 thousand persons. In addition, the number of providers of home-based care has increased substantially.

Improving efficiency to contain the growth of health spending

Perhaps the biggest challenge facing Korea's health-care system is the rapid increase in spending. During the decade to 2007, per capita health expenditures rose at an 8.7% annual average rate in real terms, the fastest in the OECD area (Figure 4.7). This reflects both buoyant economic growth and the relatively low initial level of health spending. Consequently, total health spending, which had remained below 4½ per cent of GDP between 1980 and 1997, jumped to 6.3% by 2007, and to 6.6% in 2008 (Panel B). Public health spending increased at an even faster rate, doubling its share of GDP to 3.5%. This

Figure 4.7. **Health spending in Korea has increased sharply in recent years**



1. Or latest year.

Source: OECD Health Database (2009).

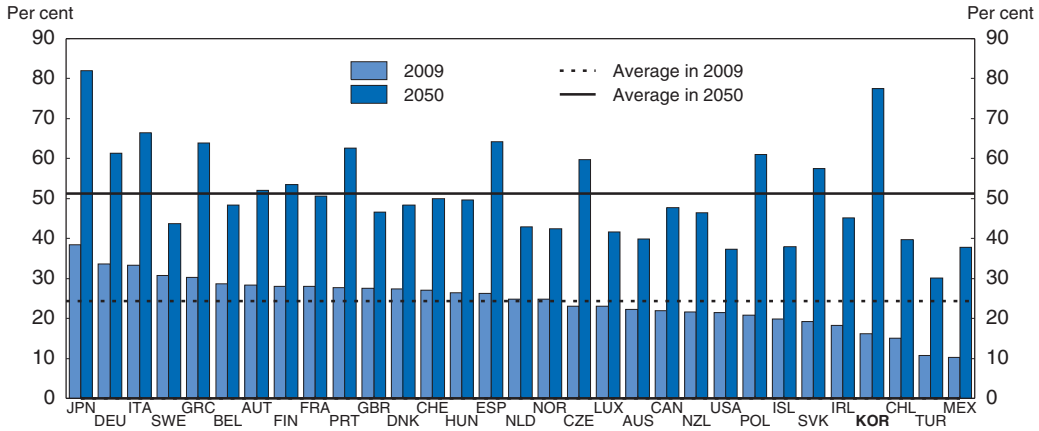
StatLink http://dx.doi.org/10.1787/888932302986

was due, in part, to the hike in medical fees in the wake of the 2000 Separation Reform, while drug expenditures did not fall as intended (Box 4.2). Population ageing is another factor for two reasons. *First*, the share of elderly in the population rose from 6.4% in 1997 to 9.9% in 2007. *Second*, spending per elderly has increased from less than three times the spending for those under 65 to 3.6 in 2007.

Population ageing will continue to put upward pressure on health spending. Korea has gone from having one of the highest fertility rates in the OECD area in the 1960s to the lowest by 2005, while the increase in life expectancy was the longest (Figure 4.1). Consequently, the rise in the elderly dependency ratio by 2050 is projected to be the greatest in the OECD area (Figure 4.8). An OECD study projects that public health spending in Korea may rise by 3 to 5 percentage points of GDP by 2050, the largest increase in the OECD area (Oliveira Martins and de la Maisonneuve, 2006). As in all countries, technological change will boost health spending. In Korea, this pressure will be magnified by the plan to expand the relatively limited coverage of the NHI.

Figure 4.8. **Population ageing in Korea is projected to be the fastest in the OECD area**

Population aged 65 and over as a share of the population aged 20 to 64



Source: *OECD Society at a Glance Database.*

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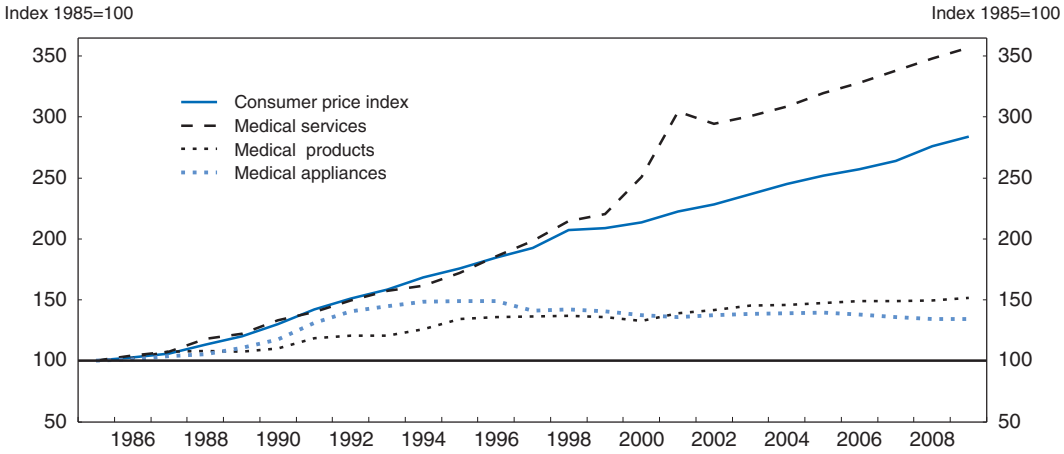
To control health spending, the authorities kept the rise in medical fees in line with consumer price index (CPI) inflation between 1985 and 1997 (Figure 4.9). After the sharp hikes in the wake of the 2000 Separation Reform, medical fees increased by a cumulative 18% between 2002 and 2008, less than the 21% rise in the CPI. Nevertheless, health spending as a share of GDP rose from 5.1% of GDP to 6.6% over that period, as the volume of care expanded rapidly. Looking ahead, it will be difficult to keep the pace of medical fee increases below the inflation rate, given considerable pressure from the medical profession. Although the cumulative rise in medical fees since 1985 far outstrips the CPI, health-care providers insist that they are underpaid, arguing that medical fees were initially set too low when the NHI was introduced in 1977. However, the fact that gaining admittance to medical school has become increasingly difficult in recent years does not suggest that physicians are underpaid.

Figure 4.9. **Increase in medical costs relative to the consumer price index**



Source: Korea National Statistical Office.

StatLink http://dx.doi.org/10.1787/888932303024

In sum, continued growth in health spending at a double-digit pace in an economy with a potential growth rate of 4-5% is not sustainable in the long run. It is essential to contain spending on health to avoid crowding out other spending and to limit the burden of taxes and social charges. As long as the system remains based on a fee-for-service payment to private profit-seeking suppliers, Korea remains particularly vulnerable to sharp increases in health spending (Yang *et al.*, 2008). Therefore, a number of structural reforms – changing the payment system, reducing the overuse of drugs, shifting long-term care out of hospitals, promoting healthy ageing and introducing gatekeepers – are urgently needed to increase the efficiency of the health-care system, thereby containing the rise in spending.

Reforming the payment system away from fee-for-service

The payment system for health-care providers has an important impact on their medical decision-making and the efficiency of the health-care system. The fee-for-service payment system in Korea has a number of drawbacks. *First*, it encourages providers to increase the volume of services by inducing unnecessary health-care treatments for profit reasons. For example, physicians in Korea usually ask that patients with minor illnesses visit their office every three days for consultations that last only two or three minutes, helping to explain why the number of consultations in Korea is one of the highest in the OECD (Figure 4.6). *Second*, providers have an incentive to raise the intensity of their services. This is illustrated by the rise in the rate of caesarean deliveries – for which the price in NHI is set 1.5 times higher than for a normal delivery – from 6% in 1985 to 36% by 2008 in Korea, one of the highest in the world and well above the 10% level recommended by the World Health Organisation. *Third*, it encourages physicians to substitute uninsured medical services – for which fees are not regulated – for insured ones. For example, the fact that CT scans were not covered by the NHI encouraged the purchase of CT scanners. In 2008, Korean medical institutions had more than twice as many CT scanners, relative to population, than the OECD median (OECD, 2009b). With the inclusion of CT scanners in the NHI, physicians moved on to MRIs, and they now have more than twice as many MRIs, relative to population, than the OECD median.[14] The incentive for physicians to supply non-covered services helps to explain why out-of-pocket payment for services not covered by the NHI still accounts for almost a quarter of health spending in Korea (Table 4.1), despite the expansion of the NHI.

Changing the economic incentives for providers by reforming the payment system is a priority to reduce the number of supplier-induced consultations. Korea started a Diagnostic-Related Group (DRG) payment pilot programme for five illnesses in 1997. In 2002, Korea introduced a DRG payment system on a voluntary basis for eight illnesses, which were chosen because of their high level of standardisation in treatment and low variation in costs. Together, they accounted for about a quarter of in-patient cases. While most of the reimbursement amount is fixed in advance, it can be adjusted in unusually complicated cases to compensate hospitals for legitimate cost differences due to variations in case-mix.

A government study found that the DRG was successful in reducing medical costs by 14% and the length of hospital stay by 6%. The cost savings were achieved in part by cutting the number of tests, from 5.1 to 3.8 per patient, and the use of antibiotics by 30%. The DRG also lowered the administrative cost of filing and processing claims for individual treatments. However, these savings were partially offset by increases in pre-admission care and the number of out-patient visits and use of antibiotics after discharge, as hospitals boosted their revenue through fee-for-service treatments (Kwon, 2003c). Nevertheless, the

DRG reduced overall medical costs. In addition, the DRG includes treatments not covered by the NHI, thereby easing the financial burden of out-of-pocket payments by patients. Moreover, the DRG is helping to promote the standardisation of clinical practices that are most effective. One concern is that the DRG might lower the quality of health care, given that physicians are employed by hospitals, which have an incentive to limit the cost of treatment. However, there was little negative effect on quality, as measured by the number of complications and repeat operations (Kwon and Reich, 2005).

Despite the favourable outcome of the pilot project, the plan to extend the DRG system and make it mandatory was prevented by physicians (Box 4.2), who strongly oppose moving away from the fee-for-service system. In part, they fear that the relatively generous initial DRG reimbursement levels would be cut if the new system were mandatory. The DRG continues on a voluntary basis for seven disease groups, with almost 67% of institutions participating in 2009. Reimbursement under the DRG system is based on the average fee-for-service reimbursement for each of the disease groups. However, the current voluntary approach to the DRG is raising health-care costs; hospitals with a relatively low cost structure generally choose to participate in the DRG system, thus increasing their revenues and profits, while hospitals with high cost structures prefer to stay with the fee-for-service approach. Given the effectiveness of the DRG system in reducing the length of hospitals stays, its use should be expanded and extended to other disease groups.[15] In addition, the reimbursement rate under the DRG should be gradually reduced to the level in the lower-cost hospitals in order to boost efficiency. The DRG should be accompanied by measures to ensure the quality of health care and to prevent hospitals from "gaming the system" by shifting treatment to before admission and after discharge.

Reform of the payment system for out-patient care is also needed to reduce the exceptionally high number of consultations and lengthen their short duration, which is a major complaint of patients. One solution would be a capitation system, which reimburses physicians on the basis of the number of patients during a year rather than the number of visits. Moreover, such a system gives physicians strong incentives to focus on prevention and health promotion for their patients (Kwon, 2003a). A mixed system combining capitation and fee-for-service may be the best option. Another option would be to modify the reimbursement rate in some cases, such as a second visit for a cold or another minor ailment. Any such reforms should be accompanied by stepped-up efforts to weed out abuse from insurance claims by not reimbursing visits judged to be unnecessary.[16] Reform of the payment system should also advance in line with an expansion of the NHI. Otherwise, more aggressive, cost-saving payment systems will prompt physicians to increase the provision of services not covered by the NHI. The end result would be higher health spending, a larger burden on patients and increased inequality in the access to health care.

Reducing outlays on pharmaceuticals drugs

As noted above, drug expenditures continue to account for almost a quarter of health spending despite the 2000 Separation Reform. Although physicians no longer sell drugs, they still benefit from illegal rebates from pharmaceutical companies. Rebates are essentially bribes – price discounts on the drugs or benefits in kind, such as expensive meals and travel – provided by pharmaceutical companies to physicians and hospitals that prescribe and purchase their drugs. The Korea Health Industry Development Institute reported that some companies spend up to half of their yearly revenues on rebates alone (KHDI, 2008). Rebates

are considered to be a major cause of unnecessary and ineffective prescriptions, high drug prices and a lack of competitiveness in Korea's pharmaceutical industry. Nevertheless, they remain prevalent due to vague definitions and poor enforcement. The Ministry of Health, Welfare and Family Affairs launched a crackdown on rebates in 2009, prohibiting any financial incentives to promote drug supply deals and limiting benefits from pharmaceutical companies to health providers to 0.5 million won (approximately USD 440) per year. Violators face a reduction of up to 20% in the official price for their drug in the NHI. In addition, the Korea Fair Trade Commission launched investigations into the rebate practices of the pharmaceutical industry, as they undermine market competition and consumer welfare.

In February 2010, the government announced a more severe plan: physicians and pharmacists who receive rebates from drug makers in return for prescribing or recommending their products are subject to up to two years in jail or having their license suspended for up to a year. This was accompanied by more serious penalties for pharmaceutical companies under this plan, which is to go into effect in October 2010. If they are found to have provided rebates for a drug on two occasions, that drug would be dropped from NHI coverage, thus sharply curtailing its use. In addition, consideration is being given to rewarding persons who report rebates to the authorities. In addition, the government will introduce a scheme to make it less costly for health personnel to give up rebates. If they report the potential rebate – the gap between the market price and the official price from the NHI – they will receive 70% of that amount from the authorities.[17] The government expects these measures to reduce drug prices by 3% to 5% a year, saving patients up to 154 billion won annually.

The new measures on rebates should be vigorously implemented, while reforming the system of setting drug prices to more closely reflect market prices. Permitting health providers to claim 70% of the difference between the market price and the official price will increase transparency about market prices, allowing the official price to be brought closer to the market price in the annual revision of medical fees in the NHI. Such a pricing system is being used successfully in Japan. In revising the fee schedule, prices are set 2% above the market price.[18] In 2008, the prices of 88.7% of the 12 740 listed drugs were decreased, 10.7% were left unchanged and only 0.5% increased, resulting in a 5.2% overall decline in drug prices. In addition, it is important to reduce the number of drugs per prescription from its current average of more than four (Table 4.3), in part by reducing the reimbursement rate for prescriptions with too many drugs. Finally, the expansion of the DRG would reduce the financial incentives for overuse of drugs in hospitals.

More effective use of generics is also key to reduce drug costs. As noted above, the price of generics is set at 68% of that of branded drugs in an effort to support the domestic pharmaceutical industry, which is concentrated in generics. However, efforts to promote this industry have been ineffective. In particular, there has been little R&D investment. Allowing the price of generics to fall would sharply reduce drug prices. For example, generics cost only 20-30% of the price of branded drugs in the United States. Moreover, making generics the standard for reimbursement by the NHI would reduce drug costs.

Finally, it is important to reduce the price of non-prescription drugs by relaxing the regulations that limit their sale to pharmacies. Indeed, even relatively simple drugs, such as aspirin, must be sold by pharmacists. Gradually allowing them to be sold in other retail outlets would be beneficial and reduce their price.

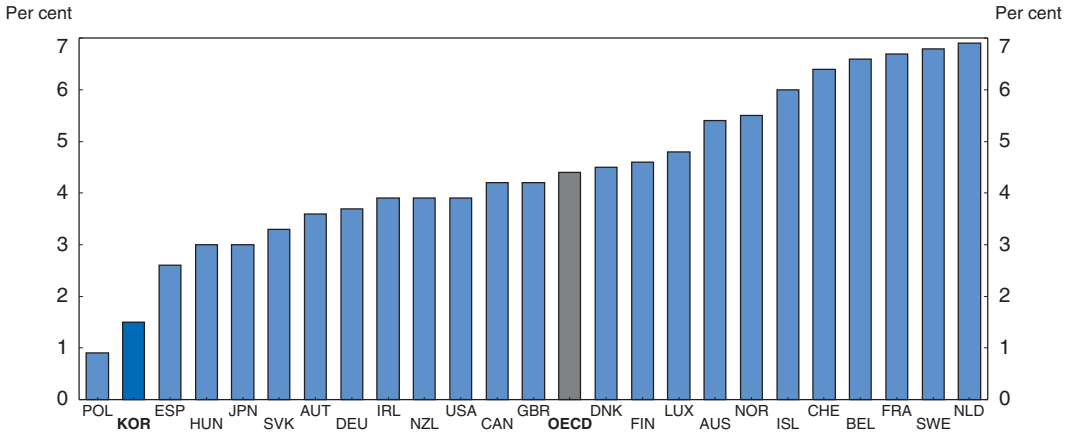
Shifting long-term care from hospitals

The large number of hospitals beds and the long average stay (Table 4.2) are partly a result of hospitals' role in providing long-term care to the elderly. *First*, there has been a shortage of formal long-term care, both institutional and home-based. In 2006, only 0.3% of the elderly were in institutional care. *Second*, given that patients tend to prefer large medical facilities, small hospitals have trouble filling their beds, thus giving them an incentive to provide long-term care. This is facilitated by the lack of a clear separation between chronic-care and acute-care beds in hospitals (NHIC, 2009b). The reliance on hospitals to provide long-term care – so-called "social hospitalisation" – is inefficient, as it creates a mismatch between the needs of the elderly and the medical services provided. The inappropriate hospitalisation of elderly needing long-term care thus raises the length and cost of their care, placing a strain on the NHI.

