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**Iceland**



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## **Iceland**

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

## **ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT**

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*This survey is published on the responsibility of the Economic and Development Review Committee of the OECD, which is charged with the examination of the economic situation of member countries.*

*Also available in French*

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*This Survey is published on the responsibility of the Economic and Development Review Committee of the OECD, which is charged with the examination of the economic situation of member countries.*

*The economic situation and policies of Iceland were reviewed by the Committee on 29 June 2006. The draft report was then revised in the light of the discussions and given final approval as the agreed report of the whole Committee on 13 July 2006.*

*The Secretariat's draft report was prepared for the Committee by Hannes Suppanz and Peter Tulip under the supervision of Patrick Lenain.*

*The previous Survey of Iceland was issued in April 2005.*



## BASIC STATISTICS OF ICELAND

### THE LAND

Area (1 000 sq. km)	103	Unproductive area (1 000 sq. km)	82
Productive area (1 000 sq. km)	21	of which:	
of which:		Glaciers	12
Cultivated area	1.1	Other area devoid of vegetation	67
Rough grazings	20		

### THE PEOPLE

Population, 31 December 2005	299 891	Occupational distribution, 2005 (per cent)	
Net increase 1995- 2005, annual average, %	1.1	Agriculture	2.5
		Fishing and fish processing	7.3
		Other manufacturing	10.7
		Construction, total	7.6
		Trade	13.6
		Transport and communication	6.7
		Other services	50.6

### PARLIAMENT AND GOVERNMENT

Present composition of Parliament:	2003
Independence Party	22
The Alliance Party	20
Progressive Party	12
The Left-Green Movement	5
The Liberal Party	4

Last general election: 10th May 2003

### PRODUCTION AND CAPITAL FORMATION

Gross domestic product in 2005		Gross fixed capital formation in 2005	
ISK million	995 990	ISK million	285 933
Per head, US dollars	53 555	Per cent of GDP	28.7

### FOREIGN TRADE

Exports of goods and services in 2005, % of GDP	31.5	Imports of goods and services in 2005, % of GDP	40.4
Main exports in 2005 (% of merchandise exports)		Imports in 2005, by use (% of merchandise imports)	
Fish products	56.7	Consumer goods	23.5
Aluminium	18.5	Capital goods and transport equipment	42.5
Other manufacturing products	15.8	Industrial supplies	24.7
Agricultural products	1.9	Fuels and lubricants	9.2
Miscellaneous	7.0		

### THE CURRENCY

Monetary unit: Króna		Currency units per US\$, average of daily figures:	
		Year 2005	62.9
		June 2006	74.6

## Executive summary

**I**celand's economy and per capita income have grown at an impressive pace since the mid-1990s, making the country one of the most prosperous in the OECD. However, growth has been volatile and accompanied by recurrent large external and internal economic imbalances that reflect in part major investments in the energy and aluminium smelting sectors but also buoyant credit-funded household demand. In the recent period, concerns about these developments have led to a decline in investor confidence and sharp exchange rate correction, boosting inflation. While exchange rate depreciation was widely anticipated, the major challenge for macroeconomic policy is to swiftly restore economic balance and to strengthen the policy framework in a way that would avoid the recurrence of recent problems. Another challenge is to ensure that the financial sector continues to contribute to good economic performance both by minimising the risk to stability and by completing reforms. Finally, human capital development is the key to sustaining the rise in prosperity achieved over the last decade.

### **Promote economic stability by swiftly restoring balance and strengthening the policy framework**

The implementation of monetary policy needs to be improved, so as to strengthen the credibility of the inflation target. In the near term, this implies that the monetary stance has to be tightened further until expected inflation is brought into line with the official target. Clearer communication could enhance the effectiveness of policy, likely leading to higher longer-term interest rates. The expansionary effect of tax cuts needs to be offset by additional expenditure restraint until domestic demand pressures abate. Budgetary control and enforcement mechanisms need to be strengthened to meet spending targets more effectively and the fiscal framework should become progressively more outcome-based. New major investment projects should not go ahead before economic imbalances have unwound and a comprehensive assessment has been made of their net benefits to the economy (taking account of resource use and environmental aspects). Greater transparency in the electricity sector would be helpful.

### **Continue financial sector liberalisation so as to foster growth and stability**

Although the financial system is believed to be broadly sound, it is advisable to continue efforts aimed at assessing its robustness and to take supervisory steps, if needed, to address possible shortcomings. The successful liberalisation of the financial sector could be completed in various ways. First, distortions in the housing market need to be removed. One way is to charge the Housing Financing Fund a fee reflecting the cost of the government guarantee and the required return to capital. Home ownership should instead be promoted through a means-tested grant for first home owners, rather than cross-subsidisation of mortgage rates. Second, remaining restrictions on indexation in financial markets should be repealed. Finally, to improve the financing of innovative start-ups, consideration should be given to whether government-sponsored investment funds should be run along private-sector lines.

**Adapt the education system to a rapidly changing economic environment**

*It is important that children from rural areas, who perform poorly in literacy tests, leave school with a set of basic competences. At the compulsory level, the focus should be on teacher quality and not quantity. Moreover, effective teaching time will need to be increased when some of the subject matter currently taught in upper-secondary schools is moved to the compulsory level in the context of a shortening of upper-secondary education. It needs to be ensured that this shortening does not undermine educational outcomes. Increased teaching time and a rapid and coherent adjustment of curricula can deliver this. Potential drop-outs should be encouraged to select vocational programmes. At the tertiary level, new legislation aimed at ensuring educational quality should be expedited, tuition fees should be introduced in public institutions, and instead of trying to offer a full range of programmes, studies abroad should be encouraged.*



## Assessment and recommendations

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### *Growth performance has been strong*

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Iceland's growth performance has been impressive. Over the past decade, its real GDP has grown by 4% per annum, significantly bettering OECD growth over that period. As result, per capita GDP has recovered most of the ground lost in a preceding spell of sluggish growth, making the country the fifth-wealthiest in the OECD on that benchmark. Most of the rise in trend growth reflects productivity gains following the implementation of widespread structural reforms, which opened the economy and enhanced competition. Financial-market liberalisation and privatisation have unleashed entrepreneurial dynamism. Many companies have expanded abroad, and the country now plays a role that belies the small size of its economy. Labour markets have been increasingly opened to foreign participants, helping to reduce labour market tensions.

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### *But the outlook is clouded by large macroeconomic imbalances*

---

This enviable growth performance has, however, been marred by high demand and output volatility and recurrent sizeable macroeconomic imbalances, which have tended to increase. The current level of excess demand is larger than in the previous boom in the late 1990s. The same is true for the current account deficit, which – at 16½ per cent of GDP in 2005 – is easily the highest in the OECD. At the same time, households and firms – in particular banks – have become highly indebted. Concerns about these developments have recently led to considerable financial market turbulence. The exchange rate and stock prices dropped sharply earlier this year, though from historically high levels. With rising import prices and capacity pressures in goods and labour markets, inflation has reached 8%. Excess demand not only reflects large-scale aluminium-related investment projects, but also surging household spending (on both consumption and housing). With hindsight, the response of macroeconomic policies to signs of overheating was insufficient. Secretariat projections suggest that, despite a slowdown in domestic demand due to higher interest rates and the gearing down of the investment projects, inflation pressures and external deficits will remain substantial in the near term. The recent wage agreement is intended to reduce uncertainty about the inflation outlook but will increase inflation in the short term. Against this backdrop, a further currency depreciation and an additional build-up of inflationary pressures cannot be excluded, implying a harsher adjustment process.

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### *Sustaining good economic performance poses a number of policy challenges*

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In the near-term, the priority is obviously to ensure the swift restoration of macroeconomic balance through a co-ordinated effort of monetary and fiscal policy. The economy has certainly exhibited a substantial degree of resilience and impressive capacity to adjust following the overheating episode of the late 1990s. But this time the imbalances are more severe and in the absence of swift and vigorous policy action financial market stability could be at risk. At the same time, there is room for strengthening the framework both of monetary and fiscal policy to make implementation more effective. This would reduce the risk of a re-emergence of economic disequilibria in the future. An issue concerning both the short- and longer-term outlook for the economy is the timing of, and decision process on, further large-scale investment projects. Another challenge is to make sure that the financial sector continues to contribute to good economic performance both by minimising risks to stability and by completing liberalisation (in particular in the housing market). Finally, adapting the education system to changing economic requirements is crucial to higher standards of living in the longer run. These challenges are discussed in some detail in this *Survey*. But this does not mean that structural reform would not be helpful in other areas (such as the energy sector, where public ownership and ownership restrictions limit competition, and in the agricultural sector, which is still heavily subsidised and regulated).

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### *Monetary policy will have to be tightened further to return inflation to the target*

---

The monetary policy framework introduced in 2001 is being put to the test. The objective of the Central Bank is to stabilise consumer price inflation around 2½ per cent, since delivering low, stable inflation is considered to promote good economic performance. However, not only has inflation exceeded the official target since 2004 (by as much as 5½ percentage points recently), but it is also expected to remain above the target for the foreseeable future. Surveys of businesses and households, bond market quotes, forecasts of financial analysts and the Central Bank's own projections all point to excessive inflation over both the near- and medium term. Although some of these forecasts were recorded some time ago, yield differentials from the bond market indicate that the inflation outlook has worsened considerably in recent months. Hence, *the Central Bank needs to raise interest rates substantially so that inflation is brought back to the target*. If inflation expectations are allowed to continue drifting upwards, this will jeopardise the wage formation process and increase the sacrifice ratio. *The Central Bank needs to re-establish the credibility of its commitment to the target through firmer policy and clearer communication*. In line with recent Central Bank statements, *it would be advisable not to call the thresholds at which reports are required "tolerance limits"*, because this seems to have led to a widespread misperception that inflation near the upper limit is acceptable. *The government needs to ensure that its agreement with Central Bank on the inflation target is being implemented*. *If no progress is made in achieving the target, then accountability mechanisms would need to be strengthened*.

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### *Longer-term interest rates also need to increase*

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Although nominal short-term interest rates have been raised substantially – by 7½ percentage points since mid-2004 – this has not translated into real lending rates, which remain low despite a recent up-tick. There are several reasons for this, but one possibility is that financial markets do not expect the policy rate to stay high. *Clear communication is needed to prevent misperceptions about future interest-rate developments.* The authorities have introduced a pre-announced schedule for monetary policy meetings that conclude with a public announcement of the Central Bank's decision regarding its policy rate. Moreover, the Bank's statements have provided increasingly clear guidance about the likely evolution of policy, although progress has been uneven. These developments are welcome and should continue.

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### *Fiscal policy should be more supportive of monetary action*

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From a longer-term perspective, the government's fiscal position is sound in international comparison; the public debt-to-GDP ratio is low and pressure arising from ageing-related public expenditure is seen to be moderate due in part to the country's occupational pension system having become fully funded. The government's medium-term fiscal programme rightly aims at maintaining fiscal balance, with a substantial surplus having been achieved in the current upswing. However, while monetary tightening aimed at curbing inflation pressures continues, the fiscal stance, as measured by the change in the cyclically-adjusted primary balance, is estimated to be loosening inappropriately in 2006. The main reason for this is substantial tax cuts decided in 2003 for structural reasons. With macroeconomic imbalances considerably wider than expected when the 2006 budget was adopted, a tightening of fiscal policy is required. *The expansionary effect of tax cuts needs to be offset by additional spending restraint so long as there is no clear evidence that the economy is cooling down.* This could be achieved, for example, through wage moderation and delaying public investment. Indeed, the government recently announced further postponement of large public projects (of both the central government and large municipalities) going forward. *The authorities should maintain a tighter fiscal stance in the 2007 budget through below trend real expenditure growth. It is important that local governments also take part in these stabilisation efforts.*

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### *Public expenditure control needs to be reinforced*

---

Spending overruns remain an issue. Government expenditure has not only continued to overshoot nominal budgeted levels but has also exceeded the medium-term growth ceilings for public consumption and transfers in real terms. This slippage both undermines the role of fiscal policy in demand management and limits the scope for tax reductions that are in principle desirable for supply side reasons. *To enhance spending discipline, the process of budget planning and execution needs to be tightened.* This requires stricter enforcement of existing regulations and generalised use of output-based budgeting. So far, medium-term projections of budget items in nominal terms have been purely indicative and the deviation from initial projections for areas such as education has been large. *To further strengthen the medium-term orientation of expenditure policy and control, the introduction*

*of multi-year budget plans should be considered, with spending limits set to rigorously limit real spending growth, but then made binding in nominal terms. Expenditure pressures have been particularly strong at the municipal level. Hence, binding annual agreements between the central and local governments should ensure the achievement of national spending objectives.*

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*Decisions on new power intensive projects are crucial to longer-term performance*

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Large-scale aluminium-related investment projects are becoming bigger from cycle to cycle. The government is encouraging such projects to make use of Iceland's wealth of renewable energy sources, and three new projects are now in the planning phase even before those under construction are completed. Altogether, the new projects are bigger by one half than those under way, which already dwarf those built in the 1990s. From a stabilisation perspective, the timing of any such projects is crucial. *New large-scale investment projects should not begin before macroeconomic imbalances have been corrected and inflation pressures have abated.* Moreover, if all the new projects go ahead, the share of aluminium in total goods exports would likely exceed 50%, implying a return to the situation when marine products dominated Iceland's exports, although the aluminium sector's share of the country's value added would be much less important. Hence, *the impact of a further expansion of the aluminium industry on the volatility of the economy should be taken into consideration.* Finally, there is a question as to the overall net benefits of such projects. As recommended in last year's Survey, *future expansions of energy-intensive industries should be evaluated on the basis of a broad, transparent cost-benefit framework, taking into consideration factors such as the appropriate rent for the use of natural resources, the environmental impact, the allocation of risks and the implications for macroeconomic performance.* So far, such a comprehensive framework that would allow an assessment whether the projects are beneficial to the country and should go ahead is not in place, although the companies involved obviously try to evaluate their profitability and the authorities carry out environmental impact assessments. In any case, *the energy sector should be opened to foreigners and the public sector should withdraw from electricity generation with a view to enhancing transparency and competition, levelling the playing field and reducing the taxpayer's exposure to the risks resulting from power investments.*

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*The financial market has expanded and is reported to be basically sound*

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Financial markets in Iceland are thriving and access to capital has greatly improved. A significant part of the responsibility for this development lies with government policy. Controls over the operation of financial markets have been lifted, commercial banks have been privatised and the sector has been opened up to international capital markets. *This liberalisation programme has succeeded admirably and should be continued.* Although supervisory and rating agencies believe that the financial system is broadly sound, the rapid growth of Iceland's banks has raised concerns about financial stability. Stress tests suggest that the banks' capitalisation can withstand very large shocks. Nonetheless, *the authorities should continue efforts aimed at assessing the robustness of the financial system and take supervisory steps, if needed, to address possible shortcomings, including related to liquidity management.*



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### Distortions in the housing market need to be reduced

---

The Housing Financing Fund (HFF) has advantages over other housing lenders that prevent fair competition, distort the allocation of resources and impede innovation. The government has announced its intention of moving the HFF into wholesaling of mortgages. While this is welcome, it could give rise to a conflict of interest between wholesaling and retailing activities, so *the authorities should consider splitting the HFF into two separate entities*. The more important priority is to remove or neutralise distortions in direct lending, in particular the government's guarantee of HFF borrowing. One way of doing this would be to restrict HFF lending as the government has recently announced. *A preferable approach may be to charge the HFF a fee to level the playing field, in particular to cover the cost of the government guarantee and the required return to capital*. This would presumably result in a substantial reduction in the role of the HFF in direct mortgage lending. Measures such as these would alleviate the need for tight monetary policy and thus reduce pressures on the exchange rate. The social objectives of the fund should be addressed more transparently and cost-effectively through targeted transfers. For example, *home ownership could be promoted through means-tested grants for first home owners, rather than cross-subsidisation of mortgage rates*. Means-tested grants might also be preferable to the housing subsidy currently arising from the tax deductibility of mortgage interest payments.

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### There is little reason to restrict indexation in financial markets

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An unusual feature of Iceland's financial markets is the widespread indexation of loans to inflation. This practice is generally sensible for the borrowers and lenders involved as it eliminates the risk that unanticipated inflation may change the real value of their loans, and it may have wider benefits. However, the practice is restricted by prohibitions on indexation of bank deposits and loans. *Remaining restrictions on indexation in financial markets have no clear rationale and should be repealed*.

---

### Providing sufficient funding for innovative start-ups is a challenge

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One area where financial markets do not seem to work well is the financing of innovative start-ups. This is a difficult problem encountered in most countries and best-practice guidelines are not obvious. The New Business Venture Fund has attempted to address some of the problems in this area but its performance so far has been disappointing. While lessons have been learned, there is understandable reluctance to repeat past failures. The government has proposed that some of the proceeds from the sale of Iceland Telecom go to a new investment fund – with pension funds and financial enterprises also invited to contribute – which would be directed towards firms in their early expansion phase, where there is a perceived gap in the market. *Consideration should be given to whether government sponsored investment funds should not be run along private-sector lines*.

---

### *Human resource development is essential to future economic performance*

---

With the growing importance of sectors such as financial intermediation, demand for a skilled workforce has increased. Human capital formation is also essential for the development of technology- and knowledge-intensive industries, whose share in Iceland's value added is still quite low. The authorities revamped the education system in the mid-1990s and further major reforms are being implemented or under consideration. They have also considerably increased education expenditure, which is now the highest in the OECD relative to GDP. Nonetheless, generating a qualified labour force across the whole skills spectrum that is able to adapt to changing market needs remains a challenge. Despite greatly increased funding, educational achievements at the end of compulsory schooling, as measured by PISA test scores, are disappointing compared to other countries, with few signs of improvement. Moreover, there is a persistent gap in between low skilled and high skilled in the labour force. While upper-secondary graduation rates have improved recently, they are still comparatively low, and other member countries have made more progress in this respect. Thus, relative to the OECD average, attainment at the end of upper-secondary schooling is now less favourable for younger people than for older people. By contrast, the proportion of those who acquire higher education qualifications is satisfactory by international comparison.