The introduction of the LTCI provides an opportunity to "de-medicalise" long-term care. The number of elderly receiving long-term care in Korea has risen sharply from 1.4% in 2008 to 4.4% in 2010 with the introduction of LTCI and the release of pent-up demand (Table 4.4). Nevertheless, the proportion in institutional care in 2009 was only 1.5%, compared to the 2007 OECD average of 4.4% (Figure 4.10). The proportion receiving home-based care (2.9%) was also far below the OECD average (8.6%). The capacity for long-term care appears inadequate at present. By 2010, Korea had 800 thousand elderly suffering from Alzheimer's disease, considerably above the 236 thousand receiving assistance under the LTCI (Table 4.4). Indeed, as of the end of 2009, there was only one place in institutional care for every 62 elderly persons. In addition to the lack of long-term care facilities, there is a shortage of qualified care workers.

Figure 4.10. **International comparison of institution-based long-term care**

Number of recipients as a share of the elderly in 2007 or latest year (2009 in Korea)



Source: OECD DELSA Database.

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Demographic trends will further increase the need for long-term care, which grows exponentially with age, with the bulk concentrated on persons over the age of 80. In Korea, the number of persons above that age is projected to rise from 2% of the population at present to 14% by 2050. In addition, growing female labour force participation and the falling share of the elderly living with their family will further narrow the scope for family-based

care, creating the need for a better developed infrastructure for care. An OECD study estimated that public spending on long-term care in Korea may rise to between 3% and 4% of GDP by 2050, above the OECD average of 2.4% to 3.3% (Oliveira Martins and de la Maisonneuve, 2006).

The government plans to gradually expand the coverage of LTCI, taking into account the insured's ability to pay and the capacity of long-term care facilities (NHIC, 2009b). Achieving the necessary expansion should rely primarily on the private sector. Moving away from the current reliance on the government to provide most long-term care facilities would foster competition among providers and more choice for families, while limiting the cost of public investment in infrastructure (OECD, 2007a). Greater choice would increase the satisfaction of older persons and their independence. It is thus essential to eliminate any regulations that may discourage the entry of new firms. Providing cash benefits would promote competition between formal and informal care and promote the expansion of private facilities. Concerns about quality can be met by requiring that LTCI be used only in long-term care by licensed providers. Moreover, the government should widely disseminate quality information to spur competition.

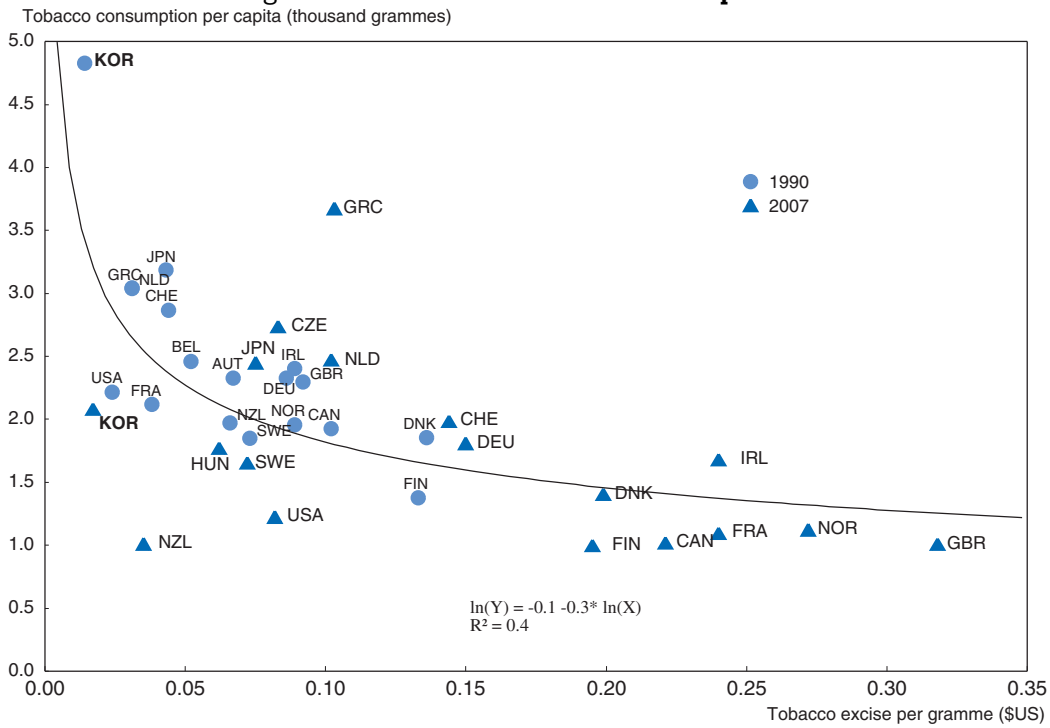
In this context, it is important to learn from the experiences of other countries that have introduced LTCI. *First*, reducing the role of hospitals in long-term care requires effective co-ordination between the NHI and the LTCI. Hospitals may try to game the system by upgrading the care level of patients, thereby preventing them from moving to long-term care facilities.[19] Avoiding such outcomes requires monitoring hospitals' evaluation of patients. *Second*, measures are needed to avoid a supply-driven increase in the number of elderly receiving low levels of care. The sharp increase in Japan reflects in part the tendency to err on the side of generosity in approving care (Imai and Oxley, 2008). *Third*, the LTCI should focus on lower-cost home-based professional care rather than institution-based care.

Promoting healthy ageing

With the number of persons over age 65 rising rapidly, reducing the relatively high expenditures on health care for the elderly is essential to restrain total health spending. As noted above, health spending per elderly person is almost four times higher than for the non-elderly. It is important to promote healthy ageing – reducing the number of years of disability – to limit the impact of demographic change on health spending. Indeed, prevention and health promotion are more cost-effective than medical treatment (Kwon, 2003a). However, a recent OECD analysis suggests that policy makers should not count on reductions in severe disability among the elderly to moderate future demand for health care.[20] At the same time, there is evidence that certain public health interventions, including the promotion of healthy lifestyles, can have a significant impact (Colombo and Hurst, 2008).

Korea's traditional diet, which is low in calories and high in fruit and vegetables, is one of the healthiest in the world and has limited the incidence of obesity to the lowest in the OECD. Nevertheless, the rate has risen during the past ten years, reflecting changing diets, thus damaging the outlook for healthy ageing. The major preventable health problem is tobacco: while the smoking rate for women was the lowest in the OECD area in 2007 at 5%, the rate for men was the third highest at 47%. The prevalence of smoking is associated with high rates of lung and stomach cancer, imposing a significant cost for Korea (Lee *et al.*, 2007). Although the tax on tobacco is twice as high as in 1990, it is still the lowest among

Figure 4.11. **Tobacco tax and consumption**[1]



1. Converted into US dollars using purchasing power exchange rates for 1990 and 2007.

Source: OECD Health Database (2009).

StatLink http://dx.doi.org/10.1787/888932303062

the OECD countries for which data are available (Figure 4.11). Evidence from OECD countries indicates that the rate of smoking is sensitive to tax rates, suggesting the need for higher tobacco taxes in Korea. Another concern is alcohol consumption; Korea has the sixth-highest rate of death from liver cirrhosis in the OECD area (OECD, 2009b).

Introducing gatekeepers

In many countries, patients must see a general practitioner (GP), who provides primary care, in order to obtain a referral to see a specialist. According to empirical studies (Gerdtham and Jönsson, 2000), countries with GP gatekeepers have lower per capita health spending. Such an approach also appears to lead to better health outcomes through improved preventive care, allowing for early detection and treatment of illness, and better management of chronic problems, thereby reducing the number of out-patient visits in the long term. In addition, it offers a more co-ordinated approach across providers, helping to limit the number of unnecessary medical appointments (Wagstaff, 2009a). However, Korea does not have gatekeepers, leaving patients free to consult any provider – primary care or specialist, except those in high-level general hospitals – at any time without proof of medical necessity and with reimbursement by the NHI (Song, 2009). The introduction of a gatekeeper system is opposed by large hospitals, which attract many first-time patients to their out-patient departments, which are more highly trusted than clinics.

The benefits of a gatekeeper system are partly due to its emphasis on primary care. Although primary health care is cost-effective in improving the health status of Koreans (Kwon, 2003a) and leads to a more equitable distribution of health care throughout the population, only 7.9% of all clinic-based practitioners were family physicians in 2006

(Lee *et al.*, 2009). In the short run, a gatekeeper system could be introduced by requiring those who go to any hospital without a referral to pay a fee. In the longer run, it would require increasing the number of GPs, in addition to changing the fee system and medical education.

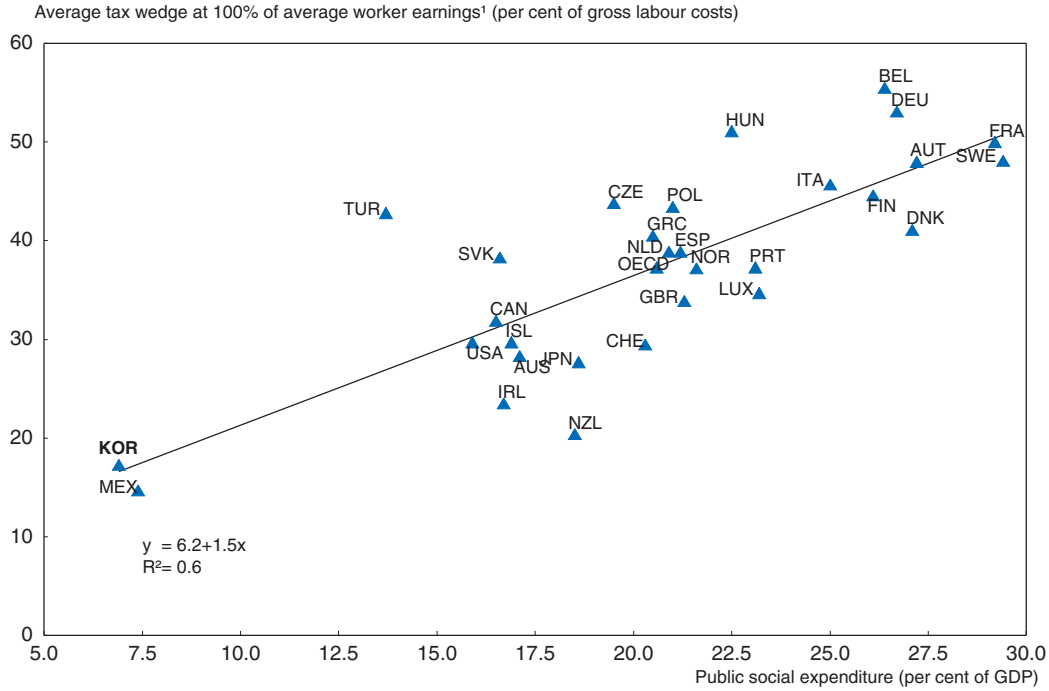
How to finance health care

As discussed above, health spending is projected to increase rapidly in the years to come, making it essential to efficiently finance the higher outlays. Funding for rising health spending will have to come from some combination of higher social insurance payments, tax revenue, out-of-pocket-payments by patients and private health insurance. Expanding out-of-pocket payments, by raising already high co-payment rates and/or reducing the already low coverage of the NHI, would not be desirable as it would reduce access to health care.[21] As for private insurance, the government "will stimulate the private insurance market so that it can share the burden of soaring costs induced by new technologies". It implemented a number of measures in June 2009 to improve private insurance.[22] While private insurance can provide additional resources, relying mainly on private insurance to finance the increase in health spending would not be appropriate, given the already high level of private spending. In addition, an OECD study found some weaknesses of private insurance (OECD, 2004). *First*, in some countries, it tends to be inequitable, as it is typically purchased by high-income groups. *Second*, allowing private insurance to provide complementary coverage for services covered by the NHI could lead to sharp increases in demand, with negative financial consequences for the NHI.

Increased health spending is likely to be financed primarily by social insurance payments and taxes. At present, Korea relies mainly on social insurance payments, which finance 70% of public health spending (Table 4.1). However, continuing to rely primarily on social insurance payments for health spending would tend to hold back employment and growth. A pro-growth approach would be to rely more on broad-based taxes that spread the burden more evenly across the population and across different income sources. At present, Korea's social insurance payments are limited to labour income, which accounts for less than two-thirds of national income, putting the burden on the labour force (one-half of the population). As the population ages and health spending matches and possibly surpasses the OECD average, the burden on workers will rise significantly. In 2009, there were more than six persons in the 20-to-64-age group for each elderly person (Figure 4.8). That figure is projected to fall to 1.3 by 2050, boosting the burden of social insurance payments and discouraging employment. A study of OECD countries estimates that relying on social insurance payments reduces formal employment by 8-10% and total employment by 5% to 6% (Wagstaff, 2009a).[23] Shifting to tax financing may thus accelerate the shift to formal employment.[24]

The composition of taxes is also important for growth. There is empirical evidence that indirect taxes[25] have a less negative impact on labour than direct taxes, notably income tax and social insurance payments (OECD, 2008).[26] The burden on labour can be measured by the "tax wedge", defined as the difference between labour costs and the take-home pay of workers as a share of labour costs. The tax wedge in Korea is currently one of the lowest in the OECD area, reflecting the early stage of development of its safety net (Figure 4.12) and the importance attached to limiting the burden of taxes and social charges in order to promote economic growth. The low tax wedge is thus a factor encouraging labour input in Korea, which is the highest in the OECD area relative to the population (Figure 1.4).

Figure 4.12. **International comparison of public social expenditure and the tax wedge in 2005**



1. The tax wedge is the sum of personal income tax, employee and employer social insurance payments and payroll taxes, less cash benefits, as a proportion of labour costs, defined as the wage plus employer social security payments and payroll taxes.

Source: OECD Taxing Wages Database.

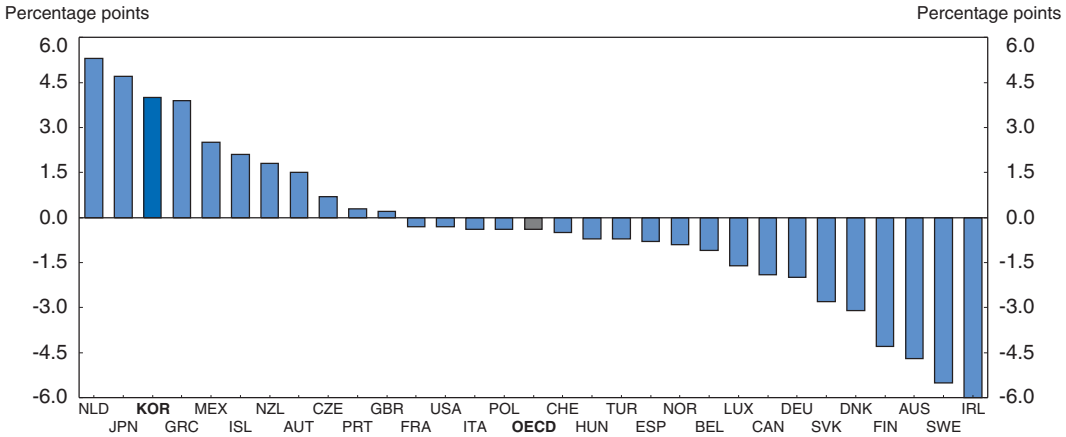
StatLink http://dx.doi.org/10.1787/888932303081

While the tax wedge is relatively low in Korea, it rose significantly between 2000 and 2008, while the OECD average fell slightly (Figure 4.13). Relying more on indirect taxation would slow the upward trend. For example, reducing the health premium by 5 percentage points in Korea could be offset by raising the VAT rate, currently set at 10%, by 3.5 percentage points (OECD, 2007b). The regressive impact of increased consumption taxes could be countered through targeted measures, such as the Earned Income Tax Credit that was introduced in Korea in 2008. The expiration of the law on financing health care in 2011 could provide an opportunity to begin rebalancing the financing of health care toward tax revenue.