---

### *Compulsory education needs to produce better results at lower cost*

---

The devolution of responsibility for the funding and operation of compulsory schooling to the municipalities ten years ago reflected a general trend towards decentralisation in Iceland as well as the belief that the system should be more responsive to local needs. Outcomes have not been satisfactory so far. While per student spending has grown sharply due to a strong rise in the number of teachers, this has not been reflected in educational achievements, which are depressed by poor test scores of young males in rural areas. *Policies should be directed at ensuring that children from rural areas, who perform poorly in PISA ratings, leave school with a basic set of competencies in reading, mathematics and problem-solving.* The strong expansion in teaching staff has not been accompanied by a rise in average qualification and the proportion of licensed teachers is unacceptably low in some rural areas. *To narrow regional differences in educational achievement, the share of qualified teachers in rural areas should be increased. More generally, the focus should be on teacher quality rather than quantity.* This implies a reconsideration of the evaluation system. *If schools' self-evaluation procedures remain unsatisfactory, the central government's quality control has to be re-enforced.* The shift of some subject matter to compulsory education in the context of broader reforms should have positive effects on student achievements, provided it is accompanied by increased teaching hours. Hence, *to accommodate the enrichment of the curriculum at the compulsory level, the effective teaching time – which is an unusually low proportion of teacher's working time – will need to be increased.*

### Upper secondary attainment is still unsatisfactory

One reason for relatively low upper-secondary attainment may be the unusually long time it takes to acquire such a qualification. Most students take the university entrance examination only at the age of 20. The authorities are preparing reforms that will reduce the duration of upper-secondary education by one year, while lengthening the school year somewhat. *It needs to be ensured – via an increase in teaching time and a careful adjustment of curricula – that the planned reduction in the duration of upper-secondary schooling does not adversely affect educational quality and outcomes.* Whereas students now all tend to complete both lower and upper secondary education at about the same age, *the best performing among them should be encouraged to make use of the existing flexibility and finish studies earlier.* A long standing problem is the stagnation of vocational graduation rates, apparently reflecting the low reputation of this track. *Potential drop-outs should be encouraged to select vocational programmes through increased counselling and a broader choice of programmes.*

### Higher education needs to maintain high standards in the face of enormous student inflows

The major issue regarding higher education is that quality might suffer in the face of an explosion of enrolment, which has doubled over the last decade, leading to substantial spending pressures. Legislation that becomes effective in mid-2006 addresses these concerns. *The new legislation governing higher education, which aims to ensure educational quality by stricter certification and evaluation requirements is welcome and should be swiftly implemented.* An issue not dealt with is the introduction of tuition fees in the public sector. *Given the private returns to higher education, tuition fees should be introduced for public institutions, with a view to reducing the length of education, making institutions more responsive and providing a much needed source of finance.* At the same time, the income-contingent student loan programme could be improved. Another concern is the fact that the rapid expansion of higher education and development of a more comprehensive system has crowded out studies abroad. With those studying abroad stagnating, their proportion has rapidly declined. *Instead of trying to offer a full range of tertiary programmes, studies abroad should be encouraged, in particular at the graduate and doctoral stages of higher education.*



## Chapter 1

# Policy challenges in sustaining improved economic performance

*Iceland's growth performance has considerably improved since the mid-1990s thanks to the widespread implementation of structural reforms. Financial-market liberalisation and privatisation, for example, have fostered entrepreneurship and investment. As a result, part of the previous relative decline in per capita GDP has been reversed over the past decade, and the country's standard of living has remained among the highest in the OECD area. However growth has been volatile and accompanied by recurrent sizeable economic imbalances and tensions, only partly reflecting major aluminium-related investment projects. Consequently, a key challenge for policy is to enhance macroeconomic stability by ensuring an orderly unwinding of current imbalances and inflation pressures and avoiding their re-emergence in the future. Another challenge is to make sure that the financial sector continues to contribute to good economic performance by both minimising risks to stability and completing reforms in this area. Finally, the changing structure of the economy away from traditional activities like fisheries requires further efforts in the field of human resource development.*

## Trend growth has steepened...

The Icelandic economy expanded at an annual rate of about 4 per cent over the last decade. This is a marked improvement from the preceding ten-year period, when economic growth averaged only 2%, and considerably exceeds OECD growth performance, which has remained broadly unchanged at under 3% (Table 1.1). At the same time, real GDP per capita accelerated to a rate of around 3% *per annum* and Iceland recovered much of the ground lost in the late 1980s and early 1990s relative to the OECD benchmark (Figure 1.1). By 2005, its per capita GDP was the fifth-highest in the OECD. To a large extent, the improved growth performance is attributable to much higher productivity gains. Nonetheless, the level of Iceland's labour productivity is still below the OECD average. The more favourable ranking in terms of per capita GDP is the result of a very high labour force participation rate (due, among other things, to low tax incentives for early retirement). As discussed in last year's *Survey*, relatively poor labour productivity likely reflects the country's economic structure and below-average educational attainment (see below). With labour utilisation already very high, sustaining the recent pace of productivity growth is the key to maintaining the country's high relative standard of living.

Table 1.1. **Relative longer term performance**

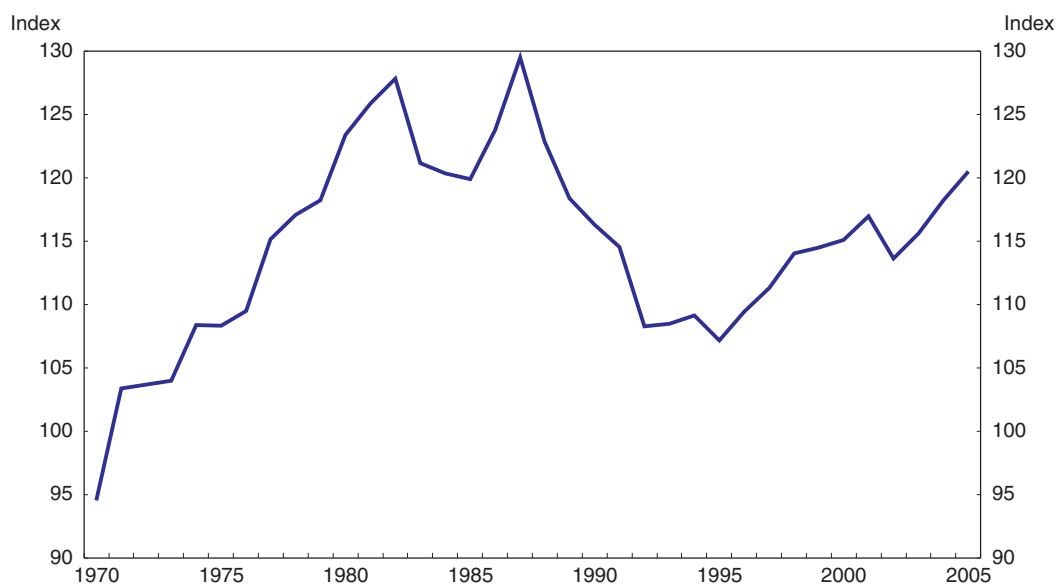
	Iceland		OECD	
	1985-95	1995-2005	1985-95	1995-2005
Real GDP <sup>1</sup>	2.0	4.1	2.9	2.7
Real GDP per capita <sup>1</sup>	1.0	3.1	2.1	2.0
Labour productivity <sup>1</sup>	0.9	2.6	1.6	1.6
Labour force participation rate <sup>2</sup>	86.7	85.7	69.6	70.8

1. Average per cent change.

2. Average level in per cent.

The acceleration in activity is somewhat overstated by the fact that a decline in fish stocks depressed economic growth in the late 1980s and early 1990s. However, the country took advantage of this difficult period, consolidating public finances and launching an extensive programme of privatisation and market liberalisation. Gradual deregulation culminated in membership of the European Economic Area (EEA) in 1994 and liberalisation of the bulk of cross-border capital flows in the following year. EEA membership was a watershed insofar as it obliged Iceland to align its legislative and regulatory framework to that prevailing in the European Union and to open up the economy. Following the privatisation of 33 companies and government agencies, only the energy sector is still publicly owned. The other major exception towards the trend toward liberalisation has been agriculture, which continues to be widely supported by government subsidies, price intervention, import protection and a system of production quotas. The macroeconomic and structural reforms have enhanced competition and economic efficiency and have

Figure 1.1. **Relative GDP per capita**  
2000 PPPs, OECD = 100<sup>1</sup>



1. 26 countries, preliminary data for 2005.

Source: OECD National Accounts.

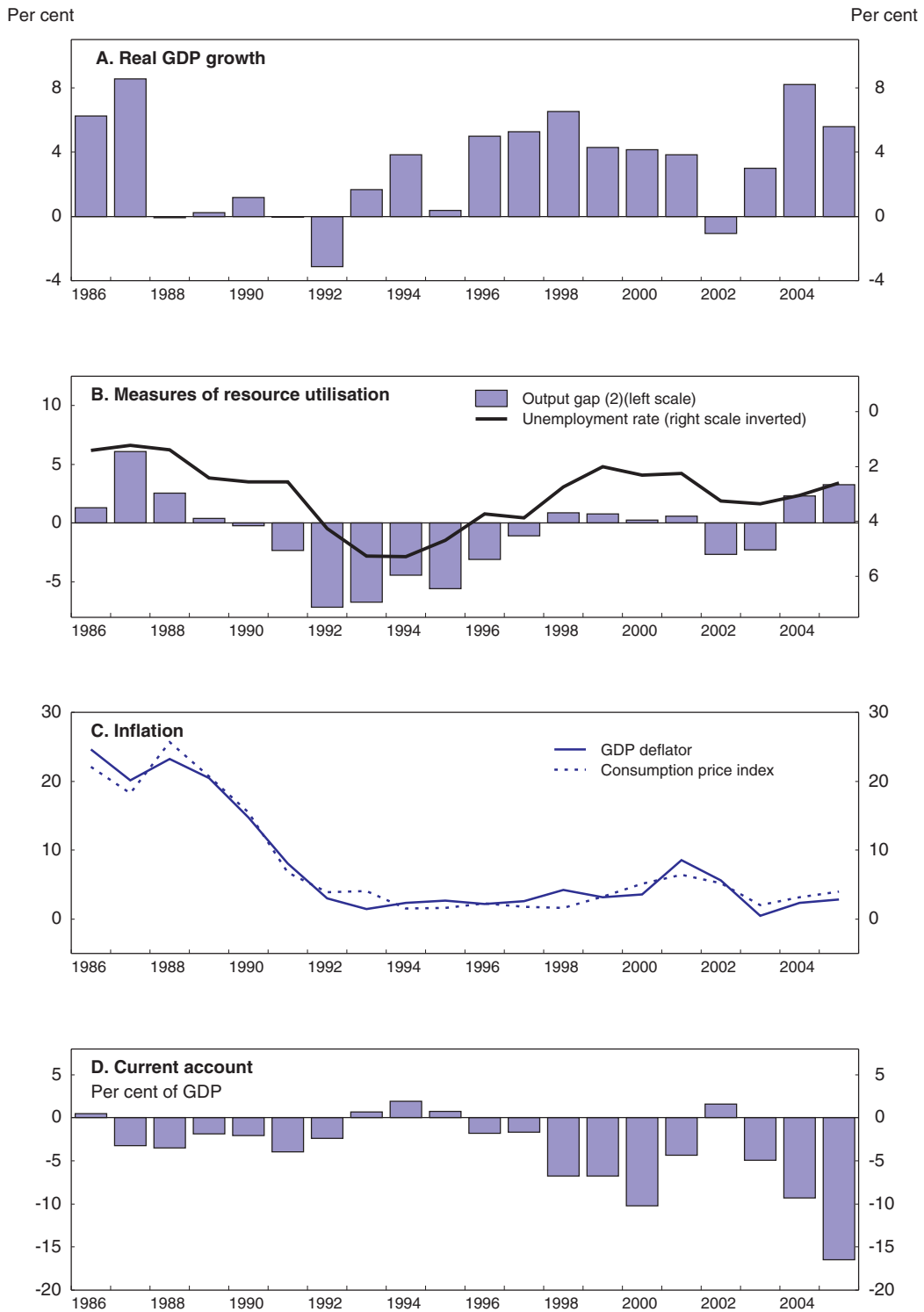
unleashed the dynamism of entrepreneurs. In recent years, many companies have expanded their operations abroad, in most cases through the acquisition of foreign companies.

### ... but growth has been volatile and accompanied by imbalances and tensions

The Icelandic economy has traditionally been very volatile and largely independent from the international business cycle. For a long time, swings in the fish catch and export prices of marine products were the leading source of fluctuations in output growth. However, despite the rising share of the service sector and a diversification of exports, growth variability has remained pronounced (Figure 1.2, Panel A). This has been associated with recurrent serious macroeconomic imbalances. Over the last decade the economy has twice overheated, requiring each time drastic corrective policy action. Substantial excess demand (that is, a positive output gap) emerged in the late 1990s and again in 2004 (Figure 1.2, Panel B). Inflation has certainly fallen considerably since the 1980s when it was in the double digits, but its variability (in terms of its standard deviation) is still among the highest in member countries (Figure 1.2, Panel C). And the external current account has displayed wide swings, with the deficit recently reaching record levels even by Icelandic standards (Figure 1.2, Panel D).

Reducing growth volatility is important because there are likely to be payoffs from achieving it *via* reduced uncertainty and hence less misallocation of resources. To some extent, high output volatility reflects the size of the economy. Cross-country analysis shows that economic fluctuations tend to be the more pronounced the smaller the economy. But even taking that into account, output volatility (as measured by the standard deviation of the annual percentage growth rate) is high (Figure 1.3, Panel A), although it has diminished somewhat since the 1970s and 1980s. Where Iceland stands out, however, is

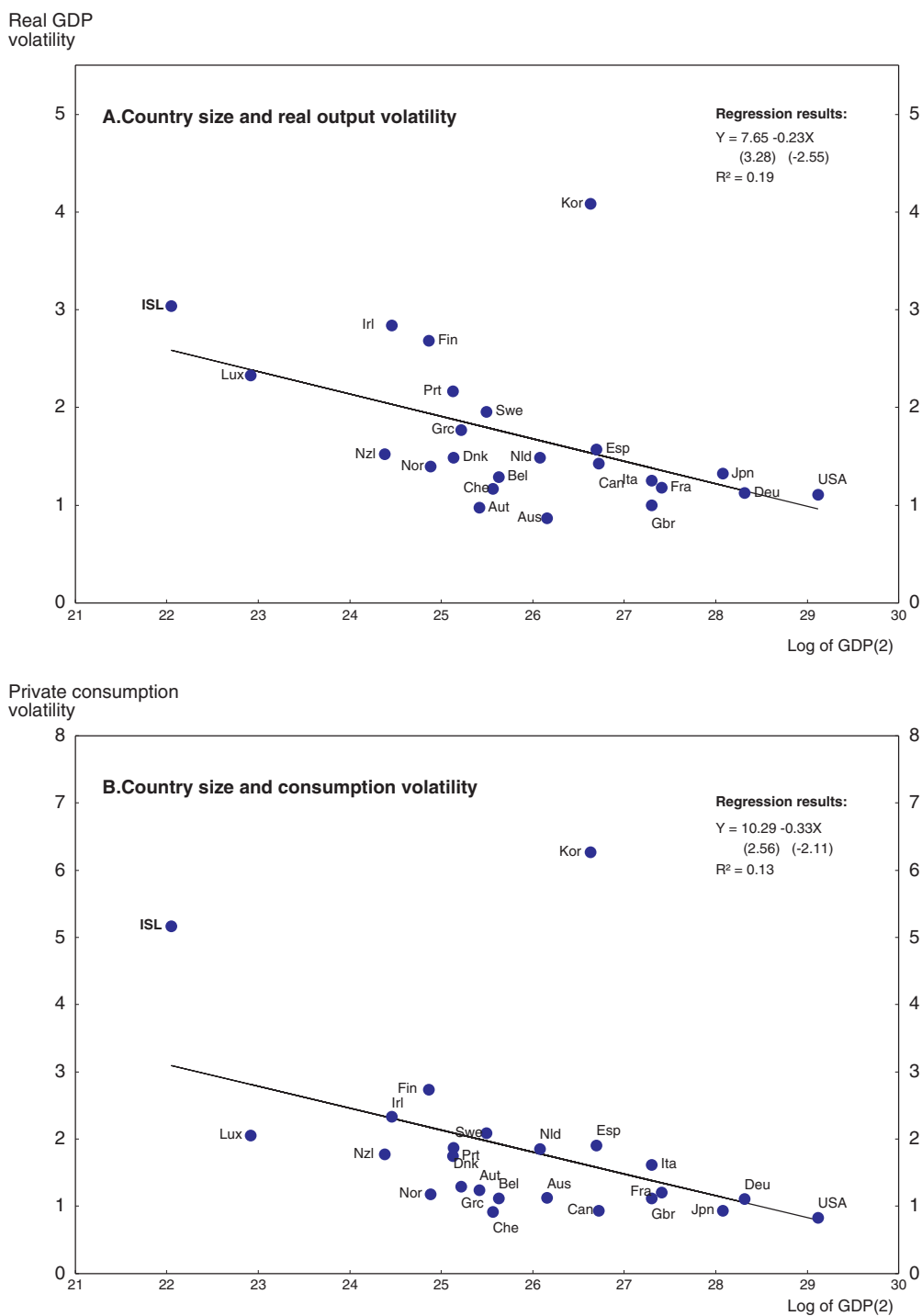
Figure 1.2. **Aggregate economic indicators**



1. Percentage difference between output and estimated potential output.

Source: OECD, Economic Outlook 79 database.



Figure 1.3. **Country size and volatility of real output and consumption growth**<sup>1</sup>

1. Volatility is defined as the standard deviation of the annual percentage growth rate from 1992 to 2005.
2. GDP in dollars at purchasing power parities, average 1992 to 2005.

Source: OECD calculations.

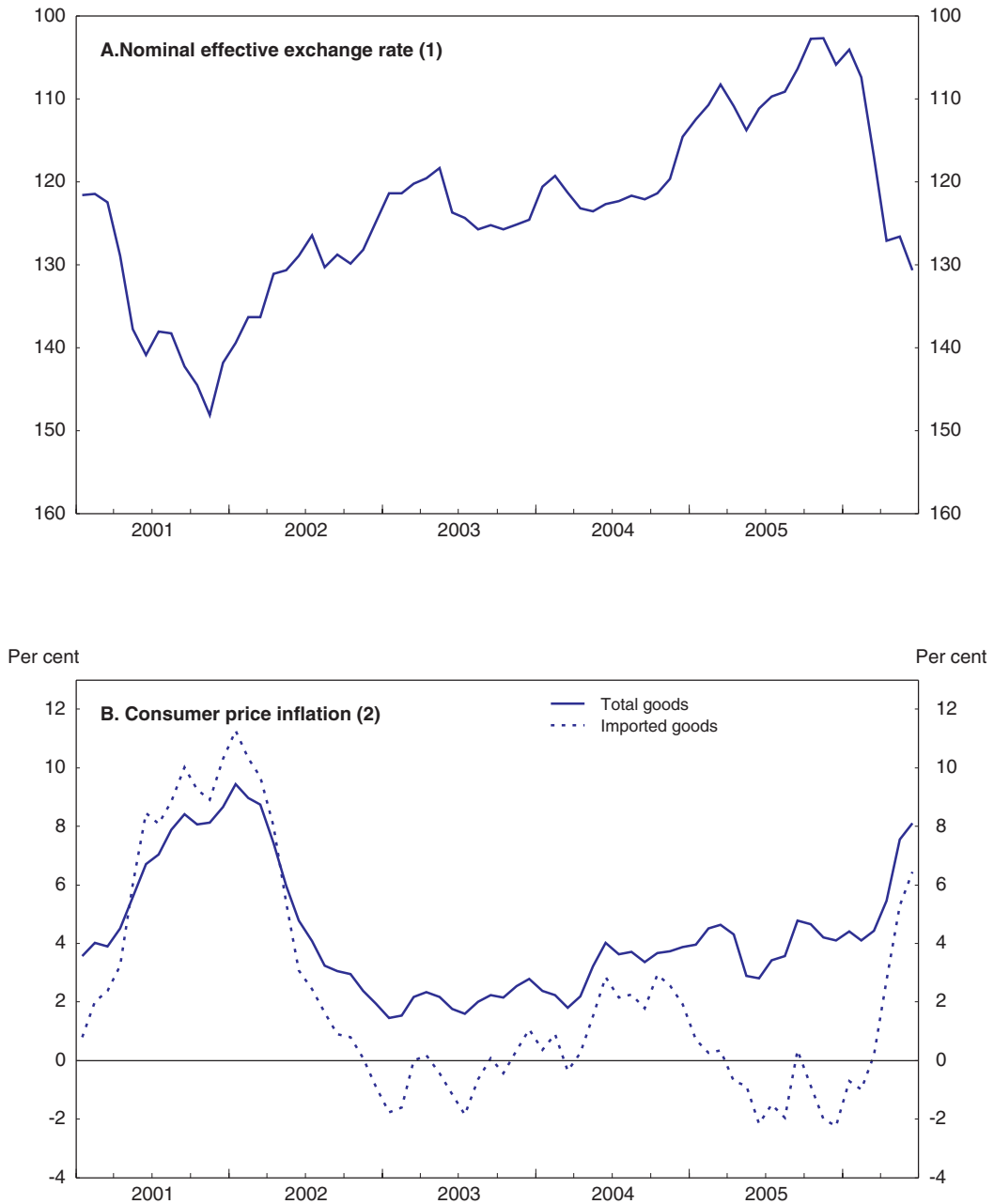
the volatility of private consumption, which since the early 1990s has been higher by one-half than might be expected on the basis of the size of the economy (Figure 1.3, Panel B). At the same time, export variability has decreased significantly in line with the falling share of marine products in total exports. Thus, over time, instability of internal demand has become relatively more important as a source of overall output volatility and also seems to play a greater role than in other countries with highly variable economic activity.