Shifting towards tax-based financing of health care offers other advantages. *First*, it reduces the administrative costs of collecting social insurance payments separately. *Second*, it would help ease the equity problem stemming from the self-employed sector, which accounts for one-third of Korea's labour force. Indeed, for the self-employed, the contribution per person has fallen from 72% of that for employees in 2000 to only 54% in 2008 (Figure 4.5). One reason for the gap is a lack of transparency about the income of the self-employed, as in many countries, which affects both the tax system and social contributions in Korea. While the share of self-employed income subject to tax has been rising, a considerable amount remains hidden. Comparing national income statistics with data from the National Tax Service indicates that only about half of self-employed income is reported, compared to more than 80% of wage income (2008 *OECD Economic Survey of Korea*).[27] Given the sense of unfairness, increases in the insurance premium face opposition from employees reluctant to

Figure 4.13. **Change in the tax wedge on labour income**

Percentage-point change between 2000 and 2008



Source: OECD (2009d), *Taxing Wages*, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932303100

shoulder an even larger share of the burden of the self-employed (Kwon, 2007).[28] This could frustrate the government's plans to expand the coverage of the NHI and to secure the necessary revenue to cope with population ageing.

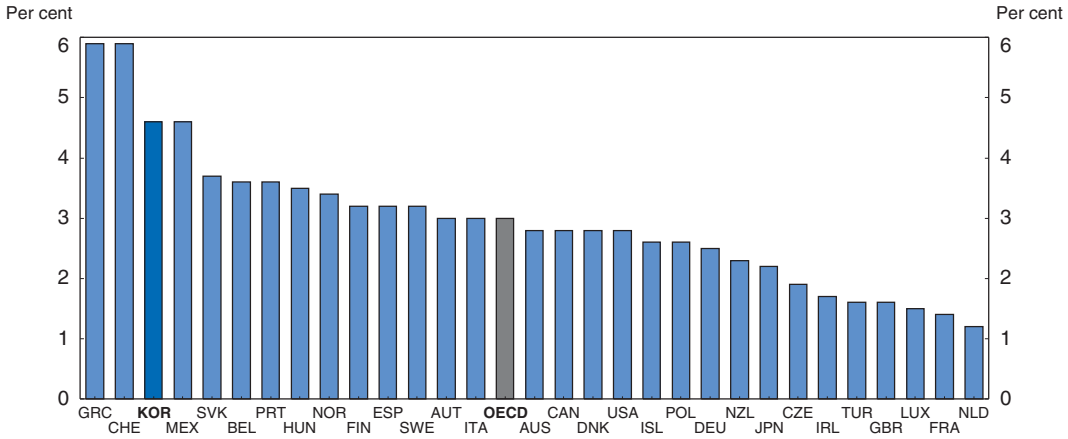
It is also argued that financing health spending through social insurance payments helps to contain its growth in Korea. Since 2000, the major financing and spending decisions are made in negotiations between NHI and health providers. In practice, though, the negotiations have not resulted in agreements in most years, shifting decisions to the Health Insurance Policy Review Committee, which includes the government and representatives of the NHI, health providers and insurance subscribers. In any case, Korea has tightly limited tax-financed social spending. Excluding the social insurance programmes (for health, employment and pensions), spending for family benefits, active labour market policies, housing and other social programmes were only 1½ per cent of GDP in 2007. Moreover, Korea has controlled tax-financed spending on education, making it the sixth lowest as a share of GDP in the OECD area. Finally, there is little evidence that relying on social insurance payments reduces health spending.[29]

Ensuring adequate access to health care

Out-of-pocket payments – co-payments and the cost of non-covered services – by patients amounted to 4.6% of household final consumption in 2007, the third highest in the OECD area (Figure 4.14). The level of medical fees is the major reason for dissatisfaction with health care in Korea (Table 4.5). Moreover, high out-of-pocket payments are inequitable and regressive because they do not depend on the income of patients, resulting in inequality in the economic burden of illness. According to 1998 data, out-of-pocket payments as a share of household income for the lowest income quintile were almost four times higher than for the middle quintile.[30] High out-of-pocket spending also increases poverty. The proportion of households below the national poverty line, defined as the minimum living expense, rises from 10.8% to 12.5% if health spending is included (Kwon, 2009c). Out-of-pocket payments thus reduce both necessary and unnecessary health care (Kwon, 2003b). In addition to penalising low-income households, out-of-pocket payments create a substantial burden on those with chronic health problems.

Figure 4.14. **Out-of-pocket expenditures on health care**

As a per cent of final household consumption in 2007 or latest year



Source: OECD *Health Database* (2009).

StatLink http://dx.doi.org/10.1787/888932303119

Ceilings on co-payments were introduced in 2004, limiting them to 3 million won (around USD 2 700) every six months. Consequently, a patient might pay up to 6 million won per year, or 51% of average per capita household disposable income. In 2008, 2.5% of the population benefited from this system, with co-payments exempted by the ceiling amounting to 0.6% of total contributions received by the NHI that year. The ceiling system was revised in 2009 to take account of the insured's ability to pay, as measured by the amount of social insurance payments. However, such payments may not be the best measure of ability to pay, given the underpayment by the self-employed. For the lower half of households, co-payments are limited to 2 million won each year, 3 million won for the next 30% and 4 million won for the top 20%. However, for a person earning half of the average disposable income per capita, co-payments could still be as high as one-third of their income. In sum, the NHI states that "the current level of protection still falls short of being adequate in terms of risk protection" (NHIC, 2009b).

Equity also involves the quality of health care. The use of better-quality out-patient care, notably at high-level general hospitals where co-payment rates are higher, is greater among high-income households (Lu *et al.*, 2007). Out-patient care for lower-income

Table 4.5. **Reasons for dissatisfaction with health-care services in Korea**

Percentages in 2008

	Whole country	Urban areas	Rural areas
High medical fees	32.0	32.8	27.9
Unsatisfactory treatment	20.0	19.9	20.3
Waiting time for treatment and hospitalisation	16.3	16.4	15.7
Unkindness	12.0	11.7	13.4
Inappropriate treatment	9.4	9.4	9.0
Over-treatment	5.4	5.6	4.1
Poor equipment	2.6	2.0	5.9
Other	2.3	2.2	3.7
Total	**100.0**	**100.0**	**100.0**

Source: Korea National Statistical Office.

households is disproportionately centred on government-run health centres. In addition, after adjusting for income-related differences in need, low-income households use more in-patient care, where the co-payment rate is a relatively low 20%.

Large regional variations in the supply of medical facilities also create questions about access. Despite the large overall number of hospital beds, some regions face shortages. However, the problem of regional imbalances has been eased by the development of transport, notably high-speed trains.[31] Perhaps a greater concern in terms of ensuring access to health care is the regional variation in the number of physicians. Rural areas have 19% of the population but just 10% of the physicians, indicating that the physician-to-population ratio is about two times higher in urban areas. Given the preference in Korea for frequent consultations with physicians, relying on trips to the capital region is not an attractive alternative, particularly for low-income households. Ensuring an adequate number of physicians in remote regions, in part through public health-care clinics, should be a priority. Special programmes to that effect deserve consideration.

Another problem is the lack of specialists in certain medical fields. Some specialities, whose services are paid relatively generously – such as ophthalmology, dermatology and psychiatry – attract a greater number of medical school graduates. On the other hand, the fields of, thoracic surgery and pathology are unpopular (Kwon, 2003c). Although the government provides financial incentives to encourage more medical students to choose specialities where there are shortages, the government is considering legislation to address the problem. However, the fundamental issue is setting medical fees so as to equilibrate supply and demand. The government introduced a Resource-Based Relative Value Scale (RBRVS) system in 2001 to correct distortions in the relative prices of medical services. The RBRVS determines fees of physicians on the basis of resource costs required to produce services. In principle, the RBRVS should be used to change the relative prices of medical services and redistribute income among physicians. However, under pressure from physicians, the RBRVS has resulted in uniform fee increases, thus failing to correct distortions (Kwon, 2003c). The council that sets medical fees should be required to provide information on the rationale for its fee decisions and an analysis of their expected impact.

Improving the quality of health care

The survey on patients' views on health care focused on quality as the most serious problem after cost (Table 4.5). Indeed, 20% of patients cited unsatisfactory treatment, while 9.4% cited inappropriate treatment. It is important to develop protocols of clinical practice and implement effective quality-monitoring mechanisms (OECD, 2003). In addition, the adoption of evidence-based best practices should be encouraged, although it is complicated by the idiosyncratic nature of medical education in Korea. One way to stimulate quality improvements would be to pay providers based on their performance. As the single public health insurer, the NHI could use its purchasing power to link financial incentives to clinical performance and good practices. The government is considering linking 10% of insurance payments to the results of hospital evaluations. Between 2007 and 2010, 43 specialised general hospitals are being assessed on their care of acute myocardial infarction and caesarean deliveries, areas where it is relatively easy to assess the quality of care. However, judging the quality of care is challenging as technical difficulties can jeopardise accurate measurement. As the choice of indicators influences decisions over the quantity and mix of care provided, it is essential to choose the correct indicators (Colombo and Hurst, 2008).

In addition, it is important to provide more information to consumers to enhance competition and to improve the behaviour of suppliers. Data on patient outcomes, adjusted for the severity of illness, need to be disclosed to the public to encourage informed choices, thereby facilitating quality competition among providers. The authorities made a step in this direction in 2005 when they announced the list of hospitals and physician clinics that are in the lower 25 percentile in their use of injectable drugs, antibiotics and caesarean sections, areas where overuse is most serious (Kwon, 2005). However, as in other countries, opposition from health providers hinders the introduction of transparency and public accountability.

Many complaints centre on the quality of hospitals, making an upgrading of this sector a priority to enhance the quality of health care. Only physicians and non-profit corporations are allowed to establish clinics and hospitals in Korea. While the former can keep profits, the latter must re-invest any profits and are not allowed to distribute them in the form of dividends. Nevertheless, hospitals act as for-profit institutions in practice (Kwon, 2009b). The current regulations make hospitals dependent on bank lending, thus restricting their funding and limiting the development of a modern hospital sector. The government has decided to allow investor-owned hospitals in certain areas, such as Jeju Island. Physicians' monopoly on the ownership of investor-owned hospitals is not justified. Allowing investor-owned hospitals throughout Korea would stimulate new entry and improve quality for patients, provided any possible negative side effects are addressed.[32] In addition, M&As between hospitals are prohibited, even though this could help restructure the hospital sector.

One way to improve the quality of care would be to reduce the number of consultations per physician, which is very high (Figure 4.6). This could be achieved, in part, by increasing the number of physicians. The number of students entering the 41 medical schools, which are predominately private, is set by the Ministry of Health, Welfare and Family Affairs. In addition, changing the payment system away from fee-for-service would reduce the incentive for unnecessary treatment, thus reducing the number of appointments and waiting time.

Conclusion

Korea's health-care system has made major progress, notably achieving universal coverage and containing spending at a relatively low level. However, rapid population ageing and the demand for broader coverage of the NHI are creating important challenges that need to be addressed. The severe conflict between the key actors in the health sector since the difficult implementation of the Separation Reform complicates the prospects for creating a consensus for reform. Nevertheless, it is important to advance with wide-ranging reforms, along the lines spelled out in Box 4.3.

Box 4.3. **Summary of recommendations to reform the health-care system**

Containing the growth of health spending by increasing efficiency

- Expand the use of the DRG system in hospitals and regularly adjust the reimbursement rate to the level in more efficient hospitals, while ensuring adequate quality.
- Reform fee-for-service billing in out-patient care by introducing some form of capitation to reduce the number of physician consultations.
- Cut outlays on drugs by reducing the use of rebates by pharmaceutical companies, basing reimbursement on market prices, cutting the price of generics and expanding their use and gradually removing regulations on the sale of non-prescription drugs.
- Shift long-term care from acute-care hospitals to home-based care and long-term care facilities to reduce costs and emphasise home-based care in long-term care insurance.
- Ensure adequate capacity for long-term care, emphasising the role of the private sector.
- Encourage healthy ageing, in part by lifting tobacco taxes from their low levels to reduce the smoking rate.
- Introduce gatekeepers to avoid unnecessary consultations with specialists and promote primary medicine.

Financing health spending efficiently

- Consider shifting toward tax-financing, particularly via indirect taxes, in conjunction with effective measures to keep spending in check, in order to limit the upward trend in the tax burden on workers, thereby encouraging employment.
- Attempt to boost the compliance of the self-employed with insurance payments to improve horizontal equity.

Ensure adequate access to health care

- Continue the upward trend in the public sector's share of health spending, thereby reducing the burden of out-of-pocket payments.
- Ensure that the ceilings on patient co-payment are low enough to provide adequate access for low-income households and those with chronic health problems.
- Promote the availability of health care in rural areas, using public health-care centres if necessary.
- Improve the system of setting medical fees to reduce shortages in certain medical specialties.

Improve the quality of health care

- Link insurance reimbursements by the NHI to the quality of health care based on carefully chosen performance indicators.
- Increase the availability of information on the performance of health providers to consumers to promote competition and improve the behaviour of health providers.
- Upgrade the hospital sector by allowing investor-owned hospitals and mergers and acquisitions, while addressing any possible side effects.
- Consider increasing the number of physicians from its current low level.

Notes

1. The first compulsory public health insurance scheme covered enterprises with 500 or more employees. Coverage was progressively extended to smaller firms and finally to the self-employed in rural and urban areas (Jeong, 2005).
2. Employer-based insurance includes employees' dependents (spouse, parents, children and siblings), thus covering more than half of the population. Non-regular and part-time workers who work less than 80 hours a month and daily workers hired for less than a month are excluded from employer-based insurance.
3. This category covers those excluded from employer-based insurance. The remaining 3.3% of the population is covered by the Medical Aid Programme for low-income households, which is financed by the government. About one-half of the recipients are required to make co-payments.
4. The contribution amount is reduced by: *i*) 50% for those living in remote rural areas; *ii*) 22% for insured in rural areas; *iii*) 10-30% for the insured with low income; and *iv*) 30% for those who support family members aged 65 or above and the disabled.
5. The co-payment rate is 60% for high-level general hospitals, 50% for general hospitals, 40% for hospitals and 30% for clinics and public health centres. In rural areas, the rate is reduced to 45% for general hospitals and to 35% for hospitals. The higher co-payment rate for hospitals is intended to encourage patients to go to physician clinics before going hospitals.
6. There is a large market for disease-specific insurance policies that provide a lump-sum payment for critical illnesses, such as cancer.
7. The hospital sector is divided between high-level general hospitals, general hospitals (more than 100 beds) and hospitals (more than 30 beds). Only high-level general hospitals require a referral.
8. According to a 2005 survey, out-of-pocket payments for non-covered in-patient services were 23% of medical costs in hospitals and 10% in physician clinics. For out-patient services, the shares were 23% and 8%, respectively.
9. The large number of hospital beds is due in part to the ambition of physicians to develop business opportunities. Physicians want to own their own clinic and then often add in-patient care.
10. This also reflects physicians' efforts to increase their revenues under the fee-for-service payment system.
11. Elderly in categories 1 to 3 – which are characterised by a lack of mobility – are eligible for the LTCI.
12. The co-payment is reduced by one-half for those with an income below 130% of the poverty line and is exempted for those receiving benefits under the National Livelihood Protection Act.
13. The 2010 rate is set at 6.55% of the NHI premium, which is 5.33% of income.
14. The use of MRIs in a limited number of cases for cancer and cerebrovascular diseases was included in the NHI in 2005, when the number of MRIs in Korea was already 24% above the OECD average. The rapid introduction of new devices also reflects the emphasis on high technology in Korea.
15. Some have proposed introducing a Diagnosis Procedure Combination (DPC) similar to Japan, which combines a DRG approach with a per diem basis (2009 *OECD Economic Survey of Japan*). However, the per diem component makes this approach less effective in reducing the length of hospital stays.
16. One study found that the deterrent effect of government investigations of health claims for fraud and abuse significantly lowered the level of claims (Kang *et al.*, 2010).
17. For example, if the official price is 100 won and the health personnel are offered a discounted price of 80 won, they can receive 14 won (70% of the 20 won price gap) from the government.
18. For example, if the price of a drug set at 110 yen is available at 100 yen in the market, its price in Japan's fee schedule would be cut to 102 yen.
19. In Japan, the introduction of LTCI in 2000 was expected to shift long-term care from hospitals to long-term care facilities. However, the number of long-term care beds in hospitals increased by nearly 50% by 2007. Rather than discharge patients with chronic problems to long-term care facilities, hospitals upgraded them to higher medical care categories in order to continue being reimbursed by public health insurance (2009 *OECD Economic Survey of Japan*).
20. A study of OECD countries showed clear evidence of a reduction in disability among the elderly in only five countries, while three reported an increase (Lafortune *et al.*, 2007).
21. The government is considering an increase in the level of co-payments for out-patient care.

22. The reforms were designed to enhance consumer understanding of insurance products and to standardise them. In addition, it is mandatory for private insurance companies to check whether an applicant already has duplicate insurance. The NHI will share statistical information with private insurers to upgrade the quality of their products. The government is considering whether to allow private insurers to directly pay health-care providers (a third-party payment system).

23. This may help explain why ten OECD countries shifted from social insurance payments to tax-based financing between 1967 and 1986.

24. Currently, moving to formal employment means being fully drawn into the tax and social insurance systems. If health were financed by taxes, the disincentive of formal employment would be reduced.

25. There are three major types of indirect taxes in Korea: the value-added tax (16.8% of total tax revenue in 2006 compared to an OECD average of 19.3%), taxes on specific goods and services (12.7% compared to an OECD average of 11.6%) and import duties (3.1% compared to an OECD average of 0.6%). Korea's system of specific taxes on 20 goods and services distorts consumption decisions and is an inefficient way to address equity concerns. Such taxes should thus be focused on externalities rather than raising revenue (2008 *OECD Economic Survey of Korea*). Korea's revenue from the value-added tax was 4.5% of GDP in 2006, well below the OECD average of 6.8%, reflecting the fact that the 10% value-added tax rate in Korea is well below the OECD average of 18%.

26. One of the main messages of the OECD's Job Strategy was to reduce payroll taxes. Some countries, notably Germany, have lowered social insurance contribution rates, while increasing their VAT rate.

27. Even with a shift to tax-financing of health care, measures to improve the tax compliance of the self-employed are important and should be continued in order to broaden the personal income tax base.

28. In addition, there is concern that increased premiums will be used to boost physicians' income rather than to enhance the quality of health care.

29. Indeed, according to one study, reliance on social insurance boosted per capita health spending by 3.5% in OECD countries, without improving health outcomes (Wagstaff, 2009a).

30. While out-of-pocket payments amounted to 3.3% of household income for the middle-income quintile in 1998, it was 12.5% for the lowest quintile (Ruger and Kim, 2007).

31. Indeed, the increasing reliance on medical facilities in Seoul and other major towns has become a major complaint of hospitals and physicians in provincial areas, and may be another obstacle in Korea's effort to promote balanced regional development.

32. The government has proposed a compromise measure that would allow non-profit hospitals to issue bonds.

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Chapter 5

Korea's green growth strategy: mitigating climate change and developing new growth engines

Korea's greenhouse gas emissions almost doubled between 1990 and 2005, the highest growth rate in the OECD area. Korea recently set a target of reducing emissions by 30% by 2020 relative to a "business as usual" baseline, implying a 4% cut from the 2005 level. Achieving this objective in a cost-effective manner requires moving from a strategy based on voluntary commitments by firms to market-based instruments. The priority is to establish a comprehensive cap-and-trade scheme, supplemented, if necessary, by carbon taxes in areas not covered by trading. Achieving a significant cut in emissions requires a shift from energy-intensive industries to low-carbon ones. Korea is strongly committed to promoting green growth through its Five-Year Plan, which envisages spending 2% of GDP per year through 2013. One challenge is to ensure that these expenditures are efficiently targeted so as to develop green technologies, while avoiding the risks inherent in industrial policy.

Korea is strongly committed to promoting green growth. On the 60th anniversary of the founding of the Republic of Korea in August 2008, the President proclaimed "Low Carbon/Green Growth" as the nation's vision to guide development during the next 50 years.[1] In order to implement this vision, the government announced in July 2009 the "National Strategy for Green Growth" up to 2050, which includes mitigating climate change, creating new engines for economic growth and improving the quality of life (Box 5.1).[2] This chapter analyses policies to implement these strategies. Policy recommendations are summarised in Box 5.3 at the end of the chapter.

Mitigating climate change

Climate change is one of the key challenges facing the world in the 21st century with serious environmental and economic implications. While there are significant uncertainties about the cost of inaction, it would undoubtedly be immense as sea levels rise, agricultural yields decline and infectious diseases become more prevalent.[3] Climate change risks unpredictable and irreversible damage worldwide.

In August 2009, the government presented the options of cutting GHG emissions by 21%, 27% or 30% relative to the projected level in 2020, which is based on a "business-as-usual" (BAU) scenario of a 36.9% rise in emissions between 2005 and 2020 (Figure 5.1).[4] Relative to 2005, the three options imply an 8% increase in emissions, no change or a 4% cut, respectively. After analysing the scenarios on the basis of Korea's capacity to make reductions and the subsequent macroeconomic impact, the Cabinet selected the most ambitious option of a 30% reduction by 2020 relative to the BAU baseline, despite the industrial sector's concern about the possible negative impact on their international competitiveness. The 2020 targets for Japan, the United States and the EU are for still larger emission reductions of approximately 30%, 17% and 13%, respectively, relative to 2005. Korea's mid-term target is thus positioned between the advanced countries and developing countries. Mexico also pledged to reduce emissions by up to 30% relative to its BAU baseline by 2020, on the condition of adequate financial and technology transfer mechanisms from developed countries. In contrast, Korea's target is not conditional on international agreements and support. Although not legally binding, the target should help guide Korea's climate change policy framework. After examining the level of energy use and greenhouse gas (GHG) emissions, this section looks at Korea's current policy framework and then proposes new measures to achieve the mid-term target.

Overview of energy use and greenhouse gas emission trends in Korea

Korea's energy intensity was a quarter above the OECD average in 2008 and the fourth highest in the OECD area (Figure 5.2).[5] During the period of rapid economic growth between 1971 and 1997, energy use increased at an 8.8% annual rate, led by the commercial and transport sectors (Table 5.1). Energy intensity, which was 42% below the OECD average in 1971, peaked during the 1997 crisis. The crisis proved to be a turning point for energy consumption growth, which decelerated to a 3.3% pace during the following decade, leading to

Box 5.1. **The National Strategy for Green Growth (announced in July 2009)**

Three objectives

1. Promote a synergistic relationship between economic growth and environmental protection.
2. Improve people's quality of life and promote a green revolution in their lifestyles.
3. Contribute to international efforts to fight climate change and other environmental threats.

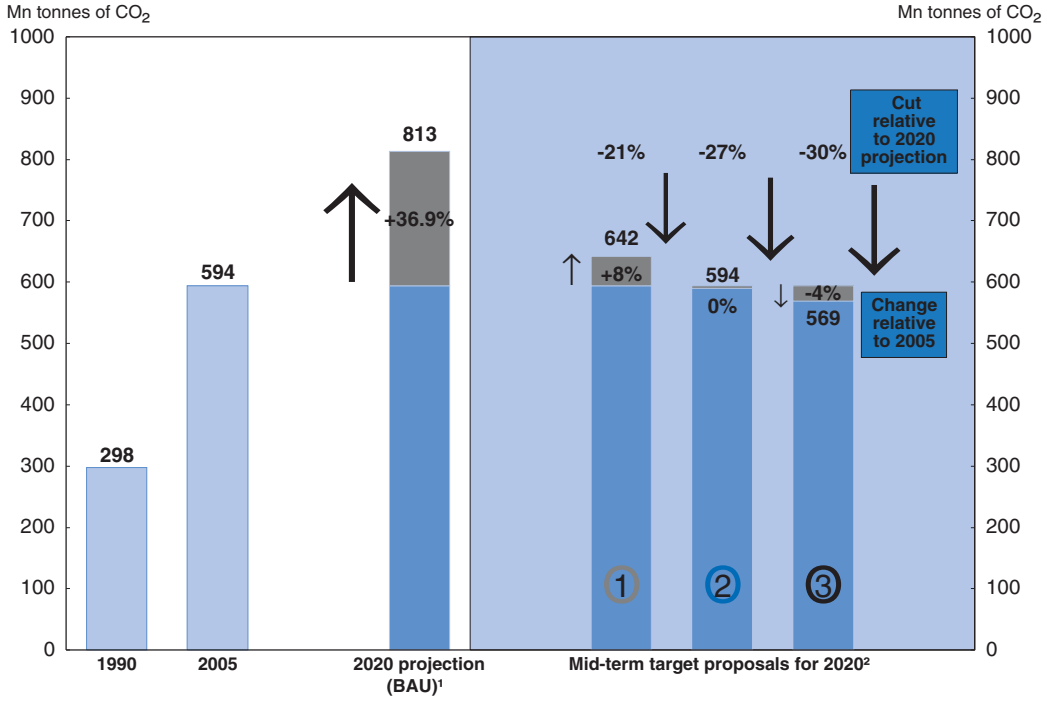
Three strategies

1. Mitigating climate change and promoting energy independence.
2. Creating new engines for economic growth.
3. Improving the quality of life and enhancing Korea's international standing.

Ten policy agendas to achieve the three strategies

1. *Effective mitigation of greenhouse gas emissions:* The government will pursue mitigation strategies for buildings, transport and industry, require reporting on emissions and promote forestation.
2. *Reduction in the use of fossil fuels and the enhancement of energy independence:* Korea will reduce energy intensity to the OECD average, increase the use of renewable energy and expand nuclear power capacity.
3. *Strengthening the capacity to adapt to climate change:* Korea will launch the "Four Major Rivers Restoration Project" and increase the share of "environmentally friendly" agricultural products to 18% by 2020.
4. *Development of green technologies:* The government will pursue the development of important green technologies, boosting its world market share in the relevant sectors to 8% within five years.
5. *The "greening" of existing industries and promotion of green industries:* Exports of green goods in the major industries will rise from 10% in 2009 to 22% in 2020 and the government will help small and medium-sized enterprises (SMEs) green their business.
6. *Advancement of the industrial structure to increase the role of services:* The government will develop health care, education, finance, contents industry, software and tourism as the core of high value-added services.
7. *Engineering a structural basis for the green economy:* The government will gradually introduce an emissions trading system, make the tax system greener and extend public credit guarantees to green industry.
8. *Greening land and water and building the green transport infrastructure:* The share of passenger travel by rail will rise from 18% in 2009 to 26% in 2020, and metropolitan mass transit from 50% to 65% over the same period.
9. *Bringing the green revolution into our daily lives:* Carbon footprint labeling will be enacted, the government will increase mandatory procurement of green goods and education on green growth will be expanded.
10. *Becoming a role-model for the international community as a green growth leader:* Korea will actively engage in international climate-change negotiations and increase the share of green ODA from 11% to 30% in 2020.

Figure 5.1. **The mid-term target scenario for reducing greenhouse gas emissions in Korea**



1. Business-as-usual scenario based on assumptions about population, oil prices and economic growth.
2. The three options were introduced in August 2009 and option three was chosen in November.

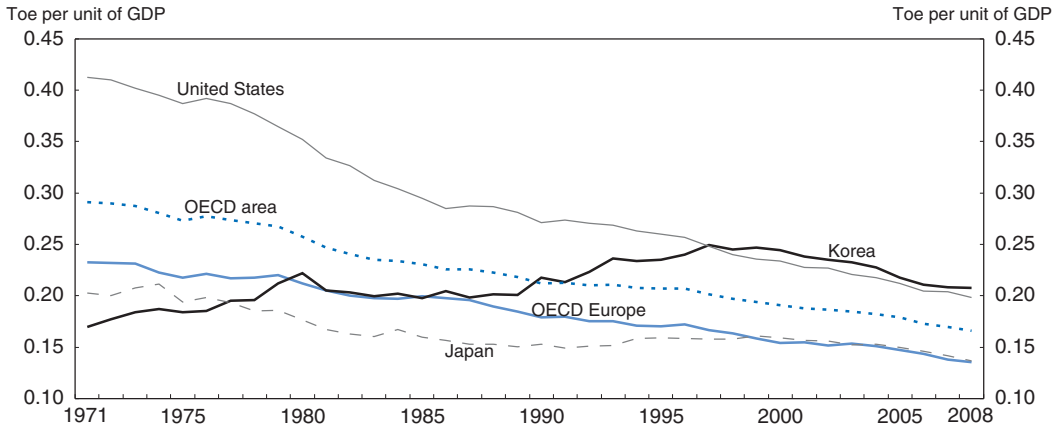
Source: Presidential Committee on Green Growth (2009a).

StatLink http://dx.doi.org/10.1787/888932303138

a marked fall in energy intensity. Moreover, the main drivers of energy consumption shifted to the residential sector, reflecting higher living standards, and the industrial sector, as exports recorded double-digit growth rates. By 2007, the industrial sector accounted for about half of energy use in Korea, followed by the transport, residential and commercial sectors.

Figure 5.2. **Korea has become one of the most energy-intensive economies in the OECD area**

Tonnes of energy per unit of GDP in thousand 2000 USD using PPP exchange rates



Source: IEA/OECD (2009a), *Energy Balances of OECD Countries 2009*, IEA/OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932303157

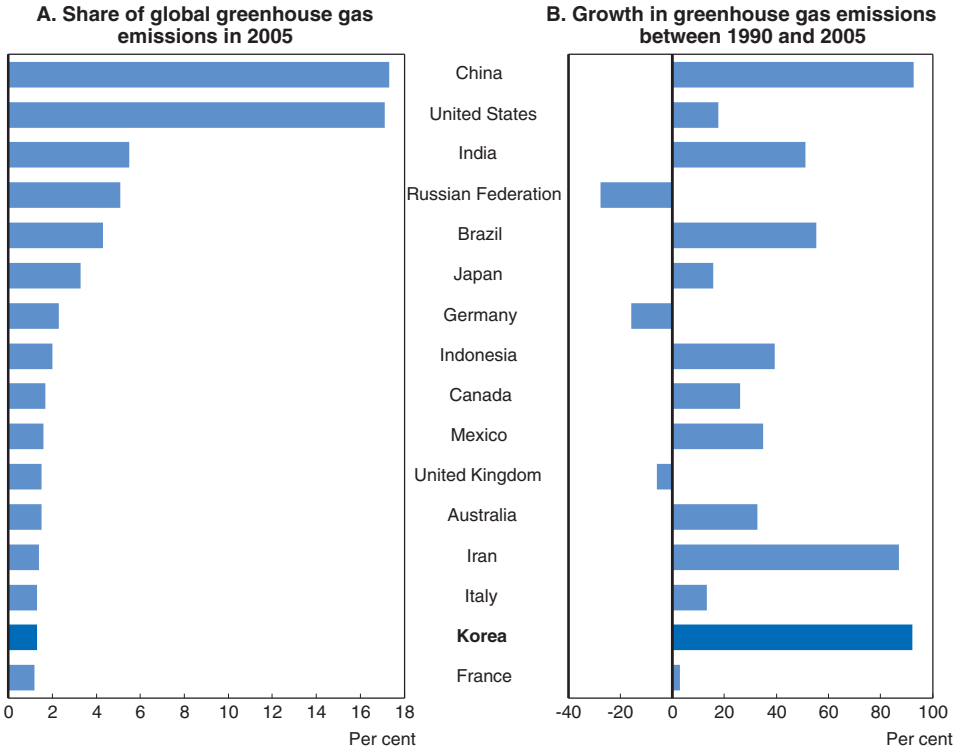
Table 5.1. **Trends in final energy consumption in Korea**

	Average annual growth rate (per cent)			Composition (per cent)			Percentage-point change 1997-2007
	1971-97	1998-2007	1971-2007	1971	1997	2007	
Industry	8.9	4.0	7.3	43.9	45.0	51.7	6.7
Transport	10.6	2.2	7.7	15.6	23.7	20.6	–3.1
Residential	3.2	6.9	3.8	35.3	9.0	12.6	3.5
Commercial	15.1	0.9	10.2	4.1	17.6	12.5	–5.1
Other	14.8	–1.9	9.3	1.2	4.7	2.7	–2.0
Total	**8.8**	**3.3**	**6.8**	**100.0**	**100.0**	**100.0**	**0.0**

Source: IEA/OECD (2009a), *Energy Balances of OECD Countries 2009*, IEA/OECD, Paris.