The last two business cycles have in many ways been similar, although they differ with respect to the relative importance of the factors contributing to overheating. Aluminium-related investments in the late 1990s were much smaller than the current ones. While they peaked at over 4% of GDP in 1998, they are estimated to reach 11½ per cent of GDP this year before falling back. Thus, their spill-over effect on private consumption was limited during the expansion in the second half of the 1990s, when consumer spending instead was boosted by financial market liberalisation and easier access to credit. The wealth effect on private consumption is also greater in the current expansion. In 2003-2005, household net wealth increased by around 60%, almost double the rise in the late 1990s. This reflects the stronger growth in housing prices this time. As discussed in more detail in Chapter 4, this can partly be traced to the unexpected entry of private banks in the mortgage market in 2004, where they engaged in head-on competition with the state-run Housing Finance Fund. The resulting massive increase in credit supply contributed to the surge in housing prices, which not only underpinned consumer spending but has also exacerbated consumer price inflation. On the other hand, the extensive use of foreign labour in the construction phase of the power-intensive investment projects (amounting to 70% at the end of 2005) helped to limit tensions in the labour market, although unemployment nonetheless dropped well below its structural rate, putting upward pressure on wages. The authorities have continued their policy of opening the labour market to foreign participants, lifting the ban on the inflow of people from the new EU member countries on 1 May 2006.

Despite these differences, what the two cycles have in common is that in both cases the macroeconomic policy response to mounting demand pressures on productive capacity was insufficient to cool down the economy in time to avoid the need for a substantial adjustment. It is true that structural reforms have increased the economy's resilience, as illustrated by the relatively soft landing achieved earlier in this decade. However, imbalances – and adjustment needs – have increased over time. For instance, according to Central Bank estimates, only one-third of the current account deficit of 16½ per cent of GDP in 2005 can be directly attributed to the large-scale aluminium-related projects. This means that the deficit that is not explained by the imports of goods and services associated with these projects is broadly the same as the total deficit in 2000, when it peaked at the end of the last boom. Even including indirect effects on household spending, the impact of the mega projects is estimated to account for not more than one-half of the current account deficit.

### **Near-term economic prospects are surrounded by a number of risks...**

As at the turn of the century, the adjustment process in the current cycle was triggered by a sharp fall in the effective exchange rate (Figure 1.4, Panel A). The incipient depreciation of the Icelandic króna accelerated after Fitch Ratings downgraded the outlook for long-term Icelandic Treasury securities from stable to negative on 21 February this year, stating that imbalances and overheating in the economy had exceeded expectations and

Figure 1.4. **The exchange rate and inflation**

1. Inverted scale. A rise therefore indicates an appreciation.

2. Year-on-year percentage change.

Source: Statistics Iceland and Central Bank.

that the fiscal stance was placing too large a burden on monetary policy to rein in the economy. With several other negative reports by bank analysts adding to the resulting uncertainty among foreign investors, the exchange rate dropped by about 25%. The abrupt exchange rate correction partly reflected foreign investors' reassessment of their exposure to Icelandic markets, but also the fact that – because of its economic imbalances – the country had become a prime target for the so-called international carry trade, in which investors borrow at low interest rates in the biggest financial markets and invest the proceeds in smaller, higher-yielding – albeit riskier – economies. With interest rates rising worldwide and cheap funding for speculative investment being called into question, some foreign investors closed their positions in Iceland (and in other high-yielding countries) – a process that has placed downward pressure on the króna, which in turn has prompted other investors to repatriate their capital too. The decline in the nominal effective exchange rate so far has largely reversed the preceding appreciation over the past two years or so (owing to massive capital inflows which easily financed the sizeable external deficit). The real effective exchange rate is now close to its long-term average and at a level that should be sustainable for the exposed sectors of the economy.

The initial effect of the sharp exchange rate depreciation has been a surge in consumer price inflation, which rose from around 4% in February to 8% in June (Figure 1.4, Panel B). This followed upon a period of broad stability since 2004, when import prices actually dampened inflation as the króna appreciated significantly, offsetting mounting resource pressures. By 2005, the output gap exceeded 3%, according to Secretariat estimates. And with labour market slack exhausted, annual wage growth reached 8½ per cent in early 2006. Given that the Icelandic consumer price index includes the cost of owner-occupied housing, soaring house prices have meant that this item has been a major source of headline inflation. But even if that item is excluded, as it is in many other countries, consumer price inflation now exceeds the authorities' 2½ per cent target by a wide margin.

Against this backdrop, the economic expansion is projected to slow down markedly in the period ahead, as the aluminium related investments near completion and household demand is adversely affected by high interest rates (Table 1.2). The downturn is dampened by personal income tax cuts this year and next and by accelerating exports as aluminium production in the new facilities commences and the lower exchange rate improves Iceland's competitive position. Nonetheless, the current account deficit is projected to drop below the 10% of GDP mark only during the course of 2007. Inflation is expected to rise further in the near term before edging down to 4% at the end of the projection period as the effects of house price increases moderate and capacity pressures diminish.

The major risk to the outlook is a harder landing of the economy associated with a sharp further correction in the exchange rate – which is assumed to remain constant at the level of early May in the Secretariat projections – in the face of a still sizeable current account deficit. Net external debt is already easily the highest among OECD countries, leaving the economy more exposed to exchange rate volatility (Figure 1.5). Iceland's negative international investment position is less exceptional, reflecting Icelandic residents' large-scale acquisitions of foreign equities funded with foreign capital, but it will rise further given persistent large current account deficits. A further substantial depreciation of the króna would require higher-than-assumed interest rates to put inflation on a downward track. The recent wage agreement should reduce uncertainty about the inflation outlook but will add to price increases in the near term. Another risk is

**Table 1.2. Short-term projections**  
Percentage change, volumes

	2005	2006	2007
Private consumption	11.9	5.3	0.8
Government consumption	3.2	2.5	3.0
Gross fixed capital formation	34.8	10.9	-14.7
Final domestic demand	14.9	6.1	-2.7
Change in stockbuilding <sup>1</sup>	0.0	-0.1	0.0
Total domestic demand	14.9	6.0	-2.7
Exports of goods and services	3.5	8.9	10.0
Imports of goods and services	28.4	13.1	-2.3
Change in foreign balance <sup>1</sup>	-10.2	-3.1	4.5
<b>GDP</b>	5.6	4.1	1.4
GDP implicit price deflator	2.9	4.2	4.3
Consumer price index	4.0	5.6	5.3
Unemployment rate ( per cent)	2.6	2.1	2.2
Current balance <sup>2</sup>	-16.5	-15.4	-10.4
General government financial balance <sup>2</sup>	3.2	2.0	-0.1
Short-term interest rate	9.0	12.6	10.5
Long-term interest rate	9.0	10.3	9.2

1. As a percentage of GDP in the previous year.

2. As a percentage of GDP.

Source: OECD Economic Outlook 79.

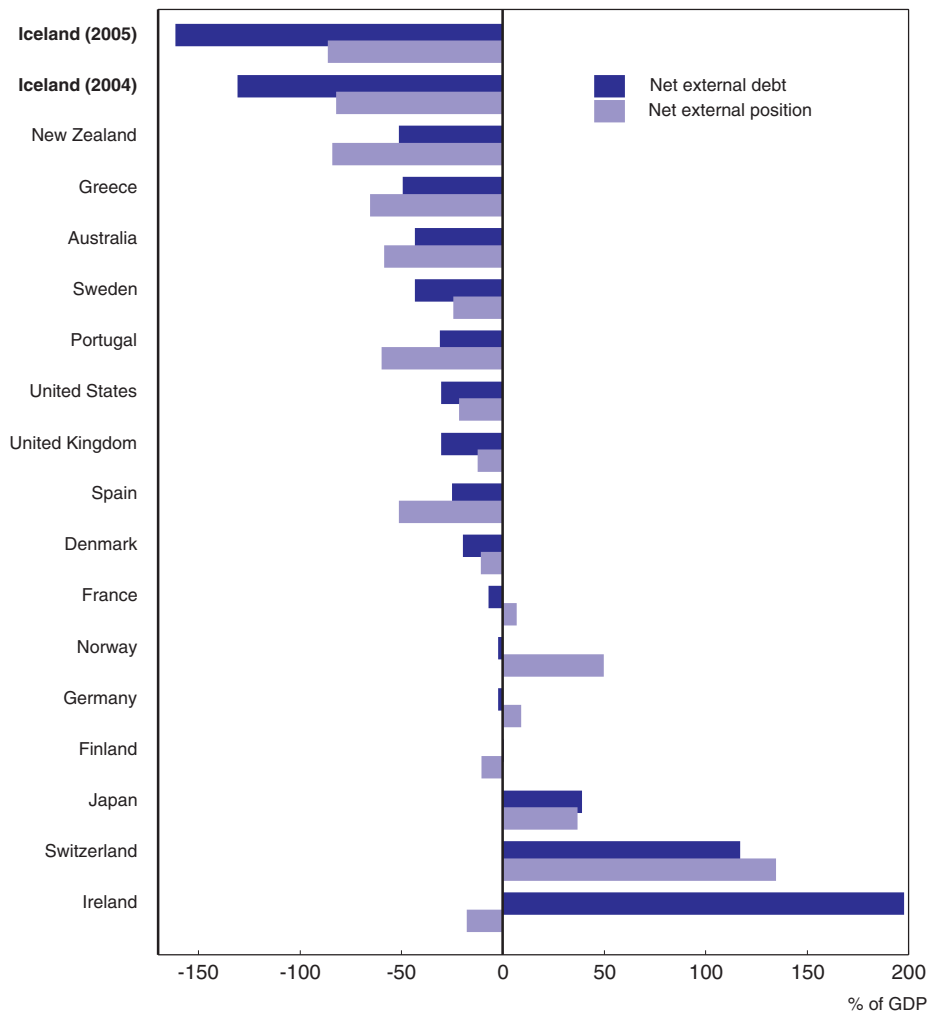
a plunge in asset prices (especially house prices), causing a drop in the financial resources households have at their disposal and hence in spending on private consumption and residential investment. Partly offsetting this, however, inflation would slow down, creating conditions for reducing interest rates sooner than otherwise.

### ... and decisions about further large-scale investments will be crucial to the medium-term outlook

In a medium-term perspective, the timing of further large-scale aluminium and power sector investments is crucial to economic stability. It seems now fairly likely that work will begin on new projects before the adjustment that is currently looming has been delivered in full. It is even possible that some of them will be launched immediately after the current ones are completed next year (see below). If these plans materialise, demand would recuperate earlier, reflecting both the direct and indirect effect of the investments. But inflation expectations would remain high, complicating the stabilisation task of monetary policy. Moreover, stronger demand would lead to a renewed widening of the still high current account deficit. At the same time, the króna may appreciate again, which would dampen inflation but squeeze the exposed sector and delay external adjustment. Hence, it is obvious that the impact that any new investment projects would have on Iceland's macroeconomic balance will need to be examined carefully before they are launched. Also, it is clear that it would be better if they were spread over a long enough period to represent a lower proportion of GDP than the wave of investments that are currently under way. The authorities have the means to ensure that, since the projects need local government authorisation and Parliamentary approval (except they do not require any special treatment) and because electricity would have to be provided by publicly owned utilities.

Figure 1.5. **Net external debt and net international investment position**

End of 2004



Source: International Monetary Fund, Central Bank of Iceland.

The new projects under consideration are the expansion of the Alcan aluminium smelter in Straumsvik (near Reykjavik), a new smelter for Alcoa near Husavik in the northeast, and a new aluminium plant for Century Aluminium's subsidiary Nordural in Helguvik in the southwest (Table 1.3). The expansion of the Alcan smelter could begin next

Table 1.3. **New power intensive projects under consideration**

2007-15	Production capacity t/y	Investment cost power	Investment cost plant	Investment cost power and plant	Time
Extension Alcan plant Straumsvik	280 ths. t/y	80 billion ISK (hydro+geo)	80 billion ISK	160 billion ISK	2007-2010
Alcoa NE Iceland	250 ths. t/y	60 billion ISK (geo)	75 billion ISK	135 billion ISK	2010-2015
Century SW Iceland	250 ths. t/y	60 billion ISK (geo)	75 billion ISK	135 billion ISK	2008-2015
Total increased capacity	780 ths. t/y				
Total cost		200 billion ISK	230 billion ISK	430 billion ISK	

Source: Central Bank of Iceland.

year and be completed in 2010. Considerable preparation work has already been undertaken and an environmental impact survey has been completed. An agreement has been signed with Reykjavik Energy (a regional utility) for the supply of 40% of the power requirements using geothermal generation, with the National Power Company (Landsvirkjun) providing the remainder from hydro-power stations (Alcoa is currently negotiating with Landsvirkjun about electricity prices). At the beginning of March, Alcoa and the Minister of Industry signed an agreement to carry out detailed feasibility studies for the planned smelter in the northeast. Construction was originally supposed to begin in 2010, but Alcoa has recently declared its interest in starting construction work as soon as work on its new aluminium plant being built in the east of Iceland is operational later next year. However, geothermal stations have to be developed in the region (probably by Landsvirkjun). Nordural and the local authorities have already signed a joint action plan for the new smelter in the southwest, which would be constructed in two stages from 2008 to 2015, with regional companies supplying power generated from geothermal steam. The project has gathered momentum with the departure of the US army from its base in the area, and with power supply ensured by a recent agreement, construction of the aluminium smelter could start as soon as late next year.

The total cost of the smelters and power facilities could amount to as much as ISK 430 billion, as compared to around ISK 300 billion (28% of GDP) for the currently developed projects. Assuming that construction proceeds at an even pace in the years 2008 to 2015, annual economic growth would over this period be about 1% higher on average than otherwise. By comparison, the average growth effect of the current projects is 1¼ per cent per annum from 2003 to 2007, with growth contributions of 2% in each of 2005 and 2006. When the projects under way will be completed next year, Iceland's aluminium production capacity will triple and amount to 3 to 4% of world production. If all the investments under consideration go ahead, capacity would double again and Iceland may produce as much as 6% of the world's aluminium. By 2008, aluminium is expected to account for 40% of the country's exported goods. It has been pointed out that aluminium would then take over the dominant role that cod had around 1980, when it represented the same proportion of exports. Should all the envisaged projects proceed, aluminium's share in good exports would probably exceed 50% and by far surpass those of total marine products. Such comparisons are somewhat misleading since the share of income accruing to domestic agents is much lower in the aluminium industry (see below). Still, research discussed in last year's *Survey* suggests that, after decreasing, economic volatility might again rise. Another consequence could be that government revenues become more volatile since the price of energy supplied by the public National Power Company is linked to the price of aluminium, which fluctuates greatly.

The authorities have actively promoted a further development of Iceland's aluminium industry. The principal argument for going in this direction is the enormous amount of untapped renewable energy still available; after the completion of the projects underway next year less than one-third of Iceland's estimated potential for electrical power generation will be used. But regional policy considerations also play a role. As to the latter, it can be argued that they could be pursued in a more cost-effective way by other means. In the construction phase, recent experience shows that the effect on domestic employment is limited (foreigners have accounted for three quarters of the work force involved in the construction of the current projects), and in the operational phase, both aluminium plants and power stations are not very labour intensive. As to the broader

merits of further developing power-intensive industries, apart from the macro stabilisation issues discussed above, there are the more fundamental questions of whether they provide significant net benefits to the economy and to what extent the government should be implicated.

The development of power-intensive industries has involved foreign companies building and operating aluminium plants, with public utilities providing the necessary electricity under bilateral long-term contracts. The domestic contribution to the production value of aluminium is typically less than one-third (10% labour, 15% electricity), with the rest representing imported raw materials and profits to the foreign owners. Present contracts between public utilities and the foreign aluminium companies make it difficult to evaluate how profitable the related energy investments are. In its financial statements, Landsvirkjun (the National Power Company) does not state explicitly the return on equity for its shareholders (that is, the national and local governments). This lack of transparency has led some analysts to express doubts about the profitability of power projects, in particular when favourable interest rates due to government guarantees are taken into account. Moreover, it is unclear whether the public utilities earn appropriate returns for the use of natural resources, the environmental costs and the risks they are taking on. For instance, at the end of 2005, Landsvirkjun's foreign debt amounted to 12% of Iceland's GDP. It is not obvious that tax payers should both subsidise utilities and bear the risks of the profitability of power projects. As suggested in last year's Survey, to evaluate the costs and benefits of any public-sector involvement in future expansions of power-intensive industries, the authorities should set reservation prices for the use of natural resources and negative environmental externalities and put to tender the right to supply electricity for a given project (including to foreign bidders). Unfortunately, such a formal mechanism that would help to determine transparently the appropriateness of going ahead with new projects is not in place. Similarly, no consideration is given to the divestiture of the National Power Company's electricity generation activities, which would help create a level playing field by avoiding cost-of-capital differentials between the incumbent and entrants and reduce taxpayers' exposure to the risks surrounding large-scale power investments.

## Macroeconomic policy could help sustain healthy growth

### **Monetary policy needs to reduce inflation**

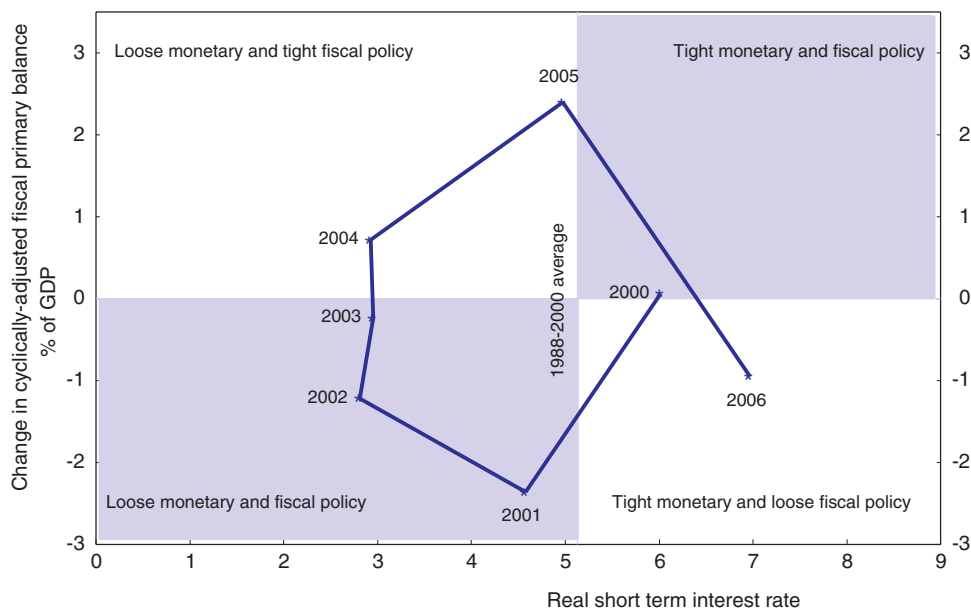
Monetary policy best promotes economic performance by delivering low, stable inflation. Reflecting this, the objective of the Central Bank is to stabilise inflation around 2½ per cent. However, it has not been meeting this objective in recent years. Actual inflation has exceeded the official target since 2004 and is expected by markets to continue to do so for the foreseeable future. These expectations of high inflation make attaining the target more costly. Hence, the Central Bank needs to strengthen the credibility of its commitment to the inflation target through clear communication and higher interest rates. One difficulty facing monetary policy is that increases in short-term nominal interest rates have not translated into real lending rates (Chapter 2). This warrants higher short-term rates than would otherwise be the case and explicit guidance that the tight stance of policy will persist. In any case, interest rates will have to rise until inflation expectations have moved back to the inflation target.



### **Fiscal management could be improved**

Fiscal management has in general been supportive of monetary policy. As can be seen from Figure 1.6, fiscal policy rarely has gone in the opposite direction since the beginning of the decade. As to developments in 2004, when the economy boomed, it could be argued that, while the fiscal stance went in the right direction – albeit hesitantly – monetary policy was much more behind the curve, with real short-term interest rates still far below the long-term average. In 2005, fiscal policy was tightened substantially through expenditure restraint, in line with rising Central Bank policy interest rates. An exception, however, is the current year, when – despite the warnings in the previous *Survey* – the fiscal stance is easing in terms of the change in the cyclically-adjusted general government primary balance, while real interest rates are reaching very high levels – even by Icelandic historical standards – as monetary policy is struggling to rein in inflation pressures. The main reason for this is substantial tax cuts decided in 2003 for structural reasons. It is to be hoped that a swift implementation of recent decisions regarding public investment will begin reinforcing spending restraint in the latter part of this year.

Figure 1.6. **Monetary and fiscal stance**



Source: OECD, Economic Outlook 79 database.

Given the unsatisfactory current policy mix, additional spending restraint should be maintained in the 2007 budget if domestic demand pressures do not abate. The difficulties fiscal policy faces in responding to current economic adjustment needs are two-fold (Chapter 3). First, despite public management reforms, expenditure slippage has remained a problem, both leading to an upward creep in its share of GDP and limiting the government's ability to use spending changes as a tool of demand management. This is particularly regrettable since the tax reductions being implemented – which are in principle desirable for supply-side considerations and affordable in light of the

government's long-term fiscal position – would require at a minimum an adherence to spending targets, if not an offset through additional expenditure restraint. Second, there is little co-ordination between fiscal policy at the local and central government levels. Not only do many of the spending pressures stem from the local level, but more than once central government efforts to adjust the fiscal stance to better match Iceland's overall economic requirements have been frustrated by contrary developments at the local government level.

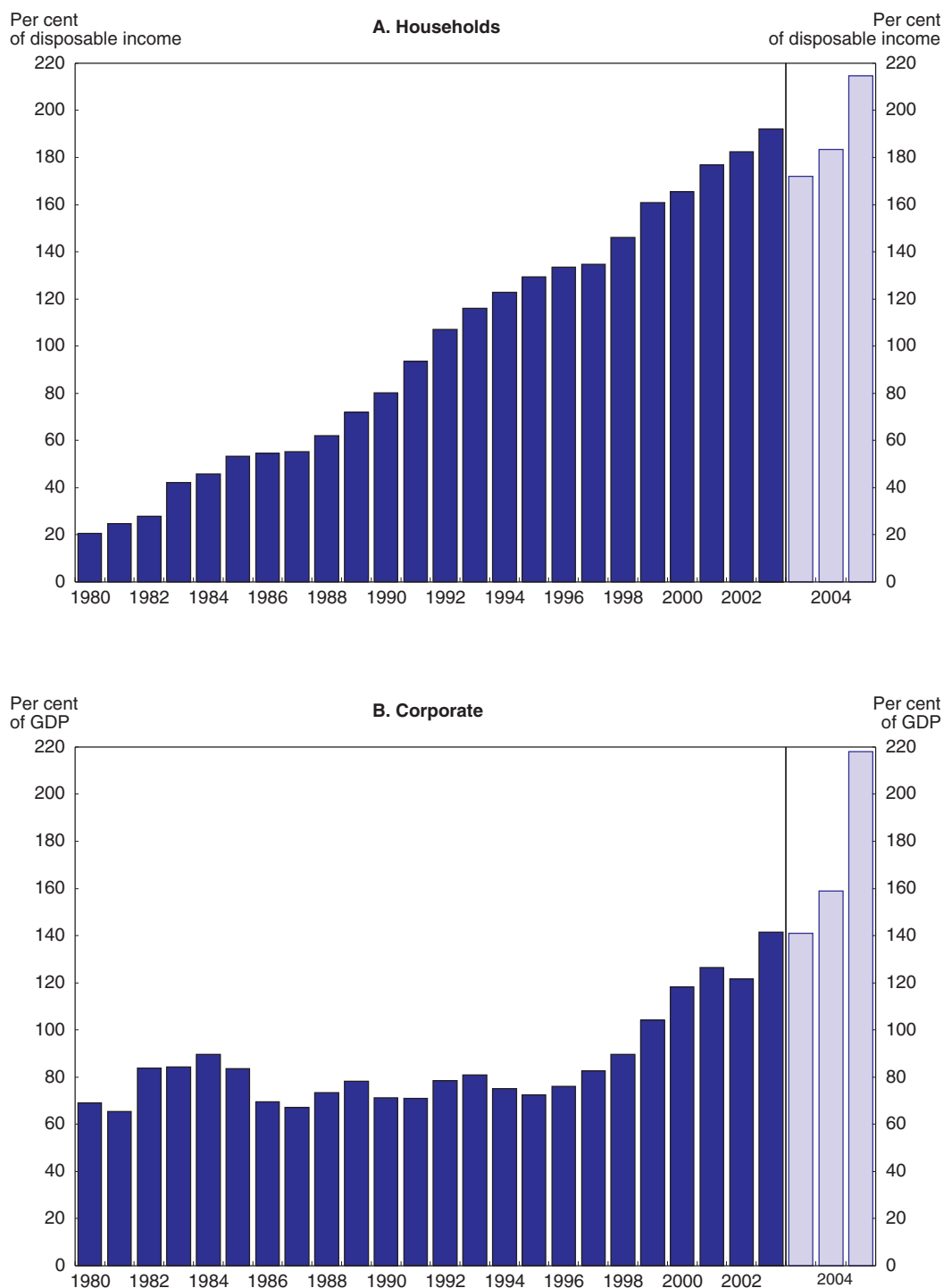
### **Financial market liberalisation has boosted growth and needs to continue**

Financial markets in Iceland are thriving (Chapter 4). Investors now have greatly improved access to capital, both relative to other countries and to the recent past. As illustration, Figure 1.7 shows the rapid growth in debt, by both households and firms. Although the rapid growth of Icelandic banks has exposed the financial system to some vulnerabilities, stress tests suggest that the banks' capitalisation can withstand very large shocks. The development of the financial sector is welcome for many reasons, not the least of which is that active financial markets facilitate investment and innovation and hence are conducive to strong economic growth. It provides another indication that Iceland's prospects are bright. A significant part of the responsibility for this lies with government policy. Controls over the operation of financial markets have been lifted, banks have been privatised and the sector has been opened up to international capital markets. This liberalisation programme has succeeded admirably and should continue.

In this respect, a policy priority is reform of the market for home mortgage lending. The government guarantee for the Housing Financing Fund distorts the allocation of capital and impedes competition and innovation. The playing field needs to be levelled, for example by imposition of a fee corresponding to the government guarantee. Iceland's unusual reliance on indexation of loans is generally sensible for the borrowers and lenders involved and may have wider benefits. However, the practice is restricted by prohibitions on indexation of bank deposits and loans. These have no clear rationale and need to be repealed. One area where financial markets do not seem to be working well is financing innovative start-ups. This is a difficult problem encountered in most countries. The New Business Venture Fund has attempted to address some of the problems in this area but its performance so far has been disappointing.

### **Human capital development is crucial to maintaining a high relative standard of living**

Despite Iceland's resource advantages, the country's economic success and prosperity will in the end be determined by its skills base and its workforce's ability to adapt to changing market needs. With the growing importance of sectors such as financial intermediation, demand for a skilled workforce has increased. Human capital formation is also important for the further development of fast-growing activities, such as technology- and knowledge-intensive industries, whose share in Iceland's value added is still quite low (Chapter 5). Recognising the importance of human resource development for future economic performance, the authorities have considerably increased education funding and revamped the system since the mid-1990s. Nonetheless, Iceland's performance in generating a skilled labour force is not outstanding, with no overall improvement in educational achievements at the end of compulsory schooling and a persistent gap in between low skilled and highly skilled. Educational achievements as measured by PISA test

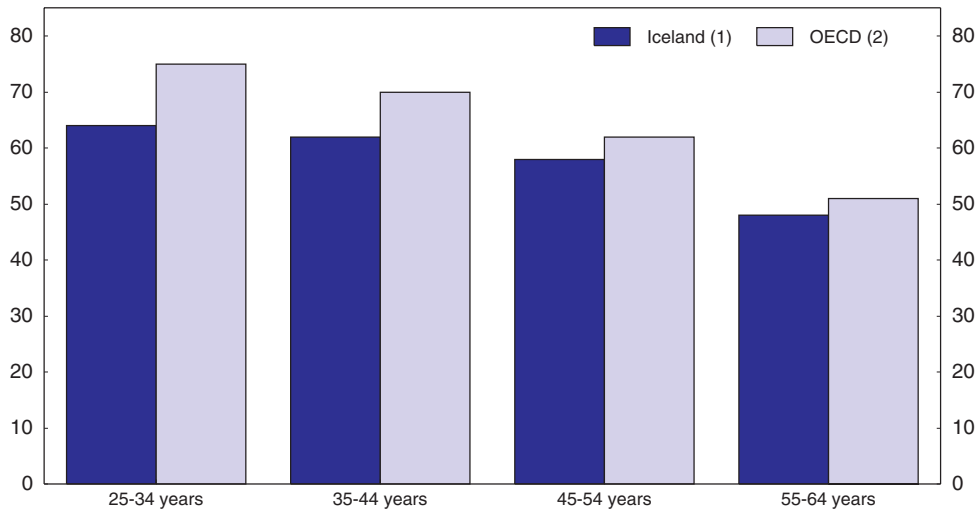
Figure 1.7. **Rising debt ratios**<sup>1</sup>

1. New classification of lending from 2003. Two columns are shown for 2003. Forecast for 2005.

Source: Central Bank of Iceland.

scores are depressed by poor outcomes of male pupils in rural areas. While upper-secondary graduation rates have risen, they have risen even faster in other countries. As a result, the gap between the OECD and Icelandic performance with regard to upper-secondary attainments is greater for younger than for older people (Figure 1.8). At the same time, higher education institutions have to struggle with a large inflow of students.

Figure 1.8. **Population that has attained at least upper secondary education**  
Per cent, 2003



1. 2002.

2. Country mean.

Source: OECD, *Education at a Glance*, 2005.

One of the education reforms implemented in the mid-1990s is the devolution of responsibility for compulsory education. Since then, per student spending in this sector has increased strongly owing to a sharp expansion in the teaching staff. However, this has not been accompanied by a rise in average teacher qualification. A major challenge at this level is to improve achievements in rural areas, where the proportion of licensed teachers is sometimes quite low. At the upper-secondary level, the authorities intend to reduce the length of schooling, with a view to shortening the combined duration of primary and secondary education, which is quite long in Iceland. In implementing this reform, it will be important to ensure that it does not lower educational outcomes. In the tertiary sector, the challenge is to maintain the quality of education in the face of an explosion of enrolment. This is the aim of recent legislative changes. A concern in this context is that the rapid expansion of higher education combined with the development of a more comprehensive system has entailed a marked decline in the proportion of those that study abroad. Student mobility is important to reinforce Iceland's research capacity and drive towards a knowledge economy. Iceland should not try to provide tertiary education in all fields at the post-graduate level but instead encourage students to study abroad in fields where it does not have a comparative advantage or the capacity to provide the relevant courses.

## Other policy areas also need continued attention

There are other structural policy areas where there is unfinished business. As mentioned above, the agricultural sector remains heavily subsidised and regulated, and foreign ownership restrictions still exist in the energy and fisheries sectors, limiting competition in these areas. Annex 1.A1 summarises progress in structural reform against the backdrop of previous recommendations. Developments in two areas – environment and health care – which may deserve a more comprehensive treatment in future *Surveys* are briefly reviewed below.

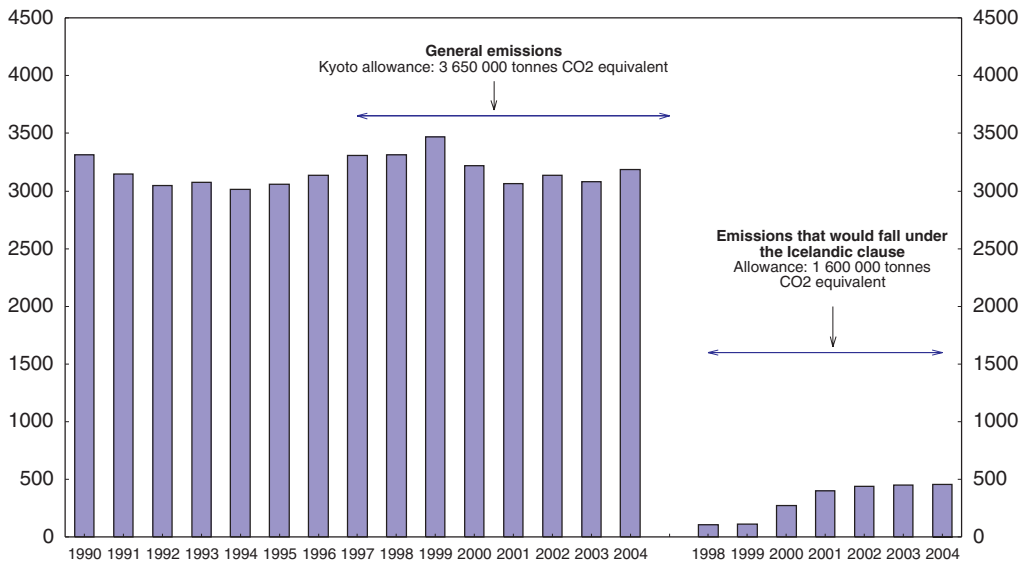
### Environment

Iceland is committed to reducing air pollutants as part of the European Area (EEA) and other international agreements. While the limited extent of air pollutants poses no problems for neighbouring countries, they are very high by international comparison in relation to GDP or per inhabitant. Sulphur dioxide emissions have been on a continued upward trend, mostly due to increased emissions from industrial activities. Emissions of nitrogen oxide, carbon monoxide and volatile organic compounds decreased for a while, as more cars were equipped with catalytic converters, reducing traffic-induced emissions. However, more recently, these emissions have picked up again, reflecting soaring car registrations and a tendency for cars to become bigger and more powerful. Per inhabitant, the number of passenger cars in Iceland is among the highest in the OECD. The introduction of a tax on diesel fuel for motor vehicles below 10 tonnes should have a positive effect, although other vehicles remain subject to a distance-based system that has poor incentives to reduce emissions.

Iceland occupies an unusual position in the OECD due to the importance of its renewable energy resources, which mean that the country has a comparatively low greenhouse gas (GHG) emission intensity despite its highly energy-intensive economy. Its policy of promoting renewable energy sources and recognition of the particular problems large investment projects pose for a small economy have allowed Iceland to have Kyoto Protocol targets that allow GHG emissions to grow substantially. Since 1990, total GHG emissions have grown by about 10%. “General emissions” have remained relatively stable and well within Iceland’s Kyoto allowance, and so far only about one-quarter of the special allowance for emissions from large industrial projects has been used (Figure 1.9). There has been a debate in Iceland whether the new investment projects discussed above are compatible with the country’s Kyoto Protocol obligations. According to official estimates, emissions from all three aluminium projects would significantly exceed Iceland’s Kyoto allowance by 2012, but probably not on average in 2008-2012, which is the relevant reference period. However, if a continuation of the Kyoto Convention is agreed, Iceland would have to ask for additional exemptions, which are likely to be granted given the extensive use of renewable energy sources.

Iceland became member of the Convention on Biological Diversity at the end of 1994. Through its membership, it has undertaken the legal obligation that the use of all the components related to biological diversity (including land use) shall be sustainable. In a recent environmental audit, the National Audit Office stated that the goals set by Iceland’s membership to the Convention have not been realised. Emphasis on environmental protection has not increased and environmental research has not been promoted, as required by the Convention. More generally, membership has had little effect on public

Figure 1.9. **Emissions of greenhouse gases, counting carbon sequestration**  
 Thousand tonnes of CO<sub>2</sub> equivalent



Source: Ministry for the Environment.

policy and there are no nationwide plans for the protection and monitoring of biological diversity.

### Health care

Like education spending, expenditure on health care (five-sixths of which are public) has increased strongly. By 2003, it amounted to 10.5% of GDP, two points more than in the mid-1990s and the fourth highest in the OECD. Since the mid-1990s, real health spending has grown by more than 6% per annum. According to Secretariat estimates, in the absence of policy action, public health spending would increase from an estimated 9½ per cent of GDP in 2005 to more than 15% in 2050. Health outcomes are better than generally elsewhere, but marginal returns of increased spending (in terms of population health) have declined. Against this backdrop, the government has taken measures to increase the efficiency of the health care system. This has mainly concerned the hospital sector. For instance, three Reykjavik hospitals were merged. The new hospital is now Iceland's largest employer, with nearly 4 000 full-time workers. A recent report of the National Audit Office concluded that the merger has been a success, resulting in higher efficiency and cost savings. Still, costs were found to be significantly higher than in comparable hospitals abroad. Moreover, cost-savings reflect a transfer of services from in-patient care to daywards and out-patient wards (contrary to hospital care, outpatient care is not entirely free). The report criticises a shortage of remedial alternatives for patients that are in fact ready to be discharged, and the failure of the government to formulate an across-the-board strategy for the health system more generally. It also points out that there is a shortage of recorded data, which are a prerequisite for quality management and comparing services in different hospitals.

## ANNEX 1.A1

*Progress in structural reform*

Past recommendations	Actions taken and current assessment
<b>A. Financial markets</b>	
Speed up privatisation of commercial banks and consolidation of savings banks.	While the commercial banks have all been privatised, incentives for savings banks to consolidate appear insufficient.
Terminate government backing of bonds issued by the Housing Financing Fund (HFF), replace the tax benefit associated with mortgage interest with a general means-tested credit, and eliminate the rebate of value added tax on house construction.	The government is currently working on a wide ranging reform of the HFF, possibly limiting its role to that of a wholesaler (see Chapter 4).
<b>B. Education and training</b>	
Continue efforts to enhance teacher qualifications and increase the focus of teaching on sciences as well as foreign languages.	Teacher qualifications have improved recently but remain unsatisfactory in some rural areas, while curriculum reform has so far failed to produce better achievements in reading and science literacy.
Boost fees for tertiary education to reduce completion times.	Recent legislative reforms to tertiary education do not allow tuition fees in the public sector, which thus remain limited to private institutions.
<b>C. Public sector management</b>	
Strengthen the "frame budgeting" process and tighten budget execution, limiting the use of supplementary budgets.	Modifications of the "frames" in the late phase of the budget process and expenditure slippage have diminished, even though deviations of outcomes from the voted budget remain substantial.
Reinforce the medium-term orientation of expenditure policy by introducing rolling multi-year budget plans with explicit spending limits.	The government has moved to publish medium-term fiscal projections, but these are only indicative.
Make the co-operation between the central and local governments more effective through binding annual agreements to ensure the achievement of national spending objectives.	No action.
<b>D. Taxation</b>	
Abolish net wealth taxation to increase efficient resource allocation and savings incentives.	The net wealth tax has been abolished as from 2006.
Index the basic tax credit for individuals.	The central government's personal income tax rate is being reduced in stages, but the basic tax credit is still not indexed.
<b>E. Product market competition</b>	
Complete the privatisation of Iceland Telecom now that market conditions in telecommunications have improved.	Privatisation of Iceland Telecom has been completed.
Consider whether divestiture of the National Power Company's electricity generation activities would help create a level playing field in generation by avoiding cost-of-capital differentials between the incumbent and entrants.	No action.