Korea's GHG emissions accounted for 1.3% of the world total in 2005, making it the 15th-largest emitter in the world and ninth in the OECD area (Figure 5.3). While Korea's emissions almost doubled between 1990 and 2005, 83% of the increase occurred by 2000. On a per capita basis, Korea's emissions rose by 71.6% over the period 1990 to 2005, far outstripping the OECD average of 2.1% (Table 5.2, Panel A). The growth in GHG emissions per capita can be explained by changes in per capita income, energy intensity and GHG emissions per unit of energy. The large increase in GHG emissions per capita was primarily a result of rapid economic growth, which doubled per capita income (second column). Moreover, the 2.3% decline in energy intensity (third column) was much less than the OECD

Figure 5.3. **International comparison of greenhouse gas emissions**



Source: OECD Environmental Database.

StatLink http://dx.doi.org/10.1787/888932303176

Table 5.2. **Decomposition of greenhouse gas emission trends**[1]

	GHG emissions/ population[2]	GDP/population[3]	Energy/GDP[4]	GHG emissions/ energy[5]
A. Percentage change between 1990 and 2005				
Canada	8.2	29.7	–15.6	–1.2
France	–4.7	22.1	–9.2	–14.0
Germany	–19.0	21.9	–19.8	–17.2
Italy	9.6	17.3	3.0	–9.3
Japan	11.8	16.7	–4.0	–0.2
Korea	**71.6**	**101.1**	**–2.3**	**–12.7**
United Kingdom	–10.6	36.5	–22.1	–15.9
United States	–0.9	30.8	–21.4	–3.5
OECD average	**2.1**	**28.9**	**–15.3**	**–6.5**
B. Level in 2005				
Canada	23.1	30.6	0.206	3.7
France	8.6	26.5	0.105	3.1
Germany	12.0	26.6	0.114	4.0
Italy	9.7	25.7	0.096	3.9
Japan	11.2	27.1	0.102	4.0
Korea	**11.6**	**20.1**	**0.149**	**3.1**
United Kingdom	11.1	28.2	0.095	4.1
United States	25.0	36.9	0.145	4.7
OECD average	**14.4**	**25.8**	**0.127**	**4.4**

1. GHG emissions/population = (GDP/population) × (Energy/GDP) × (GHG emissions/energy).
2. In t CO_2 eq. per head.
3. In thousand 2000 USD using PPP exchange rates.
4. For total final energy consumption in ktoe/ billion 2000 USD using PPP exchange rates.
5. For total final energy consumption in Mt CO_2 eq./ktoe.

Source: IEA and OECD calculations.

average of 15.3%. These factors were partially offset by a relatively large fall of 12.7% in GHG emissions per unit of energy (fourth column), reflecting greater use of natural gas and nuclear power.[6]

Despite the rapid increase, the level of per capita GHG emissions in Korea in 2005 was more than one-fifth below the OECD average (Panel B, first column). This is explained by Korea's relatively low level of GDP per capita (second column) and GHG emissions per unit of energy (fourth column), which more than offset the impact of above-average energy intensity (third column). These figures point to the conclusion that cutting energy intensity, notably by reducing the weight of energy-intensive industries in the economy, is key to slowing the growth of GHG emissions in Korea and keeping the level below the OECD average. The greening of existing industries – where there is significant scope to do so – may also help.

Korea's policy measures to address climate change

Korea ratified the Kyoto Protocol to the UN Framework Convention on Climate Change in 2002 as a non-Annex I country, meaning that it had no obligation to set a specific GHG reduction target for 2008 to 2012. Nevertheless, as required by all parties under the Framework Convention, Korea has implemented polices to combat climate change since the establishment of its Committee on Climate Change Response in 1999. The key measures are discussed below.

Voluntary and negotiated agreement systems

The National Committee on Saving Energy launched a voluntary agreement system in 1998 to encourage energy efficiency in the business sector. Firms that participate in the programme sign agreements with the government specifying their voluntary energy conservation and GHG emissions reduction targets, as well as their timelines and strategies, which are monitored by the government. In return, the firms are eligible for low interest-rate loans on energy-saving facilities, tax benefits and technical support. By 2008, a cumulative total of 19 million tonnes of energy (toe) had been saved, equivalent to a 58 million tonne reduction in CO_2 emissions (around 10% of annual emissions). Cost savings during the decade amounted to 0.6% of GDP for the participating firms, which increased from 46 in 1998 to 1 323 in 2008. Although voluntary approaches are not cost-effective in addressing environmental externalities, they can reveal information about abatement costs and environmental damage at an early stage (de Serres *et al.*, 2010).

The government launched a pilot project of mandatory negotiated agreements on energy use in 2010. It includes 38 firms, covering 41% of total energy consumption in the industrial sector. The negotiations resulted in agreements to reduce energy use by 3.7% (relative to the average of 2007-09) between 2010 and 2012, which is greater than the 3% cut that they originally proposed. This system will be replaced by the GHG and Energy Target Management System. Under this approach, companies in power generation, manufacturing, construction, waste management and transport will negotiate targets with the government, subject to penalties in case of failure to meet the targets.

Energy-efficiency programmes

Korea has introduced three energy-efficiency programmes for electronics and appliances:

- *Mandatory energy-efficiency standards and labelling* (1992): 23 items are currently subject to energy-efficiency standards, including refrigerators, air conditioners, washing machines and dishwashers, which require them to achieve at least a minimum level of efficiency in order to be sold. Energy-efficiency ratings are attached to products to encourage consumers to choose energy-efficient products and firms to manufacture or import them.
- *The high-efficiency appliance certification* (1996): The government awards labels to products with energy-efficiency levels that are higher than those required by law. A total of 46 items are subject to certification, including converters, LED lighting systems and oil-fired hot-water heaters.
- *Standby electricity reduction programme* (1999): Manufacturers are encouraged to make products that automatically switch to power-saving mode when not in use in order to minimise standby electricity consumption. The government grants labels for 20 home electronic and office equipment products, such as televisions, microwaves, computers and printers, which meet the official standard. Warning labels are applied to products that fail to meet the standard.

In order to save fuel and reduce GHG emissions by cars, the government launched the Average Fuel Economy (AFE) regulation in January 2006, patterned on the US Corporate Average Fuel Economy (CAFE) system. Under Korea's regulation, the average fuel economy of all cars sold by a manufacturer over one year must meet the standards, which depend on engine capacity. This system boosted average fuel economy by 6.6% (10.8 to 11.5 km/litre) between 2006 and 2008 and reduced CO_2 emissions by 7.3%.

Clean Development Mechanism and the carbon market

The Clean Development Mechanism (CDM) is one of three programmes introduced by the Kyoto Protocol, which together with emissions trading and Joint Implementation (JI),[7] constitute the official international carbon market.[8] The CDM, which was launched in 2001, allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO_2. CERs can be traded and used by Annex I countries to meet a part of their emission reduction targets under the Kyoto Protocol.[9] Korea, as a non-Annex I country, has been actively involved in the CDM since unilateral projects – those funded by developing countries' own money and not by Annex 1 countries – were allowed in 2005. Korean investment companies own the CERs and can sell them to any Annex 1 country in the market. Korea has 35 projects registered, with renewable energy projects accounting for a third of them.[10] Another 47 projects are in the process of registration. As of February 2010, the UNFCCC expected Korea's registered projects to reduce CO_2 equivalent by an average of 15 million tonnes per year, accounting for 4.4% of the total, ranking Korea fourth behind China (59%), India (12%) and Brazil (6%).

Since 2005, the government has been operating a voluntary carbon market called Korea Certified Emissions Reductions (KCERs), which is open to firms that that have reduced CO_2 emissions by more than 500 tonnes a year through improved energy efficiency and production processes and investment in renewable energy development. Companies receive KCERs for their voluntary GHG reduction projects, which can be traded in the market or purchased for around 5 000 won (about USD 4.50) per tonne. In practice, there are few buyers given the lack of a domestic reduction obligation, so the government buys most KCERs to promote and compensate measures to reduce GHG emissions. As of the end of 2009, 287 projects had generated 5.6 million KCERs, out of which 4.7 million had been purchased by the government for 23 billion won (USD 20 million). The government also launched a carbon fund of 105 billion won with the participation of private money in 2007 to invest in CDM projects and purchase CERs or allowances.

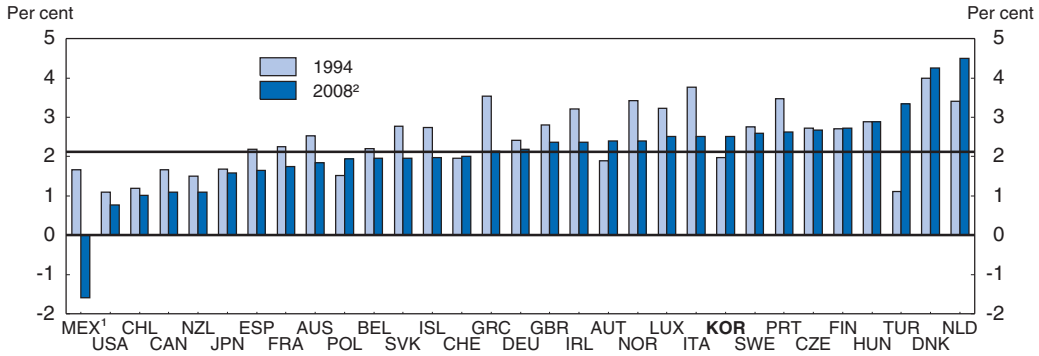
Environmental taxes

Revenue from environmental taxes in Korea increased from 2% of GDP in 1994 to 2.5% in 2008, thus surpassing the OECD average, which actually decreased slightly over the same period (Figure 5.4). Given Korea's low overall tax burden, environmental taxes accounted for 9.5% of total tax revenue, well above the OECD average of 5.4%. The rising share in Korea reflects tax reforms to encourage energy conservation and protect the environment. Between 2001 and 2007, the government raised the tax on diesel by 2.4 times in real terms and the tax on LPG butane by 6.8 times. Heavy oil for industrial uses, which had been tax-exempt in order to support industry despite its highly polluting effect on the environment, became subject to taxation in 2001. By 2009, the tax had been raised five-fold in real terms, but still amounted to only about 3% of the price.

The share of taxes in energy prices in Korea is relatively high compared to North America and Japan, although less than in Europe (Table 5.3). Overall prices for diesel, gasoline and light fuel for households and industry in Korea are significantly higher than the OECD average, regardless of whether purchasing power parity or market exchange rates are used. For example, the price of gasoline is 2.8 times higher than the OECD average using the former and 72% higher using the latter. The higher prices have helped to slow the growth of Korea's energy consumption and GHG emissions during the past decade. However, 80% of the revenue from the transport-energy-environment tax, which covers

Figure 5.4. **Revenues from environmental taxes**

Per cent of GDP



1. In Mexico, consumer prices on motor vehicle fuels are held more or less constant, in spite of large variations in world market prices. In years when world market prices are high, the excise tax on fuels turns into a subsidy – equalling 1.8% of GDP in 2008.
2. Arithmetic average. The weighted average was 1.6%.

Source: OECD/EEA Database on instruments used for environmental policy.

StatLink http://dx.doi.org/10.1787/888932303195

gasoline and diesel, is earmarked for transport infrastructure, primarily roads, thus undermining the effectiveness of energy taxation. Investment in railroads, a more energy-efficient mode of transport, is limited to one-fifth of total earmarked revenue. Energy taxation should be improved by removing earmarking to allow a more efficient allocation of the budget, particularly in the context of the need for fiscal consolidation.

Table 5.3. **Share of taxes in energy prices**

Per cent of total price

	Asia		North America		Europe			OECD average
	Korea	Japan	USA	Mexico	France	Germany	UK	
A. Share of taxes (in per cent) in 2009[1]								
Diesel	46.7	36.3	21.0	15.1	59.1	59.0	65.4	–
Unleaded gasoline	56.2	51.2	20.6	16.3	65.1	65.9	64.5	–
Light fuel oil for households	19.3	7.8	4.7	n.a.	26.2	27.7	28.5	–
Light fuel oil for industry	19.3	9.1	4.9	n.a.	13.0	14.0	25.2	–
B. Price per litre using PPP exchange rates (USD) in 2009								
Diesel	1.79	0.90	0.65	0.94	1.09	n.a.	1.57	1.06
Unleaded gasoline[2]	2.05	1.05	0.62	0.93	1.36	n.a.	1.60	0.73
Light fuel oil for households[3]	1 250	580	665	n.a.	627	n.a.	665	699
Light fuel oil for industry[3]	1 247	411	435	580	477	n.a.	n.a.	492
C. Price per litre using market exchange rates (USD) in 2009[1]								
Diesel	1.09	1.11	0.65	0.57	1.39	1.56	1.62	1.07
Unleaded gasoline[2]	1.24	1.28	0.62	0.57	1.73	1.88	1.65	0.72
Light fuel oil for households[3]	758	713	665	n.a.	798	745	686	769
Light fuel oil for industry[3]	757	505	436	353	607	626	687	519

1. The third quarter of 2009 for Germany.
2. Premium unleaded (95 RON) gasoline prices are used for France and the United Kingdom.
3. Per 1 000 litres.

Source: IEA/OECD (2010).

Creating a new policy framework: getting the price right through market-based instruments

Although these policies have helped to slow the increase in GHG emissions since 2000, emissions almost doubled between 1990 and 2005, as noted above. Achieving the emission reduction that has been included in the mid-term plan at a low economic cost will therefore require a policy strategy based on a more effective mix of instruments. The key is to rely on pricing instruments to a much larger extent so as to put a global price on greenhouse gases. Pricing GHG has several advantages. In the short run, it minimises the cost of reducing emissions by equalising the marginal abatement cost across all individual emitters for any reduction objective. Over the long run, market instruments provide incentives for firms to develop new technologies that will help lower future abatement costs. From the perspective of investors, a clear and credible price for carbon is needed as early as possible to make appropriate investment decisions for the future. New technologies that are still at an early stage of development, such as carbon capture and storage, may never be developed and deployed on a large scale without such a price signal. A market approach also reduces the costly burden of gathering the information necessary for regulation. In particular, under an emissions trading system (ETS), the authorities only need to specify the appropriate level of emissions and then rely on price signals to achieve it (Goodstein, 2007). In sum, a market-based approach that sets a clear price is clearly superior to voluntary measures, negotiated agreements or a sector-specific approach that calculates energy efficiency by sector and adds up the reductions that can be achieved.

Emissions trading systems (ETS) and carbon taxes: the pros and cons

Environmental taxes, such as the carbon tax already in place in a few countries, and an ETS based on emission permits, are the main instruments for putting a price on GHG emissions. Both meet the efficiency criteria, as they encourage emitters to adopt abatement solutions that cost less than the level of the tax or permit price, thereby ensuring that the least-expensive abatement options are fully exhausted. Both also reduce the current demand for energy and make the price of renewable energy sources more competitive. Furthermore, the two instruments give strong incentives for monitoring and enforcement by the authorities and, assuming that the permits are auctioned, generate revenues that can be used to reduce labour taxation, thereby increasing efficiency.

Although a carbon tax cannot set a fixed emission cap for the whole country, an advantage of an ETS (Box 5.2), it also provides a clear price signal that promotes private-sector investment in energy-saving technology. Moreover, a carbon tax has some advantages, as it is easy to adopt from a technical standpoint, has lower transaction costs and guarantees the maximum and minimum cost, although the optimal carbon tax rate can change over time.

In comparison, an ETS is generally more costly to implement, owing mainly to its more complex design. But once start-up costs are overcome, it has a number of clear advantages. *First*, an ETS can secure a more targeted level of emission reduction than a carbon tax. Indeed, there is less certainty as regards the amount of emission reductions associated with a certain level of tax, and thus it may require several iterations to achieve the desired level of emission cuts. *Second*, it facilitates linkages with foreign carbon markets, which could lower the cost of reducing emissions for Korea. *Third*, the participation of firms in the market for permits creates a constituency for maintaining the system.[11] *Fourth*, unlike a carbon tax, a trading scheme does not need to be adjusted for inflation or growth.