Past recommendations	Actions taken and current assessment
Reduce agricultural support, especially in the area of policies that provide incentives to increase production. Eliminate administered prices for dairy products.	No action.
Reduce the remaining ownership restrictions, notably in the energy and fisheries sectors.	No action.
<b>F. Environment</b>	
Introduce diesel fuel taxation on vehicles as the distance-based system has poor incentives to reduce emissions.	A tax on diesel fuel for motor vehicles below 10 tonnes has been introduced, while other vehicles remain subject to a weight-distance tax.
Use cost-benefit analysis to improve policy effectiveness and coherence.	No action.



## Chapter 2

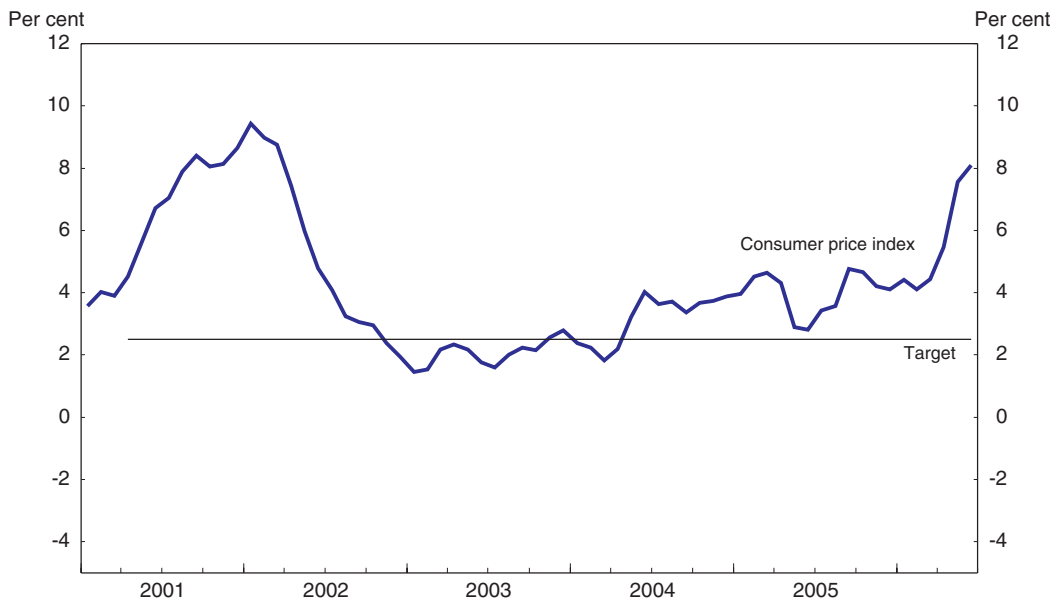
# Improving the implementation of monetary policy

*The objective of monetary policy is to stabilise inflation at about 2½ per cent. Actual inflation, however, has exceeded this target since 2004 and is expected to continue to do so for the foreseeable future. Monetary policy has reacted too sluggishly to the worsening outlook. Furthermore, increases in short-term nominal interest rates have not translated into comparable increases in real lending rates in the market. Higher interest rates and clear communication are needed to bring inflation back to the target and to strengthen the Central Bank's inflation-fighting credibility.*

## Inflation has exceeded its target

The Central Bank of Iceland has one key objective: to stabilise the inflation rate (Central Bank of Iceland, 2001a). Specifically, it aims to keep 12-month changes in the consumer price index as close to 2½ per cent as possible. As shown in Figure 2.1, the Bank has not succeeded in hitting this target for some time. Inflation went above the target in early 2004 and has moved away from it since. In the 12 months to June 2006, the consumer price index rose by 8%, some 5½ percentage points above the target.

Figure 2.1. **Inflation exceeds the target**  
12-month per cent change



Source: Statistics Iceland.

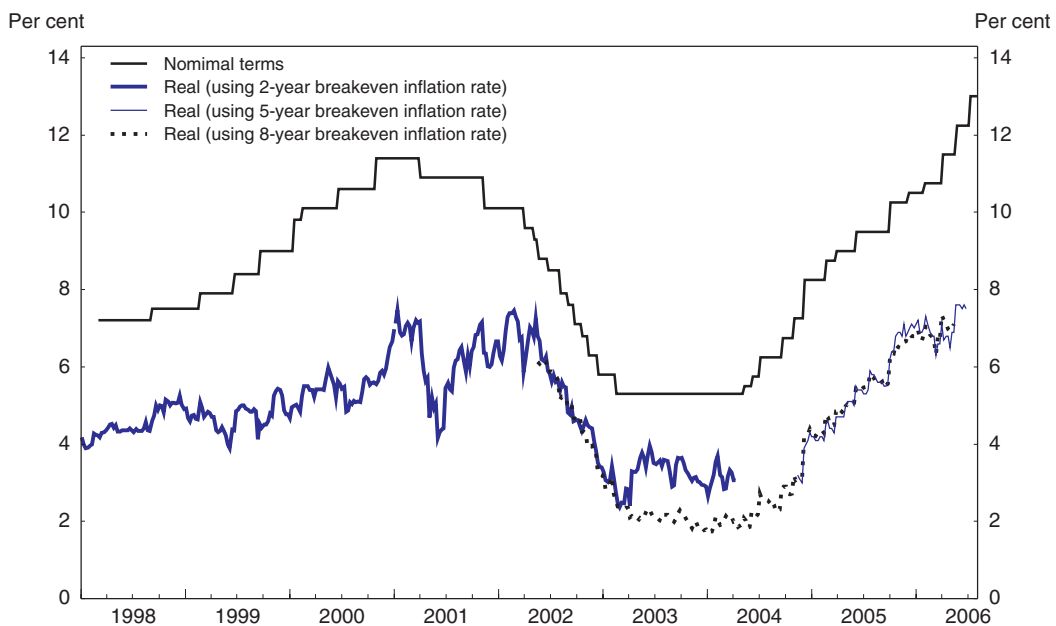
It is common to describe the Central Bank's target as a range of between 1% and 4%, rather than a point. For example, the Central Bank's Web site describes the boundaries of this range as "tolerance limits". The OECD has, in the past, used similar language. However, this is misleading, as it implies that inflation within these limits is tolerable. This matters because it would imply that the Central Bank was meeting its objectives through much of 2004 and 2005 and did not need to take corrective action. There is a debate among monetary economists as to whether it is better to target a range or a point, and central banks in several other countries have chosen to target a range. However, the objectives of the Central Bank of Iceland, as set out in the "Declaration on inflation target and a change in the exchange rate policy" of 27 March 2001, do not suggest that inflation of 4% is

acceptable. Rather, it states “the Central Bank will aim at an annual inflation rate of about 2½ per cent” (Central Bank of Iceland, 2001b). There may be room for disagreement as to how broadly the term “about” should be defined. But equating it with a 3 percentage point range seems a fairly loose interpretation. Accordingly, the Central Bank has increasingly moved away from references to “tolerance limits”, emphasising that its target is 2½ per cent.

Instead, the limits have two roles. They impose reporting requirements – discussed below – and they determine the urgency of a monetary policy response. Specifically, “If inflation deviates by more than 1½ percentage points from the target, the Central Bank shall bring it inside that range as quickly as possible.” The implication is that smaller deviations of inflation should also be corrected, though perhaps more cautiously.

Chapter 1 discusses some of the immediate causes of the increase in inflation. However, ultimate responsibility lies with the Central Bank. It has increased the policy interest rate from 5.3% in May 2004, to 13% in July 2006 (Figure 2.2). With the benefit of hindsight, it is now evident that this series of increases has been too little, too late.

Figure 2.2. **Central Bank policy interest rate**



Source: Central Bank of Iceland.

This largely reflected errors in forecasting, most of which were probably unavoidable. Similar errors were made by the OECD and private sector forecasters. Although the Central Bank will continue working to improve its forecasting performance, doing so is not easy. Forecast errors will doubtless remain a central challenge for monetary policy. However, mistakes in monetary policy also reflected a failure of policy to respond sufficiently to the worsening outlook. These errors are more easily rectifiable.

As one example of this, consider the *Monetary Bulletin* of December 2005. According to its most realistic forecast (with rising interest rates and a declining exchange rate),

inflation two-years ahead was projected to be “just below 4%”. Despite this considerable deviation of inflation from target, the policy interest rate was only increased by 0.25% to 10.5% and little was done to raise long-term rates. As discussed below, this action was offset by developments in financial markets and was insufficient to raise real lending rates in the market.

As another example, consider the fall in mortgage interest rates in 2004 – discussed in more detail in Chapter 4. It is sometimes suggested that this made the task of monetary policy more difficult. However, the role of the Central Bank is to offset shocks like this, in so far as they are likely to influence inflation. Moreover, the appropriate response to an easing in credit conditions is straightforward. Because resources are limited, an expansion of housing activity means that other sectors need to contract. Monetary policy can and should help bring this about by raising interest rates. Otherwise, the market will reallocate the resources through inflation. Furthermore, the magnitude of the required policy response can be calibrated in the same units as the initial change in lending rates. So an easing in credit conditions is a relatively simple shock to offset. Despite this, the response of monetary policy in 2004 was sluggish. Although short-term nominal rates increased over 3 percentage points in late 2004 and early 2005 this was insufficient to offset expectations of higher inflation and changes in the yield curve. Real medium and long term rates actually declined. Accordingly, the housing boom was allowed to generate economy-wide excess demand and inflation.

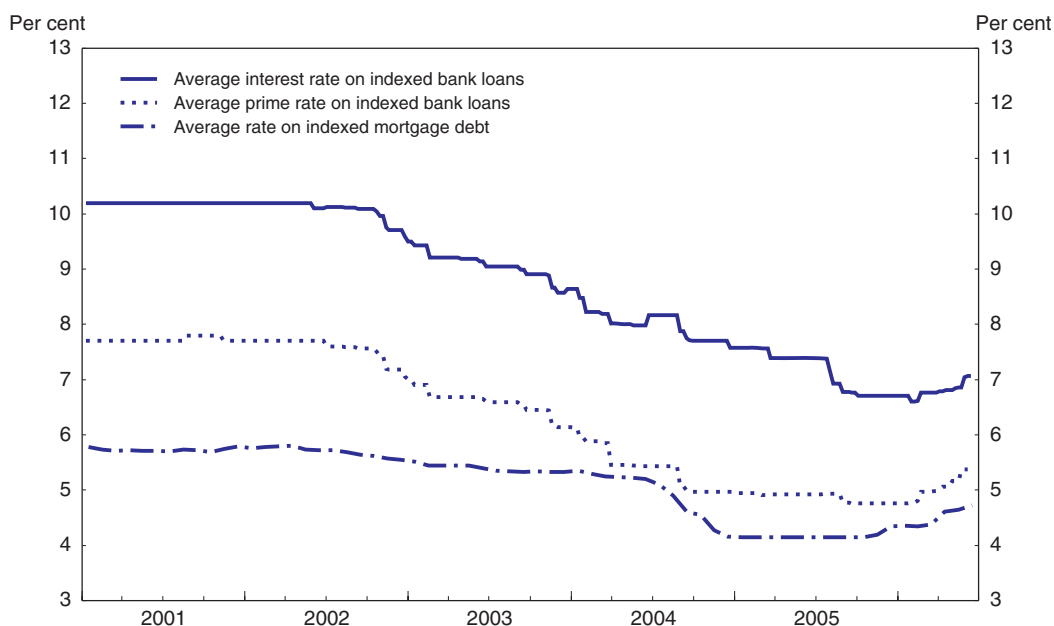
Monetary policy needs to respond more aggressively to changes in the outlook and to signals that inflation is straying from the target. The 2.25 percentage points increase in the policy rate from March to July 2006 is a welcome improvement in this regard. So was the strong commitment given in recent *Monetary Bulletins* to keep raising rates if necessary. That said, these steps have still been insufficient to bring expected inflation into line with the target, as discussed below.

### Higher policy rates have not been reflected in real lending rates

Figure 2.3 shows various real lending rates. In contrast to the policy rate, which does not directly affect spending decisions, these interest rates are those that actually face businesses, consumers and home buyers. Real lending rates remain lower now than they were two years ago, despite large increases in nominal short-term interest rates.

The opposing movements shown in Figures 2.2 and 2.3 do not mean that the transmission mechanism from monetary policy to longer-term lending rates has broken down. Rather, the divergence reflects a few special factors that happen to have offset the monetary tightening. First, financial markets have become more efficient and competitive, particularly in lending for home mortgages, compressing margins. This is discussed further in Chapter 4. It is a welcome development that the Central Bank could not prevent (nor should it). However, it does mean that extra tightening is needed to compensate. Second, inflationary expectations have risen, discussed further below. Third, for some time, the yield curve became increasingly downward sloped. That is, the increase in short-term rates did not translate into comparable increases in long-term rates. This last development has rightly been of considerable concern to the Central Bank.

According to the expectations theory of the yield curve, long term interest rates equal a weighted average of short-term rates, with perhaps some small adjustments for liquidity and term  *premia*. Hence a steeply downward-sloping yield curve implies that the current

Figure 2.3. **Average real lending rates**

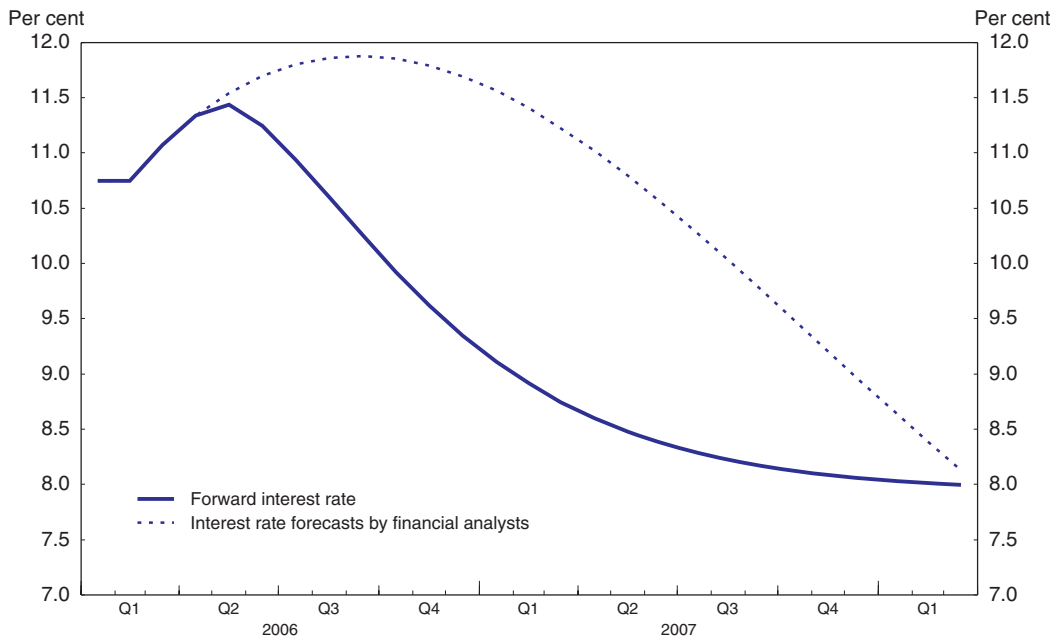
Source: Central Bank of Iceland, Landsbanki.

tight stance of monetary policy is not expected to persist. These expectations can prevent policy tightening from cooling the economy. Under this view, monetary policy can and should improve its effectiveness through clearer communication. The Central Bank can ensure that high short-term rates flow into long term rates by convincing the financial markets that the increase will persist.

In late 2005 and early 2006, this was a serious issue for monetary policy. Although the inflation outlook was well above target and Central Bank publications were indicating that large increases in interest rates were needed, the short-term yield curve was often flat or downward sloping. The expectations theory of the yield curve would imply that the need for interest rate increases was not being credibly conveyed to the markets. However, the Central Bank has pointed to a difficulty with this view. Figure 2.4 shows projected paths for the Central Bank policy rate as of the time of the 2006/1 *Monetary Bulletin*. The dashed line shows interest rate forecasts by financial analysts. However, the solid line, which, shows the rate implied by forward interest rates, is noticeably lower. Whereas analysts were anticipating a substantial tightening of policy, the yield curve was not. The puzzle posed by the difference between these implied paths is that it implies traders are foregoing profits. If a bank believed its analyst's projections, then it should sell 1-year securities, with their low yield, and reinvest the proceeds in a succession of short-term securities receiving higher expected returns.

The authorities have argued that "it is inconceivable that expected Central Bank interest changes could be the explanation [for the steep downward slope of the yield curve]. This must be attributed to market failure which inhibits the transmission of monetary policy" (Central Bank of Iceland, 2006a, pp. 14, 56). Specifically, the issuance of króna-denominated bonds by foreigners is said to have driven interest rates below rates

Figure 2.4. **Central Bank policy rate based on forward rates and analysts' projections**



Source: Central Bank of Iceland.

consistent with the expected path of short-term rates. But, in itself, this would not constitute a “market failure” as that term is usually used. Demand and supply fluctuations will routinely push interest rates away from levels implied by expectations. However, well-functioning markets would reallocate funds so as to compete away any divergence. It is only if the market as a whole is ill-informed, or there is some friction that prevents profitable trades, that interest rates can be seriously out of line with expectations.

In the absence of any clear market friction, a more plausible explanation is that the markets as a whole did not believe that high interest rates would persist. That is, financial institutions had little confidence in the analysts' forecasts. There are many reasons why this might be. The simplest explanation might be that Central Bank communication about the likely path of interest rates was reaching analysts, but not traders. But even under other interpretations, the appropriate remedy is clear and credible communication.

Even though the Central Bank may not be convinced that misperceptions of policy were important in the past, it has nevertheless greatly improved its communication to ensure that they are not currently a problem. It now provides considerably more guidance as to the likely evolution of interest rates. This is a world-wide trend in monetary policy. Arguably for this reason, divergences between interest rate forecasts and forward rates are much less noticeable than earlier in 2006. More importantly, medium-term interest rates have risen substantially in nominal terms and the short-term yield curve now has a more pronounced upward slope. This helps explain the increase in real lending rates over recent months shown in Figure 2.3.

A difficulty with indicating the future path of interest rates is that the Central Bank does not know this with certainty. There is a danger that incorrect forecasts may weaken

credibility and transparency. (In this, interest rate forecasts differ from forecasts of other variables in that they are interpretable as policy announcements). Accordingly, forecasts need to avoid excessive precision and to be conditional. The statement of March 2006 by the Central Bank is a good example. It announced that it “will tighten the monetary stance until it is convinced that a sufficient degree of tightening has been achieved to channel inflation and inflation expectations back towards target”. It was suggested that this may involve an increase in interest rates of “several percentage points”. The July statement was similar. These statements were considerably clearer and more informative than earlier statements and a very welcome development. Short to medium term interest rates rose accordingly. Such increases are necessary if the policy tightening is to cool the economy, as intended. Given the success of this greater transparency in both Iceland and other countries, the Central Bank is considering further steps in this direction.

The overall trend in Central Bank communication has been to provide more information. In particular, the March and July statements were clear, frank and on point. However, other statements have been more hesitant. For example, those of December 2005 and May 2006 talked of high interest rates being “maintained”, rather than increased. The statement of January 2006 foreshadowed increases, but as a possibility, rather than an expectation. Although the Central Bank (2006a, p. 14) believes these statements were “unambiguous” other interpretations are clearly possible. Indeed, financial markets appear to have inferred that rates were likely to remain stable.

If interest rates fail to reflect the likely path of monetary policy, the best remedy is the provision of extra information. If that is not practical or sufficient (for example, if there really were a market failure), an additional remedy would be for the Central Bank to trade the relevant securities. For example, if the 1-year interest rate is “too low”, the Bank should sell 1-year securities (either issued by itself or others), driving their price down and yield up, and buy short-term securities with the proceeds. Doing so flattens the yield curve. The overall level of central bank operations determines the level of liquidity and hence the level of short-term interest rates. However, if portfolio balance effects are important, then the composition of central bank operations can shift the slope of the yield curve. In doing so it can ensure that interest rates reflect available information, ensure that monetary policy changes are transmitted into longer-term interest rates, and generate a profit. This approach can be described as “putting the Central Bank’s money where its mouth is”. As such, it can provide a useful complement to communication when markets are sceptical of official statements.

### **Inflation is expected to remain excessive...**

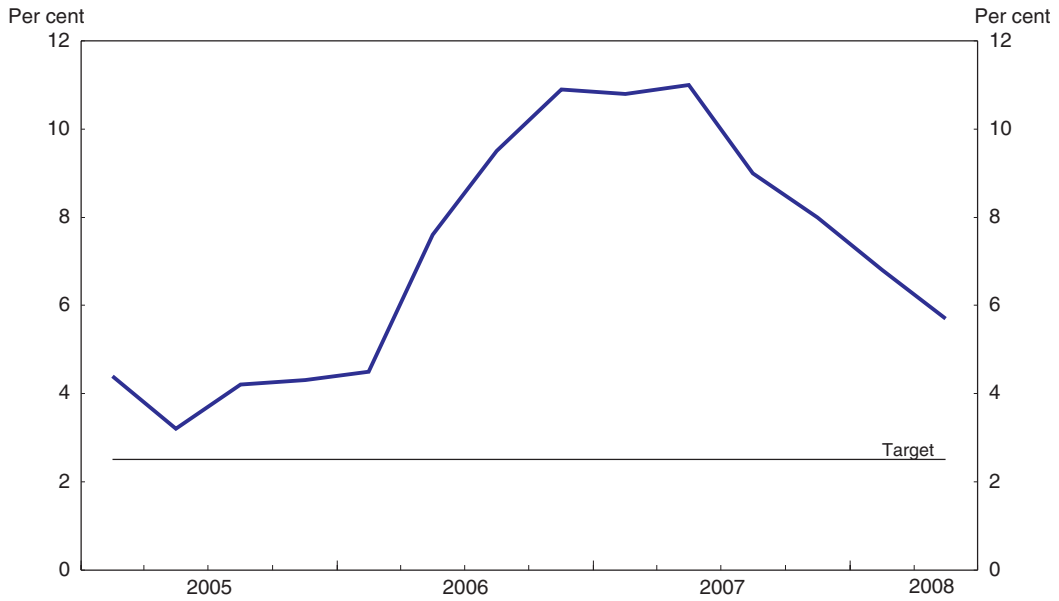
On a variety of different measures, inflation is expected to remain well above target for the foreseeable future. This is the most worrying feature of the current economic situation.

Figure 2.5 shows the Central Bank’s most recent baseline inflation forecast for the period 2006Q2 to 2008Q2 (Central Bank of Iceland, 2006b). The forecast assumes that interest rates evolve in line with the expectations of private sector forecasters, which seems more realistic and relevant than the previous practice of assuming a constant interest rate. As can be seen, inflation is projected to remain well above the target throughout the forecast horizon. Households surveyed in May-June 2006 also expected inflation to remain well above target.

Another widely used measure of inflation expectations is the difference in yields between indexed and non-indexed bonds. Figure 2.6 shows the interest differential

**Figure 2.5. Central Bank inflation forecast**

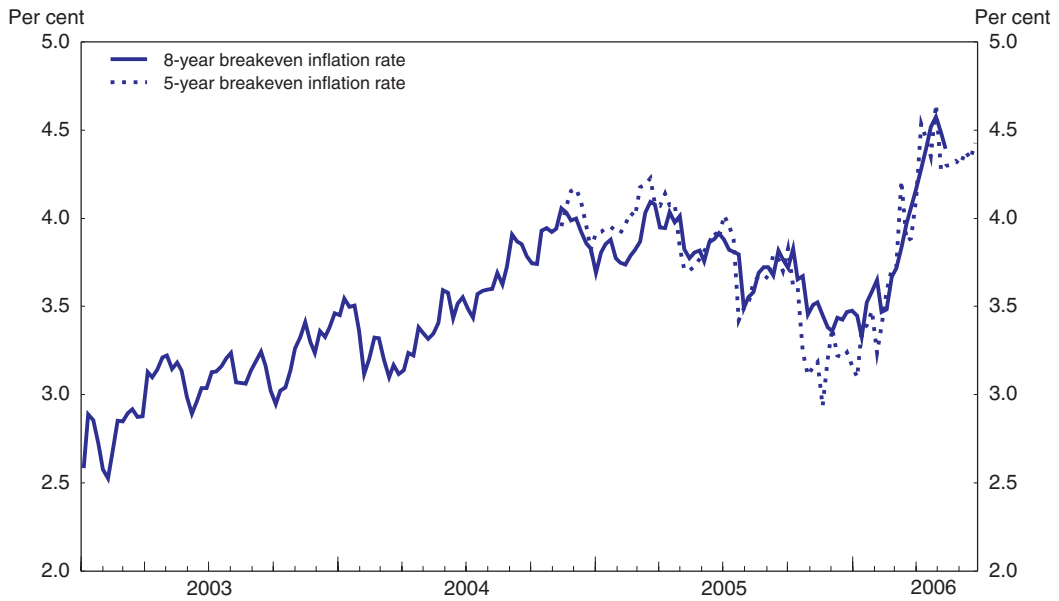
As of July 2006 for the period: Q3 2006-Q2 2008



Source: Central Bank of Iceland.

**Figure 2.6. Expected inflation implied by bond yields**

Breakeven inflation rate for bonds of 5 and 8 years maturity



Source: Central Bank of Iceland.



(technically, the “breakeven inflation rate”) on indexed and unindexed bonds of 5 and 8 years maturity. The Figure implies that bond investors believe that inflation over the next several years is likely to average about 4½ per cent. They appear to have believed that monetary policy has been off-target since 2003.

As a measure of inflation expectations, the yield differential has advantages and disadvantages. One advantage is that it reflects considered expectations of investors who back their beliefs with money. Another advantage is that the series are constantly available in real time. Whereas surveys and forecasts might be considered to be out-of-date following recent Central Bank operations, that is not the case with the yield differential. In particular, the inflation premium did not significantly change after the tightening of policy in July – even though the magnitude of the increase and the bluntness of the accompanying language surprised many market observers.

One potential limitation of the yield differential is that it may be affected by risk *premia*. If investors are worried about inflation risk they will accept lower returns on indexed debt and the yield differential will overstate expected inflation. If this were important then the National Debt Management Agency could and should lower public interest payments by retiring non-indexed debt while borrowing at indexed rates. As discussed in Chapter 4, it is currently doing the opposite, presumably on the assumption that this premium is small. A more important limitation is that the yield differential is only reliable for horizons for which both indexed and unindexed debts are actively traded, such as bonds maturing in 5 years. It is possible to infer inflation expectations for other horizons, but this typically involves extrapolating the yield curve and/or comparing securities with different risk and liquidity characteristics.

### ... which may require strengthening Central Bank accountability

The high expectations of inflation have several implications. First, they imply that monetary policy is not perceived to be fulfilling its responsibilities under the Central Bank Act. This has implications for Central Bank independence and accountability. Independence is usually considered to mean that the Central Bank is free to pursue its objectives as it sees fit. In doing so, the Bank is accorded substantial power and discretion. However, those objectives are agreed with the Government. The Bank is ultimately accountable to the public for how it exercises these powers and whether it meets its objectives. If it were to fail to meet its commitments and was not considered likely to do so, then accountability mechanisms would need to be strengthened.

Iceland is not yet near that stage. The Central Bank legislation and agreement with the Government impose reporting obligations on the Bank whenever inflation breaches limits:

“The Bank will be obliged to submit a report to the Government explaining the reasons for the deviations from the target, how the Bank intends to react and how long it will take to reach the inflation target again in the Bank’s assessment.”

Implicitly, new reports are warranted whenever that assessment substantially changes. Consistent with this, recent *Monetary Bulletins* have discussed deviations of inflation from the target in considerable detail. As discussed above, the language has become increasingly explicit. Given the great uncertainties involved, the *Monetary Bulletin* discussion is clear, informative and sensibly argued. At face value, it would seem to fulfil the obligations of the Act well.

The problem however, is that the Central Bank's announcements do not seem to be credible. The public does not seem to believe its statement that it will do whatever is necessary to hit the target. To maintain its independence, as well as for other reasons discussed below, the Central Bank needs to correct these perceptions. That will involve backing up its statements with firm policy. For the government's part, continued monitoring of the situation is in order. If the public's pessimistic assessment of the Central Bank's commitment to inflation targeting is borne out by events, then the Central Bank would need to be made more accountable.

How that should be implemented is not clear. One possibility would be to require the Central Bank to write more reports to the government. However, given that *Monetary Bulletins* essentially serve this function, that would amount to little more than a formalisation of existing practice. Another possibility would be for closer government oversight and involvement. However, given that government ministers have criticised the Central Bank for excessively tight monetary policy, that approach may run counter to the main monetary policy recommendations of this *Survey*.

### Other reasons for strengthening credibility

Even if the public's high expectations about inflation are erroneous, they are still an important problem for the central bank. Many prices and wages are set at discrete intervals. For example, most private sector workers in Iceland have wages governed by a 3-year agreement. These wages, and infrequently set prices in general, will reflect what costs, competitors' prices and the general price level are expected to be while the wage or price is in place. Hence, if inflation is expected to be high, price setters will tend to set high prices and the expectations become self-fulfilling. Economists disagree as to how "forward-looking" these expectations are in practice and on the weight that price-setters place upon them. But the consensus is that they are an important factor in the inflation process. The Central Bank's new macroeconomic model reflects this consensus (Central Bank of Iceland, 2006a, p. 46). Accordingly, if the Central Bank could clearly establish its inflation-fighting credibility that, in itself, would make the task of reducing inflation easier. Effectively, it would lower the sacrifice ratio (the amount of unemployment required to reduce inflation by a percentage point).

For the longer term, increasing the credibility of the inflation target would help to stabilise the economy. If price setters believe that price disturbances are likely to be temporary rather than persistent, they are less likely to build them into their own prices. So monetary policy would not need to restrict activity by as much to offset an inflationary surge. That is, monetary policy does not just want *lower* inflationary expectations but also *less variable* expectations.

An increased quantity and quality of communication would assist in this, though the Central Bank has recently been performing well on this score. It may be then that firm actions and results are necessary to establish credibility. The next few months will be a test of that.

Scepticism about the Central Bank's commitment to its inflation target may reflect the view that this target would be costly to hit. In the short-term that is undoubtedly correct. To reduce inflation requires higher interest rates and less economic activity. However, this does not mean that the public should resist tighter policy. A slowdown needs to occur at some point. Monetary policy cannot permanently maintain an over-heated economy.

Attempting to do so would result in ever-accelerating inflation – and a return to the financial crises of the 1970s. At some stage spending needs to be brought back to a sustainable level. The sooner that process starts, the less need there will be for an extended period of elevated unemployment.

Of course, the inflation target could be reset to a higher level. Indeed, measures of inflation expectations, such as those in Figure 2.6 and much public discussion of the Banks’ “tolerance limits” imply that the Central Bank is actually targeting an inflation rate of 4%. But were this perception to become actual policy, then the same logic would permit another increase in the target whenever the next inflationary shock were to occur. If a target is to be credible, policy needs to adhere to it. The target should not be reset simply because policy has failed to hit it.

### The current stance of policy

As shown in Figure 2.2, the policy rate is now near its highest level in real terms in over a decade. But that is not enough. As discussed above, inflation is still not expected to approach its target. So interest rates need to rise further.

As shown in Figure 2.3, real lending rates remain low, notwithstanding modest increases in the last few months. It is not surprising then that spending on housing, investment and consumer durables remains strong. Although there are also other channels of monetary policy (through its effects on asset prices, the exchange rate, and so on) a sizeable increase in real lending rates may prove to be necessary in order to cool the economy. So increases in short-term rates need to be accompanied by clear statements aimed at increasing longer-term rates.

These recommendations seem to be consistent with the analysis of the Central Bank in its *Monetary Bulletins* of March and July. However, the Central Bank’s policy announcement in May is harder to interpret along these lines. To be clear, whereas the May statement talked of *maintaining* tight monetary conditions, what is needed is a *further tightening*.

### Concluding remarks

Given its limited resources, the Central Bank of Iceland performs impressively in a number of dimensions. Its analysis, forecasting and communication display exceptional competence and professionalism. The policy framework reflects the latest thinking among the world’s monetary economists. However, there is room for improvement in terms of policy implementation. Some recommendations are provided in Box 2.1.

### Box 2.1. Recommendations on monetary policy

Surveys and bond yields imply that inflation is expected to substantially exceed its target of 2½ per cent over the foreseeable future.

- The Central Bank needs to re-establish the credibility of its commitment to the target. This can be achieved through clearer communication and tighter monetary policy. The quality and quantity of Central Bank communication are already high – so the main requirement is for tighter policy.
- The Government needs to closely monitor the extent to which its agreement with Central Bank is being implemented. If the public’s skepticism about the Central Bank’s commitment to the inflation target turns out to be correct, then accountability mechanisms would need to be strengthened.
- The alternative of abandoning the 2½ per cent target in favour of a higher target should be avoided. Revisions of the target undermine credibility. Adhering to a low target will generate both lower inflation and more stable output in the long run.

There is a widespread misperception that the Central Bank and Government regard inflation of 4% as acceptable. This is contrary to the intentions and language in the declaration on the inflation target of March 2001.

- Commentators should stop describing the reporting limits for inflation of 1% and 4% as “tolerance limits”, which implies that inflation of 4% is tolerable.
- The Bank should continue its efforts at public communication, emphasising that its inflation target is 2½ per cent

Recent increases in short-term policy rates have not translated into comparable increases in longer-term interest rates, thwarting the operation of monetary policy.

- The Central Bank’s increasingly explicit guidance as to the likely evolution of policy is welcome and should continue.
- If that is insufficient, the Central Bank should trade the relevant securities with a view to bringing interest rates into line with expectations.

Although the policy interest rate has risen by almost 8 percentage points over the last two years, this has been insufficient to keep inflation near the target.

- Monetary policy needs to respond more aggressively to changes in the outlook.

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## Chapter 3

# Improving fiscal management

*This chapter discusses budgetary policies against the backdrop of Iceland's longer-term fiscal position. With government finances in broad balance since budget consolidation in the mid-1990s, public debt has fallen significantly relative to GDP and is low by international comparison. At the same time, however, both the public expenditure and public revenue ratio to GDP have risen considerably. This reflects in part public spending overruns relative to budgeted values. Better expenditure control would both create room for tax cuts and allow fiscal policy to play a greater role in aggregate demand management. A problem in this respect is the lack of co-ordination and co-operation between the local and central governments.*

The fiscal stance was tightened considerably during the recent economic upturn and government finances moved to substantial surplus in 2005. Nonetheless, fiscal policy has been criticised – including by credit rating agencies – for not being restrictive enough and thus placing too large a burden on monetary policy to stabilise the economy. Indeed, personal income and wealth tax cuts decided in 2003 for structural reasons mean that – in terms of OECD estimates of the structural budget balance – the fiscal stance in 2005-2006 is probably similar to that in 1999-2000, the peak years of the previous investment-led boom, although economic overheating is arguably more serious this time. The challenge for policy makers is to convince the public that the expansionary effect of tax reductions needs to be offset by spending cuts and higher government fees until the economy cools down, notwithstanding the comfortable position of public finances. In fact, the authorities recently announced further postponement of public investment projects going forward, and it would be advisable to maintain a tighter fiscal stance in the 2007 budget through below trend real expenditure growth.

### A sound long-term fiscal position

Since the elimination of sizable budget deficits in the mid-1990s, the general government financial balance has been more often in surplus than in deficit. As a result, gross public debt has declined from almost 60% of GDP to 27%, while net public debt has fallen from nearly 40% to around 12%, with all the improvement occurring at the central government level. The central government's gross foreign debt has dropped below 10% of GDP as proceeds from the privatisation of Iceland Telecom have been used to accelerate repayment. At the same time, however, public companies, in particular the National Power Company, have accumulated foreign debt that is higher than that and guaranteed by the government. Still, overall, public finances are on a relatively sound footing from a medium- to longer-term perspective, although spending pressures in some areas (such as health care and education) need to be addressed. The long-term sustainability of public finances is supported by generational accounts, which have been calculated for Iceland since 1994 (Table 3.1). They estimate the present value of expected current and future taxes paid and transfers received over the life of all current and future individuals (see Benediktsson *et al.*, 2000) for a detailed description of the methodology). The results reflect both the fiscal stance (which was tightened considerably during the 1990s) and the business cycle (which provided the government with increased tax revenue in the second half of that period, see Hall and Johannsdottir, 2001). Although Iceland's generational accounts have deteriorated again in the current decade, intertemporal public liabilities are low by international standards, owing in part to the operation of occupational pension funds that have been mandatory for more than 30 years (and similar arrangements in the public sector). These calculations suggest that no significant changes to the tax structure are needed to assure fiscal sustainability, and that tax cuts are feasible provided that measures are taken to rein in public expenditure.

Table 3.1. **Generational accounts**  
% of GDP

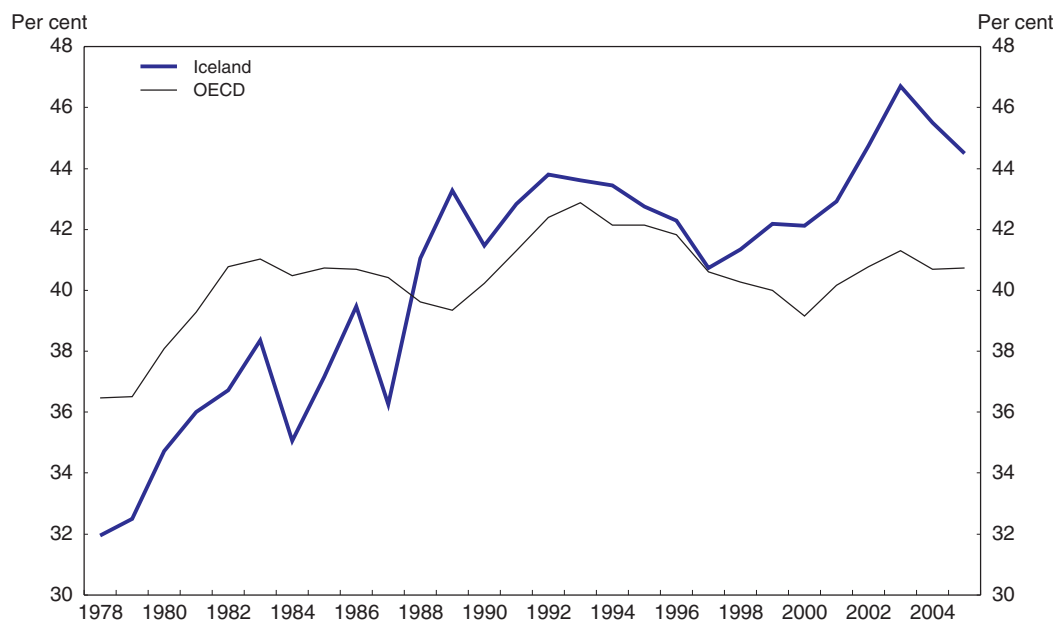
	Explicit debt	Implicit debt	Intertemporal public liabilities
1994	42	78	120
1995	44	28	72
1996	43	-5	38
1997	40	-40	0
1998	39	-55	-16
1999	33	-89	-56
2000	36	-79	-43
2001	37	-28	9
2002	36	30	66
2003	33	42	74
2004	28	25	53

Source: Institute of Economic Studies at the University of Iceland.