Box 5.2. **The main characteristics of a cap-and-trade emissions trading system**

A mandatory ETS based on cap and trade allows holders of permits the right to emit a certain amount of GHG. The total amount of permits is set at the overall desired level of future emissions by the covered sources. Emitters can trade permits among themselves in an open market, as those who emit less than their target can sell permits to those who exceed it. The price of traded permits depends, in part, on the total amount of permits. One key question is how to allocate the permits. A grandfathering approach – granting permits for free based on past emissions – is politically attractive and is used in some countries to gain the support of incumbent firms. However, if emitters expect that such an approach will continue, the incentives to reduce emissions would be weakened. Moreover, giving away permits to existing firms would act as an entry barrier, as new firms face higher costs than existing firms, and it may encourage non-viable firms to remain in business solely to receive free emission permits. A better approach is to sell permits through an auction scheme, similar to the plans for allocating frequency spectrum for mobile telephony. Although auctioning permits is more costly for firms, it would provide revenues for the government, thus allowing reductions in other taxes and their associated distortions. If policy makers instead choose a grandfathering approach, they should at least announce that it will be phased out, thereby strengthening incentives to reduce emissions.

Firms face considerable risk and uncertainty about prices in an ETS, which can be volatile. One remedy is to allow firms to save or bank permits that are not used in the trading period in which they are issued. Such an approach increases efficiency by allowing firms to adjust their emissions reduction schedule to their investment programme. A recent study found that banking cuts abatement costs, while increasing the amount of GHG emission reductions even in the short term (Bosetti *et al.*, 2008). The borrowing of permits has a similar effect, although there is a need for caution as firms do go bankrupt. Allowing firms to smooth their emission profiles through the business cycle by banking and borrowing permits also helps to limit price volatility (Philibert and Reinaud, 2004).* Banking and borrowing, however, require adequate compliance mechanisms and long-term targets to be effective. Another option to manage risk would be to set emission targets based on intensity (*e.g.* emissions per unit of output), rather than on the absolute amount, thereby allowing the automatic adjustment of emission objectives to unexpected shocks to output growth and marginal abatement costs (Ellis and Tirpak, 2006). However, intensity targets would complicate international links with ETS that are based on absolute amounts.

* In the European ETS, for example, the spot price fell from over EUR 30 per ton of CO_2 to under EUR 1 between the spring of 2006 and the spring of 2007 in the absence of banking provisions, which were avoided in the pilot stage as they would have caused serious environmental damage.

A comprehensive cap-and-trade ETS appears to be the best option

On balance, the case for using an ETS as the main instrument to control carbon emissions in Korea is compelling, in spite of the initial start-up costs. However, given that an ETS works best at the level of relatively large emitters, even a fairly comprehensive ETS may exclude certain sectors, notably households and offices. Taxation, on the other hand, is the instrument of choice for small and diffuse sources such as households, farmers and small businesses, thus leaving scope for a carbon tax to co-exist with an ETS. It is important, though, to minimise overlap and complicated interactions between an ETS and a carbon tax that would raise uncertainty about the overall outcome (OECD, 2006). In particular, the two instruments should be set to minimise differences in the explicit and implicit carbon prices across sectors (de Serres *et al.*, 2010).

The government will submit legislation in 2010 to establish a framework for an ETS under a cap-and-trade scheme and set the starting date.[12] Given the ability of a well-designed system to reduce GHG emissions in a cost-effective manner, Korea should quickly introduce an ETS with wide coverage, ideally by auctioning the initial permits, in order to achieve its 2020 target.[13] The scheme should include banking and possibly borrowing of permits to limit risk, uncertainty and volatility. In addition, Korea's ETS should be as comprehensive as possible in its coverage. As for a carbon tax, the government is considering such an approach as well. If the ETS is not comprehensive, a carbon tax would be an effective policy to cope with excluded sectors, while limiting overlap and complicated interactions.

A key obstacle to the implementation of an ETS and/or a carbon tax in many countries is concern about their impact on the international competitiveness of domestic industries.[14] An effective climate change policy requires that some firms do not survive, either because demand for their products falls or because more GHG-efficient firms – domestic or foreign – increase their market share. However, OECD analysis has found that the effects of climate policies on competitiveness are likely to be small and limited to only a few energy-intensive industries, particularly if an ETS has broad international coverage (OECD, 2009c). This illustrates the importance of wide coverage in the post-Kyoto framework. Otherwise, the emission cuts in some countries with an ETS and/or carbon tax would be partly offset by increases elsewhere, a phenomenon referred to as carbon leakage. However, recent OECD research found that unless only very few countries take action against climate change, leakage rates will be relatively small (OECD, 2009d).

Removing environmentally harmful energy subsidies

Another priority is to remove subsidies[15] to fossil fuel-based energy production and consumption, which boost GHG emissions. A recent OECD study found that closing the gap between domestic and international fossil fuel prices could cut GHG emissions in the subsidising countries by as much as 30% relative to BAU levels by 2050, and by 10% globally (Burniaux *et al.*, 2009). Moreover, eliminating subsidies would increase efficiency and save fiscal resources that could be used more productively.

Korea has few explicit subsidies for fossil fuels and they do not protect any important domestic industries. The main subsidy is for the production of coal and its use in the form of charcoal briquettes by low-income households. In 2008, domestic coal production amounted to only 2.8% of Korea's coal imports (Table 5.4). Nevertheless, this subsidy distorts resource allocation and encourages excessive consumption of coal, which has more harmful emissions than other fossil fuels. Despite the gradual decline in the subsidy, it still amounted

Table 5.4. **Coal production and briquette price subsidy**

	1989	1999	2007	2008	2009
Coal production (million tonnes)	20.8	4.2	2.9	2.8	2.5
Total subsidy (billion won)[1]	**46**	**323**	**339**	**297**	**267**

1. The subsidy covers subsidies for briquette manufacturers, industrial accident insurance premiums, and school expenses for children of mine workers.

Source: Ministry of Knowledge Economy.

to 267 billion won in 2009, equivalent to around 5% of total environment-related spending by the central government. The government should eliminate this subsidy in favour of more environmentally friendly measures to support low-income groups.

Another, more indirect, subsidy is the sale of electricity at prices below costs. Overall, the recovery rate – the unit price as a share of the total unit cost – was 93.8% in 2007, but it varies widely among sectors (Table 5.5). In particular, the recovery rate in the residential sector was high at 99.2% compared to 90.5% in industry and only 39.2% in agriculture. Without the subsidy, the electricity price for industry would be around the OECD average.[16] The subsidy for industry widens the price gap with services (most of which are included in the general category in Table 5.5) to 34%, much larger than the 21% gap in unit costs. There are also cross-subsidies in natural gas (Moltke *et al.*, 2004). The 2008 National Energy Master Plan through the year 2030 stated that Korea should abolish cross-sector subsidies, thereby allowing prices to match unit costs in each sector.

Table 5.5. **Recovery rate of electricity price by sector in 2007**

	Average	General	Residential	Industrial	Educational	Agricultural
Unit price (won/kWh)	77.9	97.7	114.3	64.6	77.2	42.5
Total unit cost[1] (won/kWh)	83.0	90.1	115.3	71.4	87.1	108.2
Recovery rate (%)	93.8	108.4	99.2	90.5	88.7	39.2

1. Unit cost is all production and sales cost, plus the cost of capital.
Source: Government of Korea (2008), *The National Energy Master Plan 2008-2030*, Seoul.

Creating new growth engines for the future

Achieving large reductions in GHG gases requires shifting the economic structure away from the energy-intensive industries that have driven Korea's rapid development thus far. However, fighting climate change need not hinder economic growth, as moving to a more sustainable growth path brings new opportunities to increase output and employment, provided that action is taken early so that GHG emissions can be reduced progressively. While the shift to a low-carbon society will reduce jobs and activities in some sectors, this will be offset by the creation of new jobs and the expansion of other sectors. Environmental policies can act as a catalyst for eco-innovation, in particular by creating new markets for low-carbon technologies and equipment. The net impact of environmental policies on employment could be positive insofar as green jobs tend to be concentrated in more labour-intensive sectors, such as renewable energy, recycling, public transport and construction. According to one estimate, boosting investment in renewable energy to USD 630 billion by 2030 would create at least 20 million additional jobs worldwide, making it a much larger source of employment than today's fossil energy industry, which includes mining, petroleum extraction, refining and fossil power generation (UNEP, 2008).

The Five-Year Plan for Green Growth, 2009-13

To implement the National Strategy for Green Growth, which covers the years up to 2050 (Box 5.1), the government announced in July 2009 the Five-Year Plan for Green Growth. This initiative revives the practice of five-year plans, which were used between 1962 and the mid-1990s. While the government recognises that the "effectiveness of five-year plans dwindled as the Korean economy more broadly embraced market economy principles", it believes that they are useful for national consensus building and to incorporate green growth spending in the national budget (Presidential Committee on Green Growth, 2009b). The

Five-Year Plan absorbed the Green New Deal for 2009-12, which was announced in January 2009 to tackle the financial crisis through job creation and to secure new growth engines by transforming Korea into a green economy.[17]

The Five-Year Plan calls for spending 2% of GDP per year over the period 2009-13, completely financed by the central government budget except for 8.5 trillion won (0.8% of GDP) in spending by two public enterprises.[18] The government estimates that the plan will induce production worth 182-206 trillion won (around 20% of 2009 GDP) and create 1.6 to 1.8 million jobs (a 10% rise in employment) by 2013, suggesting a relatively high fiscal multiplier of around two.

The high level of spending in the Five-Year Plan is due in part to the inclusion of large construction projects among the 600 projects (Table 5.6). Two of the ten spending categories, which are mainly focused on public construction, account for 61 trillion won – more than half of total expenditures. *First*, "Greening the land, water and building the green transport infrastructure" (category 8) includes ongoing railway projects as part of the government's plan to boost the share of passenger transport by rail from 18% in 2009 to 26% in 2020. This will be achieved by further expanding the high-speed train system, Korea Train eXpress (KTX), which started in 2004 and already accounted for a little more than one-half of long-distance rail passengers in 2008.[19] *Second*, "Strengthening the capacity to adapt to climate change" (category 3) includes water management, such as river restoration and sewage facility projects. The Korean peninsula experiences droughts in the spring and heavy monsoon rains in the summer and climate change is exacerbating this pattern. A large share of this spending (15.4 trillion won) is for the "Four Major Rivers Restoration Project", which notably includes the construction of 16 new weirs (dams that allow water to flow over the top) on the four major rivers, two new dams on their tributaries and heightening the banks of 96 existing agricultural reservoirs. The Project has five aims: *i*) securing abundant water

Table 5.6. **The Five-Year Plan for Green Growth (2009-13)**

Trillion won[1]

	Total	2009	2010	2011	2012	2013
Total	**107.4**	**17.4**	**24.2**	**25.7**	**20.6**	**19.4**
Central government budget	98.9	17.4	20.5	21.9	19.6	19.4
Public enterprises' investment	8.5	–	3.7	3.8	1.0	–
Memorandum item: Total green technology R&D investment in all categories	*(13.0)*	*(1.9)*	*(2.2)*	*(2.5)*	*(2.8)*	*(3.5)*
A. Adapting to climate change and enhancing energy independence	**57.5**	**8.5**	**15.5**	**16.0**	**9.8**	**7.7**
1. Effective mitigation of greenhouse gas emissions	5.4	1.0	0.9	1.0	1.1	1.3
2. Reduction of the use of fossil fuels and the enhancement of energy independence	15.4	2.8	3.8	2.9	3.0	2.8
3. Strengthening the capacity to adapt to climate change	36.7	4.7	10.9	12.0	5.6	3.6
(Four Major Rivers Restoration Project)	*(15.4)*	*(0.8)*	*(6.4)*	*(7.1)*	*(1.1)*	*(–)*
B. Securing new growth engines	**23.5**	**3.9**	**4.1**	**4.7**	**5.3**	**5.6**
4. Development of green technologies	7.6	1.5	1.4	1.5	1.5	1.6
5. The "greening" of existing industries and promotion of green industries	4.5	0.7	0.9	0.9	1.0	1.0
6. Advancement of industrial structure to increase services	9.7	1.4	1.5	2.0	2.4	2.5
7. Engineering a structural basis for the green economy	1.8	0.3	0.2	0.3	0.4	0.5
C. Improving living standards and enhancing national status	**26.4**	**5.0**	**4.6**	**5.1**	**5.6**	**6.1**
8. Greening the land and water and building the green transport infrastructure	23.9	4.6	4.2	4.6	5.0	5.5
9. Bringing the green revolution to daily lives	1.8	0.3	0.3	0.3	0.4	0.4
10. Becoming a role-model for the international community as a green growth leader	0.7	0.1	0.1	0.1	0.1	0.1

1. Actual budgets for 2009-10 and projections for 2011-13.

Source: Ministry of Strategy and Finance and Presidential Committee on Green Growth.

resources; *ii)* implementing comprehensive flood control; *iii)* improving water quality and restoring the ecosystem; *iv)* creating multipurpose spaces for local residents; and *v)* promoting regional development centred on rivers, leading to the creation of 340 thousand jobs (Government of Korea, 2009). In contrast to the large share of infrastructure construction, spending on R&D accounts for 12% of the Five-Year Plan.

The October 2009 mid-term fiscal plan (Chapter 2) incorporated the expenditures contained in the Five-Year Plan for Green Growth announced in July. Nevertheless, the total amount of spending for the years 2011-12 did not increase compared to the 2008 mid-term fiscal plan. This could be explained by two factors. *First*, outlays in some non-green growth categories may have been cut. *Second*, some previously planned expenditures may have been re-categorised as green growth. To the extent that it is the latter, the role of the green growth plan in shifting spending priorities appears less important. Nevertheless, the plan is likely to affect public expenditure decisions going forward.

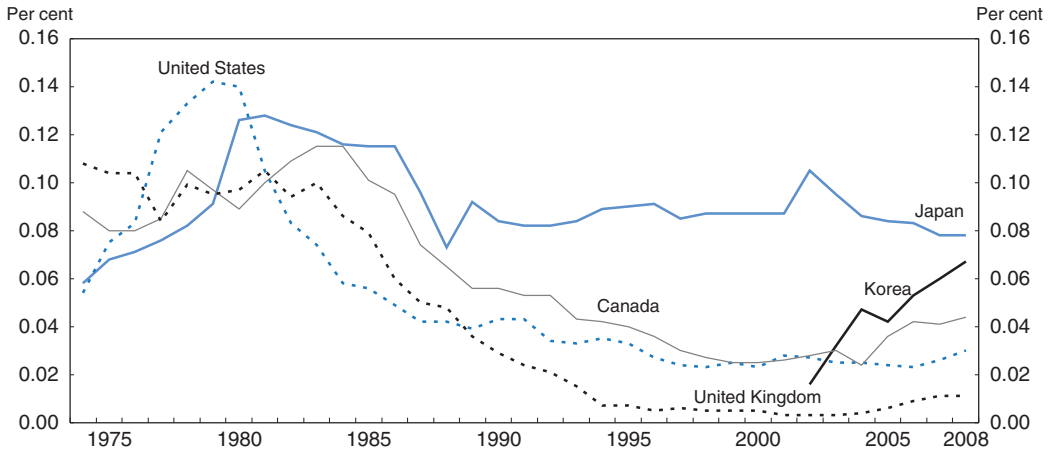
Given the large size of the Five-Year Plan, it is crucial that spending be implemented in a transparent and effective manner, in line with the OECD's recommendations on good practices for managing public environmental expenditures (OECD, 2008d). Green growth infrastructure projects should be subject to the same *ex ante* cost-benefit analysis as other public investment. In Korea, the Public and Private Investment Management Centre (PIMAC) was established as an independent organisation in 1999 to conduct *ex ante* evaluations of large-scale public investment projects. During its first five years, it rejected about 80% of the proposed projects, resulting in significant cost savings (OECD, 2005b). Moreover, the performance of each green growth project should be carefully monitored and regularly reviewed as part of the budget process to ensure that it achieves the desired policy goals. In an era of fiscal consolidation, choosing cost-effective policy measures is especially important. The Five-Year Plan should therefore rely on policies with well-designed incentive schemes that activate market forces. For example, R&D tax credits are likely to lead to a more efficient allocation of resources than direct subsidies for specific projects (de Serres *et al.*, 2010).