### Continued expenditure slippage

Iceland has been much less successful than other member countries in controlling public spending pressures. Over the last quarter-century, the public expenditure-to-GDP ratio has trended upwards, while it has stabilised in the OECD as whole since the early 1980s (Figure 3.1). As a result, public spending has significantly exceeded the OECD benchmark. An unfortunate implication of this trend is that it has required a parallel rise in the revenue-to-GDP ratio in order to maintain budget balance. The increase in the revenue ratio by around 15 percentage points since the turn of the 1980s lifted it to 48% of

Figure 3.1. **Public expenditure**  
Per cent of GDP



Source: OECD, Economic Outlook 79 database.

GDP in 2005, despite a number of tax rate reductions during the past decade. While the appropriate public spending ratio for a country is obviously a question of social choice, in the case of Iceland its elevated level is not entirely the result of conscious *ex ante* decisions.

Indeed, to a significant extent, the upward trend in the public spending ratio reflects fiscal slippage. Budget overruns have remained a problem despite the introduction of “frame budgeting” in the 1990s. While this approach improved planning and decision-making during the budget formulation phase, it was undermined by modifications during the Parliamentary phase of the budget process (mostly initiated by the government itself) and, in particular, by subsequent overspending that is to a large extent sanctioned by supplementary budgets (OECD, 2003). As to the former, changes to Parliamentary procedures have led to significant improvements so that it is no longer a matter of great concern. As can be seen from Table 3.2, Panel A, voted central government expenditure exceeded that in the initial budget proposal by less than 1% in 2004-2005, as compared to more than 4% in 2001, for instance. However, the situation has not improved to the same extent during the budget execution phase. In 2004 and 2005, spending outcomes surpassed budgeted levels by 9% and 4%, respectively. If items that are arguably not relevant to budget implementation (such as estimated pension liabilities, lost tax claims and capital income tax payments) are excluded, overruns are lower (by about one half on average, see Table 3.2, Panel B). In 2005, they seem to have virtually disappeared if the government’s tax liabilities

**Table 3.2. Proposed, voted and realised central government spending**

	ISK billion				Per cent		
	Budget bill (A)	Voted budget (B)	Outcome (C)	Difference B – A	Difference C – B	Difference B – A	Difference C – B
<b>A. Accrual basis</b>							
1998	163.0	165.7	189.6	2.7	24.0	1.7	14.5
1999	179.2	182.4	199.0	3.2	16.6	1.8	9.1
2000	190.0	193.2	229.0	3.2	35.9	1.7	18.6
2001	210.0	219.2	228.7	9.2	9.5	4.4	4.4
2002	239.3	239.4	267.3	0.1	27.6	0.0	11.7
2003	253.3	260.1 <sup>1</sup>	280.0	6.8	20.6 <sup>2</sup>	2.7	7.9 <sup>3</sup>
2004	273.0	275.3	300.4	2.3	25.1	0.8	9.1
2005	294.6	296.4	308.0 <sup>4</sup>	1.8	11.6	0.6	3.9
<b>B. Accrual basis, excluding pension liabilities, lost tax claims and capital income tax</b>							
1998	139.1	142.7	147.8	3.6	5.1	2.6	3.6
1999	151.8	155.3	164.8	3.5	9.5	2.3	6.1
2000	165.1	169.1	177.0	4.1	7.8	2.5	4.6
2001	185.7	190.9	201.6	5.1	10.7	2.8	5.6
2002	211.0	212.4	224.3	1.4	11.9	0.7	5.6
2003	227.3	234.6	248.5	7.3	13.9	3.2	5.9
2004	248.7	251.0	260.6	2.3	9.6	0.9	3.8
2005	269.8	271.6	271.5 <sup>4</sup>	1.8	-0.1	0.7	0.0

1. 264.8 including March supplementary budget.

2. 15.2 from March supplementary budget.

3. 5.7 from March supplementary budget.

4. Estimate.

Source: Ministry of Finance.



related to sizeable capital gains from the sale of Iceland Telecom are deducted, although operating costs are estimated to have exceeded the budgeted value by almost 2%. The fact that the budget balance nevertheless moved back into surplus is attributable to buoyant tax receipts associated with stronger-than-expected economic activity. Extra revenues have increased the scope for and reduced the resistance to providing supplementary appropriations after the enactment of the initial budget. A quite exceptional feature (especially compared to other Nordic countries) has been persistent overspending on projects and by government agencies, which sometimes has lasted several years. The National Audit Office has repeatedly observed that it found it unacceptable that many ministries and public bodies have far outspent their budgets year after year, a practice that is at variance with existing regulations governing the budget process and undermines stated government objectives. In its latest financial audit concerning the budget execution in 2004, the Office criticised in particular the widespread practice of transferring budget appropriations in excess of the stipulated 4% limit to the following fiscal year, as this unduly weakens the budget process (National Audit Office, 2005). The authorities have aimed to address these problems by strengthening regulations and providing incentives for public managers to keep expenditures within budgeted amounts, but it remains to be seen whether these moves are sufficient. They have also moved towards performance management, which focuses on outcomes while giving budget managers considerable flexibility regarding inputs. This approach should be generalised if evaluations show positive results.

Another move to get a better handle on government finances has been the adoption of a medium-term fiscal framework, starting with the 2004 budget. It includes spending growth ceilings for public consumption and transfers, whose annual increase is to be limited to 2% and 2½ per cent, respectively, in real terms. So far, these limits have not been respected. Real public consumption grew by around 3% in both 2004 and 2005 and is officially projected to expand by 2½ per cent in both 2006 and 2007. This is not only due to developments at the local government level. The central government has also overshot the stated objectives, though to a smaller extent. Its consumption expanded by just over 3% in 2004 and by just over 2¼ per cent in 2005, and is officially projected to continue to grow at about that pace in 2006 and 2007. While it might be argued that the spending objectives are not overly ambitious, the authorities have pointed out that they reflect relatively high population growth in Iceland. In any case, it is important for policy credibility that at least the stated targets be rigorously met. However, there is a case for strengthening the medium-term fiscal framework further. Adopting nominal – rather than real – multiyear spending targets would not only make them more transparent and enforceable, but also be more consistent with the inflation-targeting framework introduced in 2001. In particular, the government has been accommodating wage increases that are at variance with the inflation target. This is reflected in the evolution of medium-term projections since the 2004 budget (Table 3.3). Projections of (nominal) central government expenditure for 2007 have slipped by more than 6% since then, and this is likely to be optimistic since the estimated outcome for 2005 was almost 10% above the medium-term projection published in the 2004 budget. Deviations have been most extreme for education expenditure and social transfers, whose projected 2007 levels are now 23% and 15% higher than initially.

Table 3.3. **Medium-term expenditure projections**

ISK billion

	2005	2006	2007
2004 Budget	284.7	303.2	325.4
2005 Budget	294.6	308.3	328.5
2006 Budget	312.3	313.2	345.7

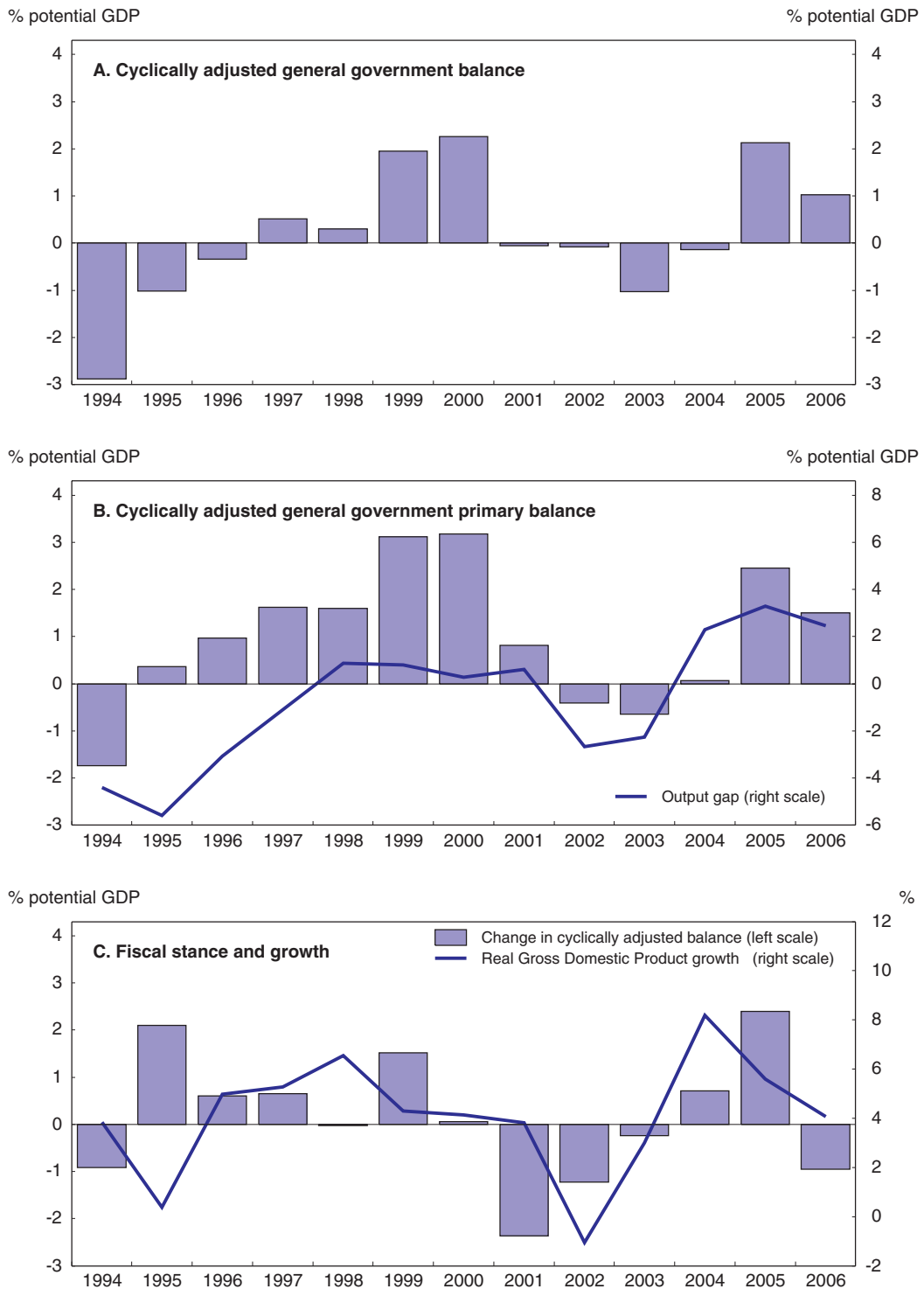
Source: Ministry of Finance.

## Demand management

Over the last decade, Iceland has allowed fiscal automatic stabilisers to play relatively freely and discretionary measures have in general been counter-cyclical (Figure 3.2). The cyclically-adjusted general government balance moved into sizeable surplus during the boom in the late 1990s, though arguably a little late since a positive output gap had already emerged by 1998. Fiscal restraint was then appropriately withdrawn in the following downswing. Like in the previous cycle, fiscal policy was slow to respond to the subsequent strengthening of activity. By 2004, the adjusted budget balance was still in slight – albeit diminishing – deficit, reflecting a massive rise in public investment by one-third (mainly at the local government level, see below). However, by 2005, a structural surplus of around 2% of potential output had emerged, similar to that recorded in the late 1990s. In terms of the cyclically-adjusted primary balance (excluding net interest payments), the picture is broadly the same. The issue is whether in the current cycle a late tightening is followed with too early an easing of the fiscal stance. Substantial tax cuts mean that – in the absence of corrective measures – this time the structural budget balance will rapidly deteriorate this year and next, while the surplus remained at a high level for another year in the late 1990s, despite a much smaller positive output gap than at present, according to OECD estimates. It would certainly be more prudent to take offsetting measures – such as temporary expenditure restraint and the extension of user fees in health care and education – until there are clear signs that the adjustment process is making progress and inflation expectations decline. The recently announced spending cuts are a welcome first step in this direction.

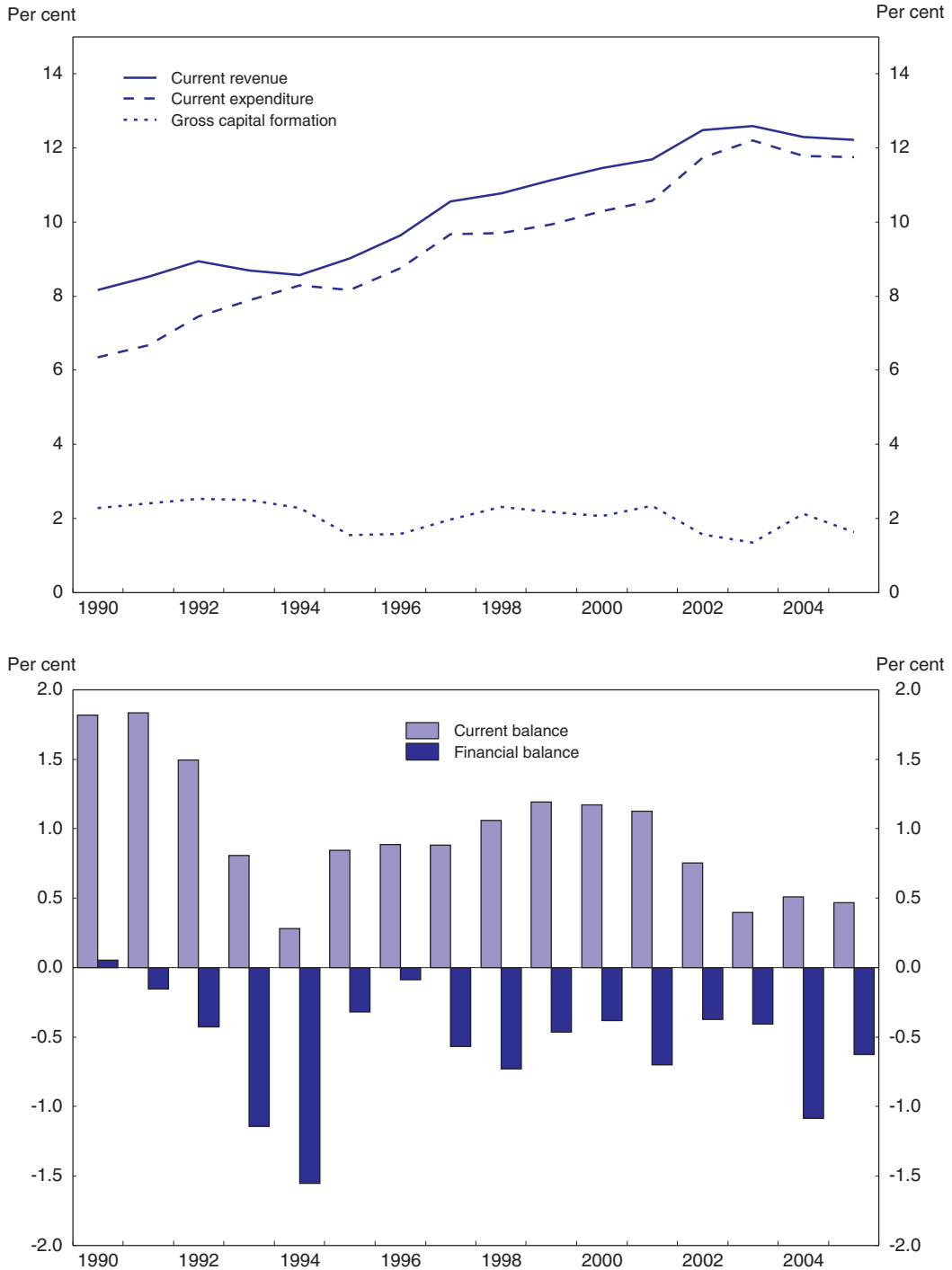
The authorities have argued that the personal income tax cuts would have positive supply effects, preventing them from contributing to overheating. However, such effects tend to be gradual and are likely to be limited by the already high rate of labour force participation in Iceland. They have also underlined that structural change has increased the economy's resilience and have quoted studies of other small countries (such as Hoeller *et al.*, 2002) that suggest that – because of the size of fiscal tightening alone needed to counter overheating and the difficulties in getting the timing of measures right – fiscal activism tended to be counter-productive (Ministry of Finance, 2005). While the economy indeed showed remarkable resilience earlier in the decade, current imbalances are arguably too large to rely solely on the economy's capacity to adjust and the working of fiscal stabilisers, which are less powerful in Iceland than on average in the OECD according to recent estimates (OECD, 2005, and Girouard *et al.*, 2005). A recent study (Gestsson and Herbertsson, 2006) confirms that a counter-cyclical government spending policy is in principle the most promising tool in mitigating economic fluctuations, although only a few OECD countries (including small ones) have been able to implement it successfully. Should there be a view that the pre-conditions for such a policy do not exist in Iceland, a second-best fiscal rule would be to allow government spending to grow by a pre-determined rate

Figure 3.2. Fiscal stance and growth



Source: OECD, Economic Outlook 79 database.

Figure 3.3. **Local government finances**  
Per cent of GDP



Source: Statistics Iceland.

### Box 3.1. Recommendations regarding fiscal management

The government's tax reduction programme provides a considerable stimulus to the economy at a time when monetary policy is tightening to fend off the inflationary pressures stemming from exchange rate depreciation and excess demand in goods and labour markets.

- Offset the expansionary effect of tax cuts by additional spending restraint so long as there is no clear evidence that the economy is cooling down.
- While the personal income tax cuts are desirable because of their positive supply effects over the medium term, user fees in the education and health care sectors should be raised both for short-term stabilisation reasons and to address the longer-term cost pressures in these areas.

Spending overruns remain an issue, limiting both the government's ability to pursue a demand management policy and the scope for tax reductions. The government's medium-term fiscal programme that includes multi-year spending targets has so far not been an unmitigated success.

- Further strengthen the "frame budgeting" process by generalising outcome-based budgeting and tighten budget execution, limiting the use of supplementary budgets.
- Make sure that the stated limits on the real growth of public consumption and transfers are respected.
- Consider the introduction of multi-year budget plans with spending limits made binding in nominal terms in order to further strengthen the medium-term orientation of expenditure policy and budget discipline.

The existing consultation mechanisms are not sufficient to co-ordinate fiscal policies at different levels of government, as evidenced by the fact that spending tends at the local government level – partly resulting from wage developments – often undermine the central government's stabilisation efforts.

- Make the co-operation between the central and local levels of governments more effective through binding annual agreements to ensure the achievement of national spending objectives.

derived from potential output growth and let automatic stabilisers play on the revenue side. But, in any case, medium-term expenditure targets would have to be met. And, to be consistent with the inflation target, they should be set and made binding in nominal terms.