R&D in green technologies

Technological change is the key to minimising the cost of addressing the climate change problem (OECD, 2010d). To encourage innovation in green technologies, the first priority is to put a credible price on carbon, preferably through emissions trading, as noted above. Market forces would then provide a powerful incentive for the development of new low-carbon technologies and would guide resources to the best technologies, making them more cost-competitive.[20] However, price signals alone cannot ensure adequate R&D and innovation given market failures, such as those related to learning-by-doing and market size, as well as the inability of innovators to fully capture the gains from their innovation. While such problems are common to all types of R&D, it is magnified in the area of climate change by policy uncertainty and weak protection of intellectual property rights (IPR).[21] Given these market failures, public investment in R&D is needed to "kick-start" the innovation process. The government should focus on basic R&D to share the risk of developing new technologies with the private sector, particularly in large-scale projects.[22] To promote the use of new technologies, the government can provide other measures, such as commercialisation support and information services (OECD, 2010a).

Government spending on energy research, development and demonstration (RD&D)[23] fell as a share of GDP in many OECD countries between the early 1980s and the 1990s (Figure 5.5), reflecting the difficulties in the nuclear industry and the drop in oil prices

Figure 5.5. **Government energy RD&D budget as a share of GDP**



Source: IEA/OECD Energy Database.

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from 1985 to 2002 (IEA/OECD, 2008a). To combat climate change and promote green growth, more public investment in RD&D worldwide appears to be needed. Korea's RD&D budget in energy-related areas rose from 0.02% of GDP in 2002 to 0.07% in 2008, the second highest in the OECD area. In terms of the absolute amount, Korea ranks fourth after the United States, Japan and France. However, the share of green technology patents originating from R&D in the environment or energy is rather small, suggesting that innovation is very multi-disciplinary (OECD, 2010b). Therefore, the authorities should be careful in emphasising R&D in a particular area.

In the Five-Year Plan, the government plans to expand its R&D investment in green technologies from 2 trillion won in 2009 to 3.5 trillion won by 2013, making a cumulative amount of 13 trillion won. This would boost green R&D from 16% of the government's total R&D spending in 2009 to 20% by 2013.[24] R&D will focus on 27 core technologies (Table 5.7) that were announced in January 2009 as new growth engines for Korea. These strategies were chosen following consultation with various experts and later incorporated into the Green Growth Strategy. The decision whether to include a technology in the list was based on its potential contribution to economic growth and environmental sustainability and its strategic importance. In order to co-ordinate R&D policy, the National Science and Technology Council will be closely linked to the Green Growth Committee. The "Key Green Technology Development and Commercialisation Strategies" was announced in May 2009 as a roadmap to develop these technologies. In addition to public R&D, the Five-Year Plan includes fiscal support for green R&D by SMEs.

Public R&D and public funding of private R&D have a role to play, although they may not meet the cost-effectiveness criterion, as they have no mechanism to ensure that the target is achieved at the least cost (de Serres *et al.*, 2010). The success of public R&D depends on two factors. *First*, it is necessary to establish a clear and credible price for carbon beforehand to make public R&D effective in redirecting technological change towards green technologies (Bosetti *et al.*, 2009). This would suggest accelerating the introduction of an ETS and a carbon tax. *Second*, it is important to upgrade the general innovative capacity, which is a key determinant of innovation in environmental technology (Hascic and Johnstone, 2010).

Table 5.7. **Core green technologies**

Sector	27 core green technologies	Timing[1]
Climate change	1. Monitoring and modelling for climate change	Long term*
	2. Climate change assessment and adaptation	Long term*
Energy source technology	3. Silicon-based solar cells	Short term
	4. Non-silicon based solar cells	Long term*
	5. Bio-energy	Long term*
	6. Light water reactors	Short term
	7. Next-generation fast reactors	Long term
	8. Nuclear fusion energy	Long term
	9. Hydrogen energy R&D	Long term
	10. High-efficiency fuel cells	Long term
Technologies to improve efficiency	11. Plant growth-promoting technology	Long term
	12. Integrated gasification combined cycle	Long term
	13. Green cars	Medium term
	14. Intelligent infrastructure for transport and logistics	Long term*
	15. Green city and urban renaissance	Long term
	16. Green buildings	Long term
	17. Green process technology	Medium term
	18. High-efficiency light-emitting diodes/green IT	Short term
	19. IT-combined electric machines	Long term
	20. Secondary batteries	Medium term
End-of-pipe technology	21. CO_2 capture, storage and processing	Long term
	22. Non-CO_2 processing	Medium term
	23. Assessment of water quality and management	Medium term
	24. Alternative water resources	Medium term
	25. Waste recycling	Medium term
	26. R&D in monitoring and processing for hazardous substances	Long term
R&D in virtual reality	27. Virtual reality	Medium term

1. Projects are divided between intensive investment in the short, medium and long run. Long-run projects marked with an asterisk are to have gradual, rather than intensive, increases in investment.

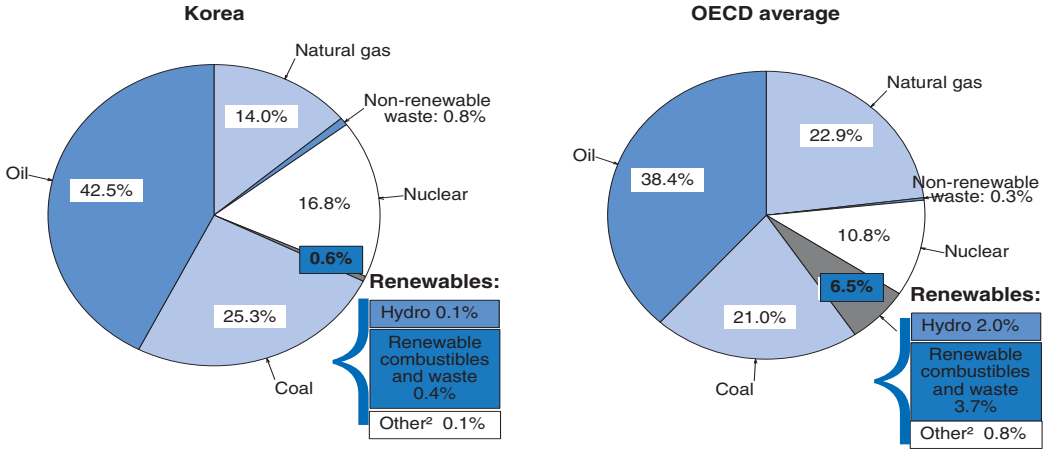
Source: Presidential Committee on Green Growth (2009a).

Despite its high level of R&D intensity and the improvement in its innovation framework, Korea still has weaknesses in fundamental research and system linkages (OECD, 2009b). To promote Korea's convergence to high-income countries, the government has focused on immediate and tangible returns from its R&D investments, focusing on "experimental development". Technological progress and the growing maturity of the Korean economy require expanding basic research from its current 15% share of total R&D and developing more sophisticated infrastructure, particularly for green technologies. The government should promote these goals by further increasing the share of basic research in public R&D spending to support private-sector innovation. For large-scale R&D projects, it is important to share the risk with private firms by investing public money in related basic research. In particular, Korea needs to bolster its capacity for basic research in universities, which employ around 70% of all doctorates but account for just 10% of total R&D spending. Moreover, a lack of co-operation between government research institutes (GRIs) and universities hinders development of closer and mutually beneficial linkages. The government needs to encourage closer co-operation between GRIs, universities and the private sector by facilitating joint projects, enhancing the mobility of researchers, tackling the mismatch between human resources and research spending in universities and expanding access to GRIs' research infrastructure.

Developing renewable energy sources

The development and deployment of renewables is one of the key priorities to achieve a low-carbon society. Although worldwide investment in renewable energy reached USD 155 billion in 2008, a seven-fold increase from 2002, it has been estimated that this investment must more than triple for global carbon emissions to peak by 2020 (UNEP, 2009a). The share of renewable energy in the total primary energy supply (TPES) in Korea was only 0.6% in 2007, far less than the OECD average of 6.5% (Figure 5.6) and the lowest in the OECD area.[25] Moreover, its share declined from 1.1% in 1990, while the share in the OECD area increased from 5.8% over the same period. There appears to be considerable scope to develop renewable energy sources in Korea; the additional realisable potential contribution of renewables in 2020 has been estimated to amount to 43.2 TWh, equivalent to 12% of total electricity generated in 2005 (IEA/OECD, 2008b). This would be a large increase from only 1% in 2007. In particular, Korea has a relatively large potential in solar photovoltaics (10.4 TWh) and offshore wind (9.0 TWh).

Figure 5.6. **Energy sources in the OECD area in 2007**[1]



1. As a share of total primary energy supply.
2. Geothermal, wind, solar and tide.

Source: IEA/OECD (2009a) and IEA/OECD (2009b).

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The National Strategy for Green Growth established a target of increasing the share of renewable sources in TPES from 2.4% (according to Korea's definition of renewables) to 6% in 2020,[26] 11% in 2030 and 30% by 2050. The government estimates that this objective requires 111.4 trillion won of investment by 2030, including R&D of 11.5 trillion won. The public sector will provide 32 trillion won of this amount. Moreover, a Renewable Portfolio Standard (RPS)[27] will be introduced in 2012 to accelerate the diffusion of renewables. In addition, the government plans to increase the use of nuclear power, which is the least expensive means to generate electricity and produces almost zero GHG. Nuclear energy's share of electricity generation capacity is targeted to increase from 26% in 2007 to 41% in 2030.

In sum, Korea is still at an early stage in the development and utilisation of renewables. Achieving its 6% target by 2020 requires an effective and efficient policy framework based on the following principles (IEA/OECD, 2008b):

- Remove non-economic barriers, such as administrative hurdles, obstacles to grid access, poor electricity market design, lack of information and training, and social acceptance issues.
- Establish a predictable and transparent support framework to attract investment.
- Introduce transitional incentives that decrease over time to foster and monitor technological innovation and move technologies quickly towards market competitiveness.
- Develop and implement appropriate incentives that guarantee a specific level of support to different technologies based on their degree of technological maturity, in order to exploit the significant potential of the many options for renewable energy technologies over time.
- Consider the impact of large-scale penetration of renewable energy technologies on the energy system in terms of cost efficiency and system reliability.

As noted above, the government should develop a flexible framework that increasingly applies market principles as a renewable energy technology matures and its deployment advances. Moreover, as technology evolution is hard to predict, picking winners by subsidising specific projects is risky as it may lock in technologies that will not be economically efficient. For example, the high cost of biofuels suggests some caution in promoting this energy source. Indeed, the cost of support to biofuels is estimated at between USD 960 and USD 1 700 per tonne of CO_2 saved (OECD, 2008a), compared to the price of USD 15 to USD 30 price per tonne in the European ETS.

Promoting green industries

The Five-Year Plan includes 23.5 trillion won (2.2% of 2009 GDP) to secure new growth engines, in part by greening existing industries and promoting new industries. For example, among the 17 new growth engines announced in January 2009, there were six in green technology industry; new renewable energy, low carbon energy, water technology, LED application, green transport system and high-tech green city (Table 1.3). The government has launched a number of initiatives to provide financial resources to green industry. *First*, it introduced tax incentives in 2010 for financial instruments that invest in green technology and industry. Dividends and interest from bonds, deposits and investment funds that invest at least 60% of their capital in firms and projects with green certificates (see below) are tax-exempt up to certain ceilings. *Second*, as part of the Five-Year Plan, government lending for green firms and projects will be expanded. *Third*, public credit guarantees for green firms will be increased from 2.8 trillion won in 2009 to 7 trillion won in 2013, and provided under more favourable conditions. *Fourth*, the government plans to launch a green private equity fund (UNEP, 2009b). These green finance measures will fund firms, projects and technologies that are granted "green certificates", under a new programme that was introduced in April 2010. The certificates will be given by public institutes based on technologic impact, feasibility, the degree of greening and environmental impact. Green firms are defined as those for which certified green technology accounts for more than 30% of sales.

It is important to avoid the risk that granting green certificates to certain firms and projects might result in a bubble. Such a risk is demonstrated by the experience with the measures to jump-start the venture business sector in the late 1990s. Firms that met one of three criteria were designated as a venture business and received a number of financial benefits.[28] The end result was a bubble in KOSDAQ, the second-tier stock exchange. Moreover, the qualifying conditions were sufficiently vague that it reduced the credibility of the venture business sector. After the introduction of tighter criteria in 2002, the KOSDAQ price index fell 90% from its 1999 peak (2005 *OECD Economic Survey of Korea*). In establishing green certificates, the government should plan an exit strategy in order to avoid another disruptive bubble.

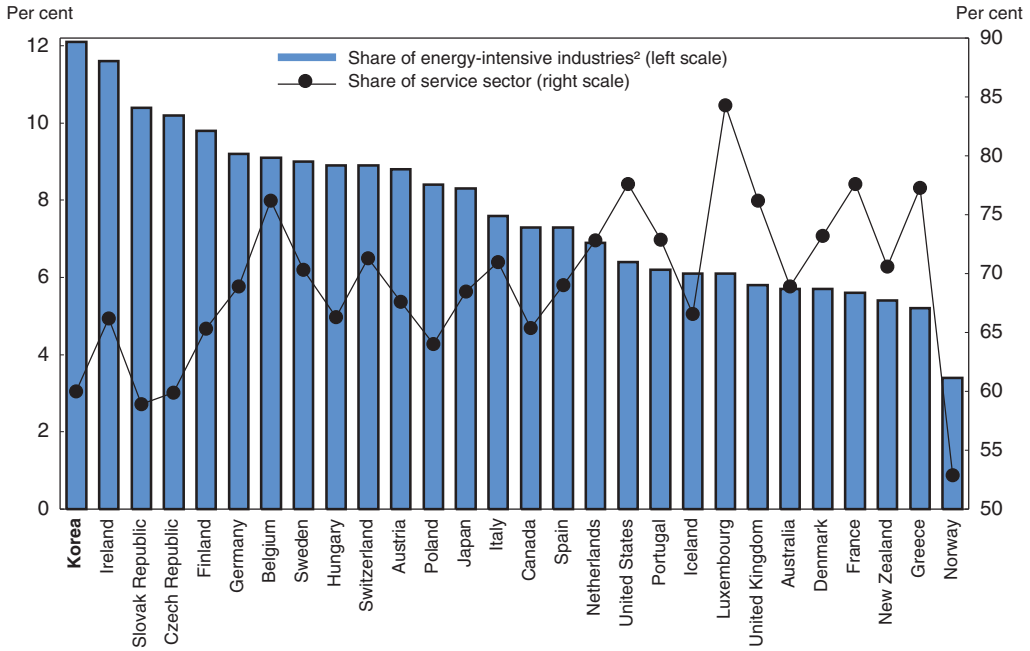
Direct government support for green industries raises a number of policy challenges, such as choosing which sectors should receive support, the appropriate timing of assistance and the suitable policy instrument. These decisions entail inherent risks, as illustrated by the mixed results of past government efforts to identify growth engines (OECD, 2004). Efforts to "pick winners" are inherently risky given the pace of innovative change and the possibility of being locked into the wrong technology. Moreover, there is a risk of losing significant amounts of public funds. To avoid government failure, policies to promote green industries should be as neutral as possible, focusing on basic and long-term R&D in technologies that are still too far from commercial viability to attract private investment. In sum, measures to promote green growth should not revert to traditional industrial policies.

The priority should be to establish a framework that will promote the transformation to a low-carbon economy at a low cost. *First*, as noted above, it is essential to establish a price for carbon through an ETS and a carbon tax. *Second*, fossil fuel subsidies should be phased out. *Third*, the shift towards a low-carbon economy requires the reallocation of labour and capital resources across sectors. For workers, labour market flexibility to promote the redeployment of workers and effective training are required (Chapter 1). *Fourth*, strong competition, including openness to imports and foreign direct investment, is needed to stimulate the adoption of new technology. In particular, it is important to facilitate the entry of new firms, which account for a large share of radical innovations in some fields, and the exit of firms in declining industries. In addition, the government should reduce barriers to imports of products important for climate change technology. A recent OECD study found that Korea's trade barriers in this regard are high compared to those in the EU, Japan and the United States (Steenblik and Kim, 2009).

A well-designed framework and appropriate government policies will facilitate the shift to a low-carbon economy. In 2008, energy-intensive industries, such as steel, petro-chemicals and cement, accounted for 12% of total value-added in Korea, the highest in the OECD area and well above the OECD average of 8% (Figure 5.7). The role of the industrial sector is also evident in a decomposition of final energy consumption by sector (Table 5.8). While per capita energy use in the transport, residential and commercial sectors was below the OECD average, it was almost 50% above the OECD average in industry. In contrast to the high share of energy-intensive industry in GDP, the share of the service sector in Korea is one of the lowest at 60% of value added. Energy intensity in services in Korea is less than one-third of that of manufacturing. One of the benefits of developing the service sector would be to reduce energy-intensity.[29] Such an approach would help achieve the government's target of reducing energy intensity by one-third from the 2006 level by 2020, reaching the OECD average (Figure 5.2).

Figure 5.7. **Share of energy-intensive industries and the service sector across OECD countries**

Relative to total value added in 2008 or latest year[1]



1. The data are for 2007 for Germany, Hungary, Poland, Sweden, Switzerland, United Kingdom and the United States, 2006 for Japan, New Zealand and Portugal, and 2005 for Australia and Canada.
2. Energy-intensive industries are defined as ISIC 21-28.

Source: OECD STAN Database.

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Table 5.8. **Per capita energy use by sector in major OECD countries**

Toe per capita in 2007

	Total primary energy supply	Total final consumption per capita				
		Total	Industry	Transport	Residential	Commercial
Canada	8.13	6.19	2.43	1.75	0.97	0.92
United States	7.67	5.20	1.48	2.08	0.88	0.67
Korea	**4.57**	**3.02**	**1.56**	**0.62**	**0.38**	**0.38**
France	4.12	2.58	0.73	0.71	0.65	0.33
Japan	4.03	2.68	1.11	0.65	0.39	0.50
Germany	4.02	2.83	1.01	0.67	0.70	0.26
United Kingdom	3.46	2.34	0.64	0.73	0.66	0.26
Italy	3.02	2.36	0.80	0.70	0.47	0.24
OECD total	**4.61**	**3.17**	**1.06**	**1.04**	**0.58**	**0.39**

Source: IEA/OECD (2009a).

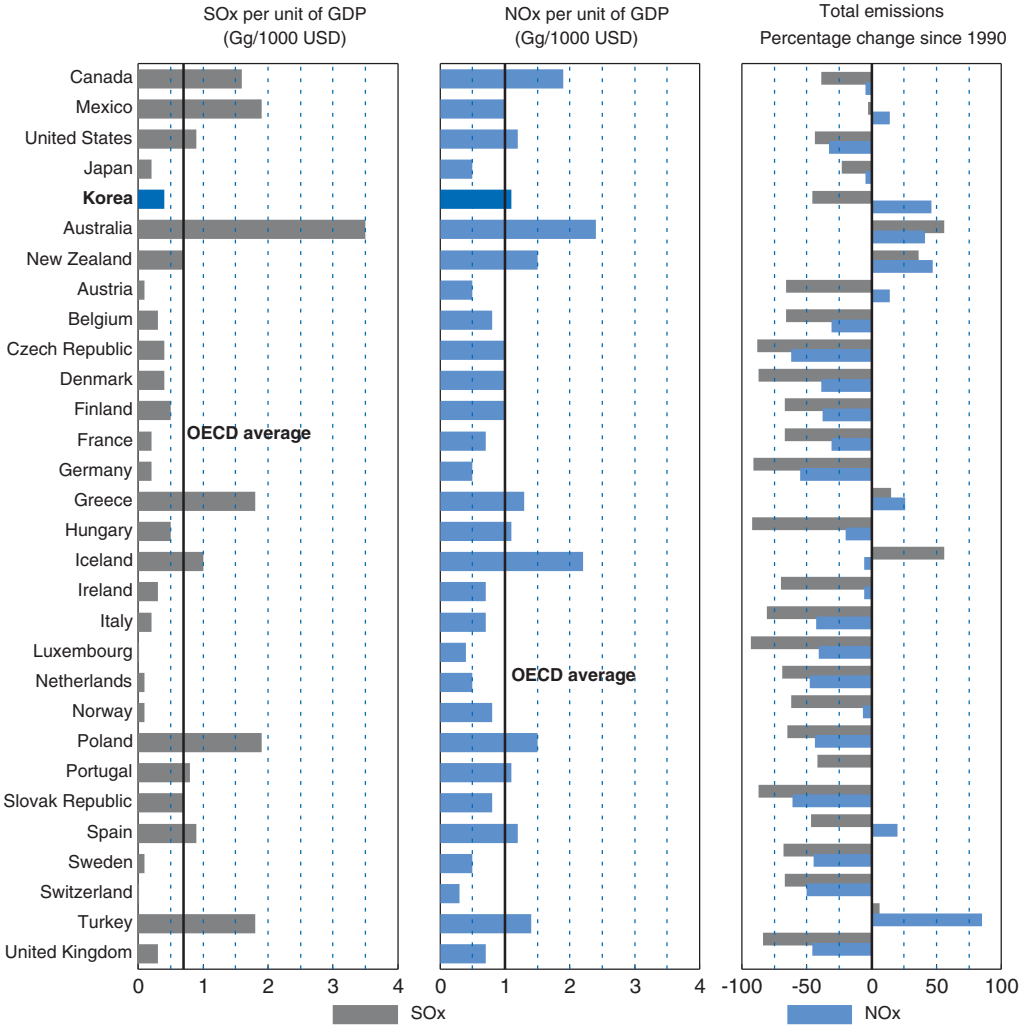
Improving the quality of life through better air quality

One of the benefits from cutting GHG emissions is the accompanying reduction in air pollutants, which have negative effects on human health, water quality and crop yields. Recent studies have found that climate change and air quality are closely interrelated with respect to the sources, atmospheric processes and environmental effects, reflecting the fact that fossil fuel combustion is a major source of both air pollution and GHG. One study

found that cutting CO_2 emissions by 10-20% compared to a BAU baseline would reduce sulphur dioxides (SO_2) by the same amount and nitrogen oxides (NO_x) by 5% to 10% over the next 10 to 20 years (IPCC, 2007). The benefit, in terms of premature deaths avoided thanks to reduced air pollution, is estimated to be up to USD 50 per tonne of CO_2 equivalent removed (Burniaux *et al.*, 2008).

Improving air quality is a priority in Korea, given that in the capital region (Seoul, Incheon and parts of Gyeonggi province), it is one of the worst among OECD countries (Kim and Kang, 2009). Although the level of emissions relative to GDP is below the OECD average (Figure 5.8), the concentration of emissions in the capital region, which accounts for one-half of the population, is problematic. Moreover, the increase in emissions of NO_x between 1990 and 2007 was the third highest in the OECD area (Panel C). The government's objective is to improve air quality in the capital region to the average OECD level by 2014.

Figure 5.8. **International comparison of emissions of NO_x and SO_x in 2007**



Source: OECD (2010c), *OECD Environmental Data: Compendium 2009-10*, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932303271

To that end, an emission cap-and-trade programme was introduced in 2008 covering NO_x, SO_x and Total Suspended Particles (TSP) in the capital region. The system began with large-scale emitters and was extended to mid-size emitters in January 2010, targeting 136 factories in the capital region. It thus covers 84% of NO_x, 78% of SO_x and 57% of TSP emissions in the capital region. The emission levels of the three pollutants are allocated to each source within the overall total limit. Emitters with excess pollution are able to purchase emission permits from those with surplus emission allowances. In case emitters exceed their allocated amount, they have to pay a penalty charge and their permissible emission level is reduced for the following year. While the trading system applies to fixed sources of emissions, vehicles are a major pollution source in the capital region, accounting for around half of NO_x emissions. Although the AFE regulations introduced in 2006 have increased fuel efficiency, the standards remain well below those in EU countries and Japan.

Conclusion

To achieve its target of reducing GHG emissions, Korea should remove fossil fuel subsidies and introduce an emissions trading system based on cap and trade, supplemented by a carbon tax in areas not covered by trading. Such a market approach would minimise the overall economic cost of emission reductions by equalising marginal abatement costs across all emission sources. In addition, it would establish a credible price for carbon that would encourage innovation to reduce emissions. The government's Five-Year Plan should be carefully designed and implemented to promote such innovation and encourage the transition from energy-intensive industry to a low-carbon economy. The large-scale expenditures should be used efficiently while limiting the risk of government failure resulting from policies to "pick winners". Specific policy recommendations to improve Korea's climate change and green growth policy are provided in Box 5.3.

Box 5.3. **Summary of recommendations for Korea's green growth strategy**

Mitigating climate change

- Introduce market-based instruments as soon as possible to achieve the 2020 GHG emission reduction target in a cost-effective way by ensuring that abatement costs are equal at the margin across all options.
- Put a price on carbon emissions by creating a mandatory and comprehensive cap-and-trade ETS, thereby providing a clear price signal that enables market participants to make appropriate investment decisions.
- Auction ETS permits and allow them to be banked for the future and, perhaps, borrowed.
- Introduce a carbon tax in areas not covered by the ETS and use the revenue, together with that from auctioning Wpermits for the ETS, to reduce the need for higher taxes and their associated distortions.
- Accelerate the phasing out of environmentally-harmful energy subsidies and ensure that energy prices in each sector reflect the cost of production and distribution.
- Stop earmarking environmental taxes for transport construction, especially roads.

Box 5.3. **Summary of recommendations for Korea's green growth strategy** *(cont.)*

Creating new engines for growth

- Ensure good framework conditions, including openness to foreign investment and a strong competition framework, to facilitate entry of new firms and the exit of firms in declining industries.
- Enhance flexibility in the labour market and ensure adequate training of workers to facilitate the transition toward a greener economy.
- Ensure that the spending in the Five-Year Plan for Green Growth – 2% of annual GDP over 2009-13 – is implemented in a transparent and effective manner to address market failures, while avoiding outlays designed to boost specific industries.
- Promote innovation in green technologies by increasing its share in public R&D, focusing on basic research, particularly in areas related to large-scale projects by the private sector and in technologies still too far from commercial viability to attract private investment.
- Improve the overall innovation framework by spending more on basic research, closely linking government research institutes, universities and industry and reducing the mismatch between human resources and research spending in universities.
- Encourage the development of renewable energy resources by removing non-economic barriers and establishing a predictable and transparent support framework with incentives that decrease over time.
- Design the green certificate programme and the green finance initiatives carefully to limit the risk of bubbles.

Improving the quality of life through a better environment

- Gradually reduce the level of emissions allowed under the cap-and-trade programme covering NO_x, SO_x and TSP in the capital region to improve air quality to the level in advanced OECD countries.
- Increase the Average Fuel Efficiency standards to reduce NO_x emissions, notably in the capital region.

Notes

1. Korea also pushed for green growth to feature prominently on the agenda of international organisations. In 2005, the "Seoul Initiative Network on Green Growth" was adopted at the Ministerial Conference of the United Nations Economic and Social Commission for Asia and the Pacific. In addition, Korea chaired the 2009 OECD Ministerial Council Meeting which adopted the "Green Growth Declaration".
2. The government set a target of reducing energy intensity by one-third from the 2006 level by 2020, reaching the OECD average. This chapter will not explicitly discuss increasing energy independence as it will be a natural consequence of mitigating climate change and shifting to a low-carbon economy.
3. Recent assessments show a permanent 14% loss in average world consumption per capita from both market and non-market impacts (Stern, 2007).
4. The BAU baseline makes assumptions on oil prices (from the Energy Information Agency), population (official projection) and economic growth (Korea Development Institute).
5. Energy intensity – total primary energy supply (TPES) divided by GDP – is affected by many non-energy factors such as climate, geography, travel distance, home size and manufacturing structure.
6. The shares of natural gas and nuclear energy in TPES increased by 10 percentage points (3% to 13%) and 3 percentage points (15% to 18%), respectively, between 1990 and 2005. CO_2 emissions from natural gas are less than a quarter of that from oil.

7. Like the CDM, JI is a project-based mechanism that feeds the carbon market by enabling industrialised countries to carry out joint implementation projects with other developed countries.
8. The global carbon market doubled from USD 63 billion in 2007 to USD 126 billion in 2008. The allowance market occupied three-quarters while the project market, including CDM, accounted for the remaining quarter.
9. The projects are registered with the UNFCCC and pass through a rigorous process designed to ensure real and measurable emission reductions that are additional to what would have occurred without the project.
10. As of February 2010, 2 209 projects has been registered, with anticipated annual CERs amounting to 342 million tonnes of CO_2 equivalent.
11. An ETS that gives away permits for free is less costly for firms than a carbon tax. As noted below, however, such an approach is less efficient than auctioning permits.
12. ETS are already in place or are about to be implemented in the European Union, Australia, Canada, New Zealand, Norway and some states in the north-eastern part of the United States. A growing number of other countries, including Japan, are considering introducing an ETS (Burniaux *et al.*, 2008).
13. Korea's introduction of an emission cap-and-trade programme in 2008 covering NO_x, SO_x and Total Suspended Particles (TSP) in the capital region is giving it experience in operating an ETS.
14. Another concern is a possible adverse impact of a carbon tax on income distribution, reflecting its regressive nature. This can be addressed, at least in principle, via the tax-benefit system (Duval, 2008).
15. The definition of subsidies in OECD analysis of the energy sector includes grants or soft loans to producers or consumers of energy, market price support and differential tax rates on different fuels (OECD, 2005a).
16. In 2008, Korea's electricity prices for industry and households were USD 0.087/kWh and USD 0.128/kWh (using purchasing power parity exchange rates), while the OECD averages were USD 0.108/kWh and USD 0.141/kWh, respectively (IEA/OECD, 2010).
17. The Green New Deal included 36 projects, such as the Four Major Rivers Restoration Project and railroad construction. Spending is divided between water and waste management (13 trillion won), railroad construction (11 trillion won), energy-efficient buildings (10 trillion won), low-carbon vehicles (3 trillion won) and renewable energy (3 trillion won). The government expects this programme to create 0.9 million jobs.
18. Local governments are developing their own five-year plans to implement the national plan.
19. The line connecting Daegu and Busan is to be completed by the end of 2010, while a line connecting Seoul to Mokpo in the southwest is to be completed by 2014. This spending would not be included in the OECD's definition of environmental expenditure.
20. This is illustrated by the introduction of an emission cap-and-trade programme in 2008 covering NO_x, SO_x and TSP in the capital region in 2008, which led to a large increase in the number of patents on technology to reduce emissions (Kim and Kang, 2009).
21. Weak protection of IPR is likely to be particularly problematic in R&D related to climate change for two reasons. *First,* developing countries may consider access to the most efficient abatement technologies to be an important condition for their participation in emission abatement efforts. This weakens the credibility of IPR and thus reduces firms' incentive to innovate. *Second,* the value of R&D in climate change depends on the credibility of governments' abatement policies. If firms are uncertain whether governments will follow through on their intended policies, their incentives to invest in such R&D are weakened (OECD 2008b).
22. Breakthrough technologies, such as fuel cells, advanced biofuels or advanced nuclear technologies, are estimated to require large investment in R&D at the initial stage (de Serres *et al.*, 2010).
23. In the area of energy R&D, "demonstration" – projects to show that new technology is feasible, for example in renewable energy sources – is an important compliment to R&D. Korean official statistics do not include outlays for demonstration. Instead, their target is for R&D alone.
24. In addition, the government will double the share of its basic R&D in green technology to 35% by 2012.
25. The Korean government's data on the share of renewable energy in TPES were higher at 2.4% in 2007 because they include industrial waste and non-renewable municipal waste as renewable energy sources. Under IEA methodology, such waste is excluded from the definition of renewable energy sources on the grounds that they are not biodegradable (IEA/OECD, 2009b).

26. This objective is relatively modest compared to the EU and China, which both set targets of 20% for 2020.

27. A RPS is a regulation that requires the increased production of energy from renewable sources. It generally places an obligation on electricity companies to produce a specified fraction of their electricity from renewable sources.

28. A firm could be certified as a venture business by the Small and Medium Business Administration if it met one of three criteria: *i)* it received equity investment from venture capitalists amounting to more than 10% of its capital; *ii)* the amount (over 50 million won) and intensity of its R&D spending was high; and *iii)* it used new technologies. As of 2004, only 5% and 18% of venture businesses qualified under the first two criteria, while 77% were approved under the less stringent third criterion.

29. Indeed, a long-term econometric model estimates that reductions in GHG emissions would cause a significant expansion of the service sector (de Serres *et al.*, 2010).

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