## Local government finances

In contrast to the central government, local governments (that is, the municipalities) have been in constant fiscal deficit over the past decade. In fact, one has to go back to 1990 to find a surplus in their finances (Figure 3.3). Like the central government, local governments moved into substantial financial deficit in the first half of 1990s as weak economic growth depressed their revenues. In 1997, they took over the operation and funding of compulsory schools from the central government (see Chapter 5), but at the same time part of the personal income tax receipts was shifted to them. Even after this change in responsibilities, local government expenditure continued to rise as a share of GDP. To take some pressure off their finances, the municipalities were allowed to increase their income tax rates (to just over 13%), which explains in part the rising overall tax

burden in spite of tax cuts at the central government level over the past decade or so. Nonetheless, a declining operating surplus in recent years obliged local governments to curb the growth of current spending. Contrary to the latter, local governments' investment has remained relatively stable as a share of GDP, apart from short-term fluctuations. As noted, a jump in investment at the local government level partly offset the central government's efforts to restrain public spending in 2004. More generally, local government finances have shown little correlation with the business cycle, moving, if anything, in a pro-cyclical way. This highlights the importance of a closer co-operation between levels of government and a co-ordination of their spending targets. The government's recent announcement that discussions would be held with municipalities with the objective of reducing their investments this year and next is welcome, but co-operation should be institutionalised, with binding annual agreements between the central and local governments ensuring the achievement of national spending objectives.

## Concluding remarks

Although the long-term position of public finances is comfortable, serious imbalances and tensions in the economy require a tight fiscal stance in the near term to take some pressure off monetary policy. Expenditure discipline needs to be enhanced further to reverse the upward trend in the public spending-to-GDP ratio and create room for tax reductions. The long-standing problem of often diverging trends in central and local government policies needs to be addressed. Box 3.1 makes some recommendations in these respects.

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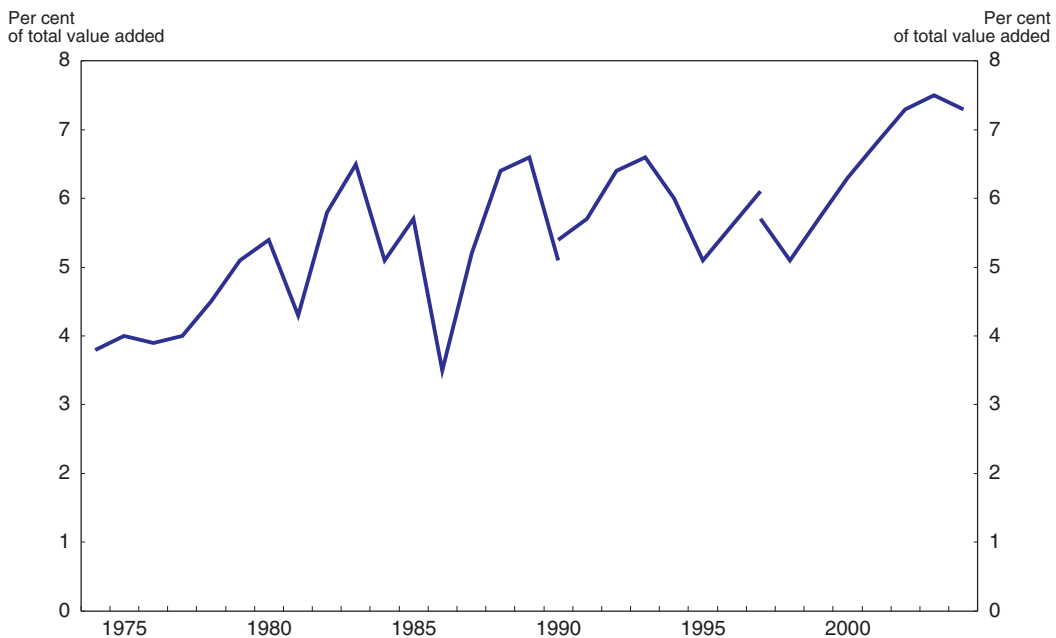
## Chapter 4

# Building on the success of financial liberalisation

*This chapter discusses recent developments and policy issues relating to financial markets in Iceland. Overall, the sector is thriving, both relative to history and to conditions in other countries. This bodes well not only for those directly involved in the industry but for the country as a whole, as financial development is an important source of economic growth. Recently concerns have been expressed about the stability of the financial system; however the guarded assessment of financial supervisors and ratings agencies is that the system is broadly sound. A significant part of the credit for the vitality of the financial sector probably lies with government policy – in particular, the opening of the sector to international markets and the privatisation of the banks. Market liberalisation has been successful so far and should continue. In this respect a policy priority is to remove distortions in the market for home mortgage lending. In particular, the government guarantee for the Housing Financing Fund should be removed or neutralised; for example, by charging a fee. Iceland’s unusual reliance on indexation of loans is generally sensible for the borrowers and lenders involved and may have wider benefits. So restrictions on indexation of bank deposits and loans should be repealed. The financing of innovative start-ups is a difficult issue, where “best practice” guidelines are not obvious. Consideration should be given to use of less bureaucratic means of financing start-ups.*

Iceland's financial sector has expanded considerably. As shown in Figure 4.1, its share of output has risen from 4% of GDP in the mid-1970s to an average 5½ per cent in the 1990s to 7½ per cent recently. The sector is now a bigger part of the economy than high-profile industries such as fishing (5% of GDP), electricity (4%) or aluminium (1%). Real output of financial services is difficult to estimate, but simple measures of activity point to dramatic growth. For example, domestic lending of the credit system (assets, including portfolio investment, excluding those of foreign subsidiaries) has risen by an average of 15% a year since 1996 (compared with growth in nominal GDP of 8%). Much of this growth has occurred within the banking system, where domestic lending and securities has risen an average 25%. The last few years have been especially remarkable. Domestic lending and securities of the banking system grew by 37% in 2004 and 50% in 2005, while that of the credit system as a whole rose by 20% and 30%. Other measures of the quantity of financial services have also shown phenomenal growth. For example, the number of cheque, credit and debit card transactions has tripled since 1994.

Figure 4.1. **Financial intermediation: contribution to GDP<sup>1</sup>**



1. There are breaks in the series in 1990 and 1997.

Source: Statistics Iceland.

This growth of Iceland's financial sector is interesting in its own right. But it is also highly encouraging for Iceland's future economic prospects. Economic research suggests that financial development can play a key role in economic growth. As a representative



example, the results in King and Levine (1993) imply that variation in the size of the financial sector can account for about a fifth of cross-country variations in long-run growth rates. Comparing a group of slow-growing countries with a group of fast-growing countries, the difference in sizes of their financial sector accounted for a difference in average growth rates of about 1 percentage point a year. Many other researchers, using different data sets and techniques, have made similar findings, though the results are not unanimous. For surveys of this research, see Levine (2004) or Wachtel (2003). These results appear to be fairly robust to how other influences are controlled for and to reflect a causal effect from finance to growth. The effect of finance appears to reflect development of both equities markets and debt markets and to occur in both rich and poor countries.

There are several reasons why financial market development boosts economic performance. Most obviously, capital should be more productive if it can freely flow to those sectors where demand for it is greatest. In particular, ready access to capital facilitates investment in machinery and equipment, which is an important source of rising living standards. But perhaps more important, a financial sector that facilitates access to capital will promote innovation and hence economic growth over the long run. Consistent with this last channel, Jaumotte and Pain (2005) identified financial development as an important determinant of research and development spending and patenting activity.

Iceland's experience seems to be consistent with a favourable effect of financial development, although, given how recently its financial system has been developing; it is too early to point to strong evidence. As noted in Chapter 1, the Icelandic economy has been growing at an average rate of 4% a year over the last decade, which is notably faster than previous experience or the growth rates of other OECD economies. One cannot attribute all, or probably even most, of this growth to financial development, given that many other positive factors have also contributed. Nevertheless, market participants believe that improved access to capital has played an important role. Innovative entrepreneurs now appear to find it easier to expand their businesses. The banking sector itself is a prominent example, discussed in more detail below.

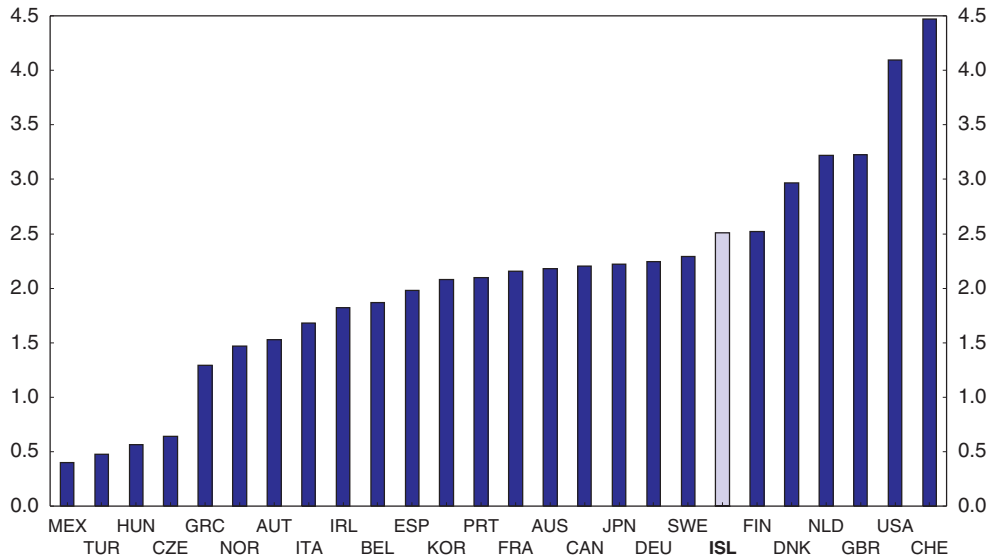
Motivated in part by these issues, this chapter documents Iceland's financial development and explores some of its implications. It then turns to three important policy issues: government lending for housing; Iceland's unusual reliance on indexation of debt to inflation; and the financing of innovative start-ups. The general conclusion is that the liberalisation of financial markets has been of considerable benefit to Iceland and should continue.

## Financial development

### **A rapid expansion**

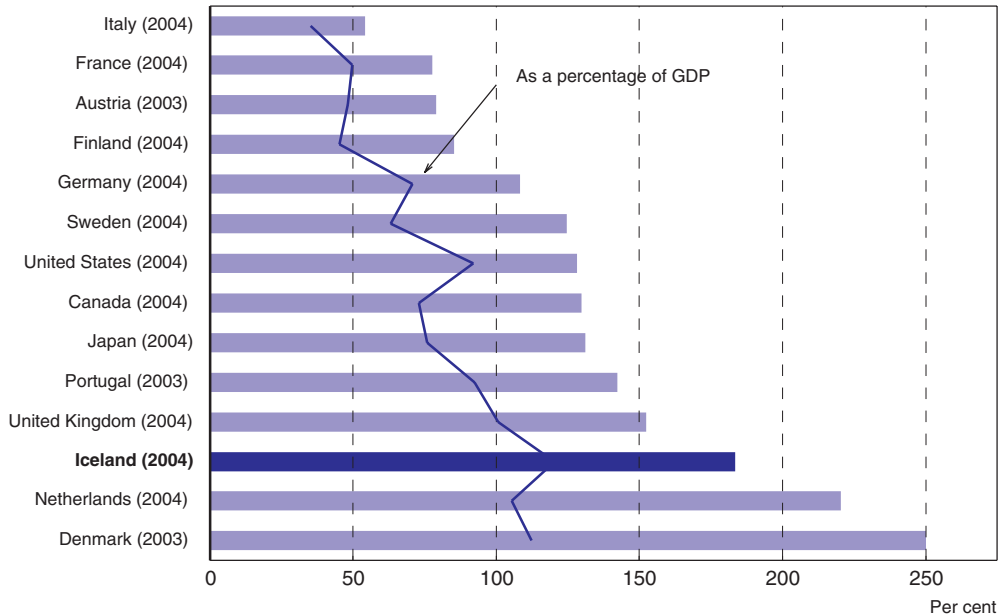
As discussed above, Iceland's financial sector has been growing strongly (Figure 4.1). In particular, firms and households have been borrowing increasingly heavily (Figure 1.7). As a result, Icelanders make relatively heavy use of financial services. One broad measure of this is the ratio of private sector loans and securities capitalisation to GDP (Figure 4.2). A narrower measure is the ratio of household debt to income (Figure 4.3). These are higher in Iceland than in most OECD countries. Several factors may help to explain this including large pension savings, the long duration of household mortgages, the young age of the population, and rapid productivity growth (Karlsdottir, 2005). A standard interpretation of

**Figure 4.2. Total loans to private sector and securities market capitalisation**  
As a ratio of GDP, 2000-2003 average



Source: World Bank Financial Structure database.

**Figure 4.3. Household debt in selected countries**  
Percentage of disposable income, 2004 or latest available year

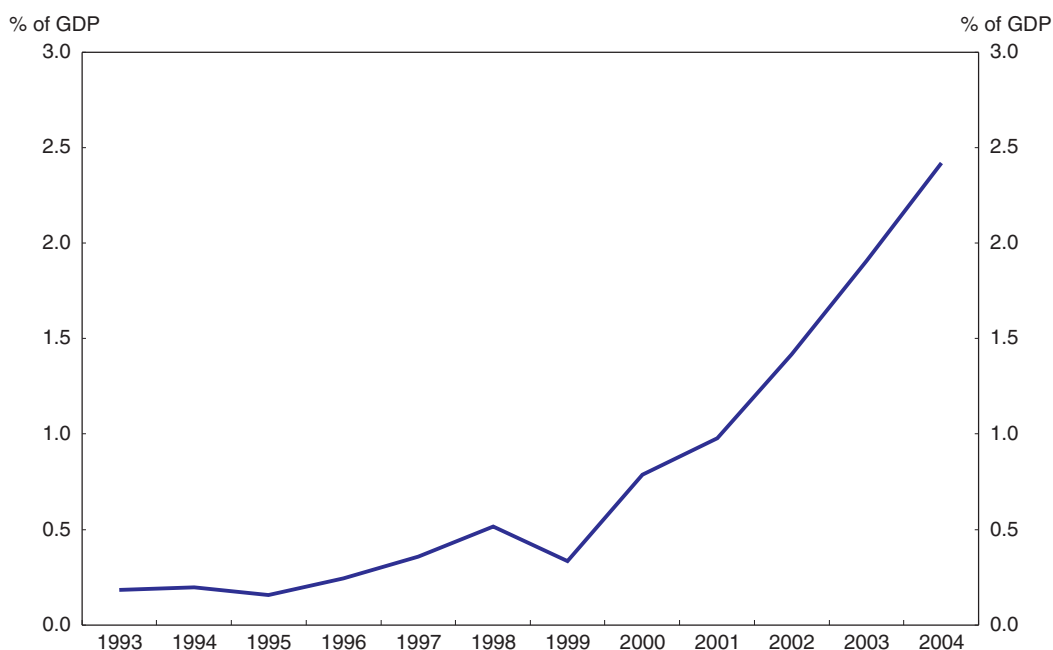


Source: OECD, Annual National Accounts database and Central Bank of Iceland.

these measures, consistent with the empirical literature (Levine, 2004), is that they indicate well developed financial markets and relatively easy access to finance.

However, on some other measures Iceland's financial sector is still under-developed. For example, it has few markets for derivatives. And trading in standard financial products, like foreign exchange, bonds or equities, is often thin. These limitations seem to mainly reflect the small size of the economy, which impedes liquidity. They can be expected to be overcome with advances in time, income and technology. As one indication of this, Figure 4.4 shows the rapid increase in turnover and hence liquidity of stocks on the Icelandic Stock Exchange. The ratio of turnover to GDP has been rising by an average 35% a year since 1993. This is encouraging in part because research suggests that stock market liquidity facilitates long-run growth. Levine (2004) gives several references. Liquidity in the bond market has been developing at a similar pace (Kaupthing Bank, 2005).

Figure 4.4. **Turnover on Icelandic Stock Exchange**



Source: Statistics Iceland.

Not just the quantity, but also the variety and sophistication of financial transactions have increased. The financial sector has expanded into many new lines of business, often quite recently. To give some examples, banking by internet and other forms of electronic transactions have exploded. Refinancing of home mortgages is now common; before 2004, this service was not offered. Banks now offer “one-stop shops” for home loans. Previously, borrowers took out different mortgages from different lenders, at different rates and conditions. (Housing finance is discussed in more detail below.) Large investment projects are now financed by domestic rather than foreign banks. In 1998 when the predecessors of Century aluminium financed their green field smelter, only one Icelandic bank (FBA, now part of Glitnir) participated in the syndication. Seven years later, the refinance and expansion financing were led by the Icelandic banks. New products are regularly being

offered on the market. For example, Kaupthing Bank has recently announced that it will start issuing mortgage-backed securities. Similarly, in 2005 foreign borrowers started issuing bonds denominated in Icelandic krónur. Although targeted at small foreign investors, these affect domestic markets through adding liquidity and depth.

### ... especially abroad...

The expansion of Icelandic financial institutions into foreign markets has been especially dramatic. In the last few years the three major banks have each made a number of substantial foreign acquisitions, particularly of banks in Nordic countries and the United Kingdom. Their foreign subsidiaries are now of similar size to their domestic assets (Table 4.1). Reflecting this expansion, the total assets of the commercial banks (plus the largest savings banks)<sup>1</sup> rose to 200% of Iceland's GDP in 2003 and 370% of GDP in 2004. As a result, the three major banks are now huge relative to the size of Iceland's financial markets. As of November 2005 they accounted for 55% of the total capitalisation of the Icelandic stock exchange (Table 4.1).

Table 4.1. **The 3 major banks**

	Kaupthing	Landsbanki	Glitnir (formerly Islandsbanki)
Market capitalisation (as of November 2005, ISK billion)	439	263	215
Share of Icelandic stock exchange	26%	16%	13%
Foreign subsidiaries as share of total assets (as of end-2005)	62%	22%	39%

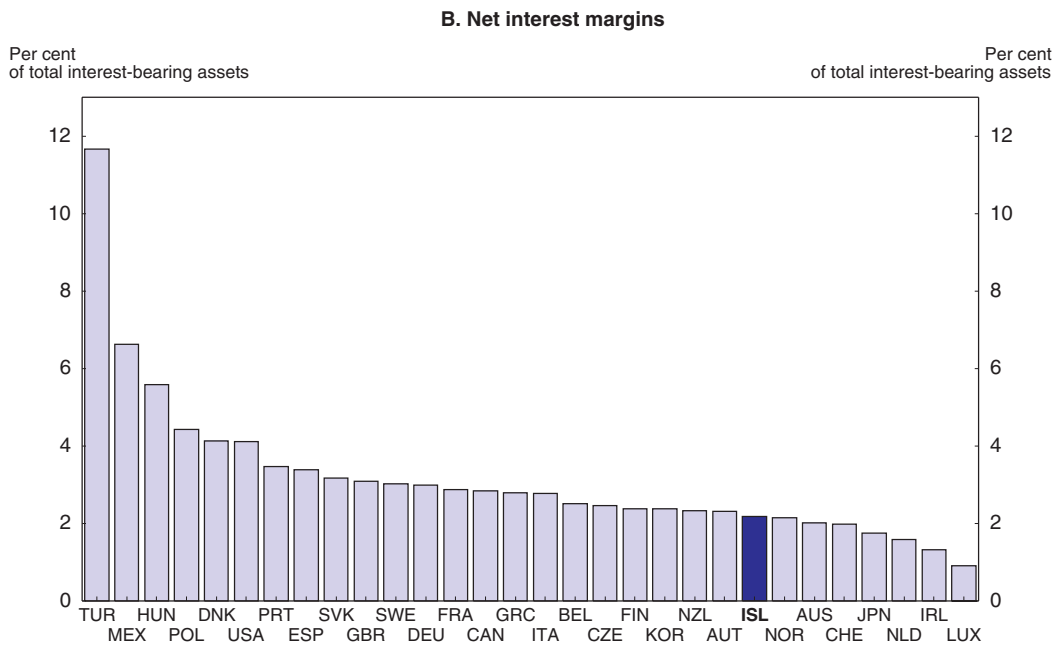
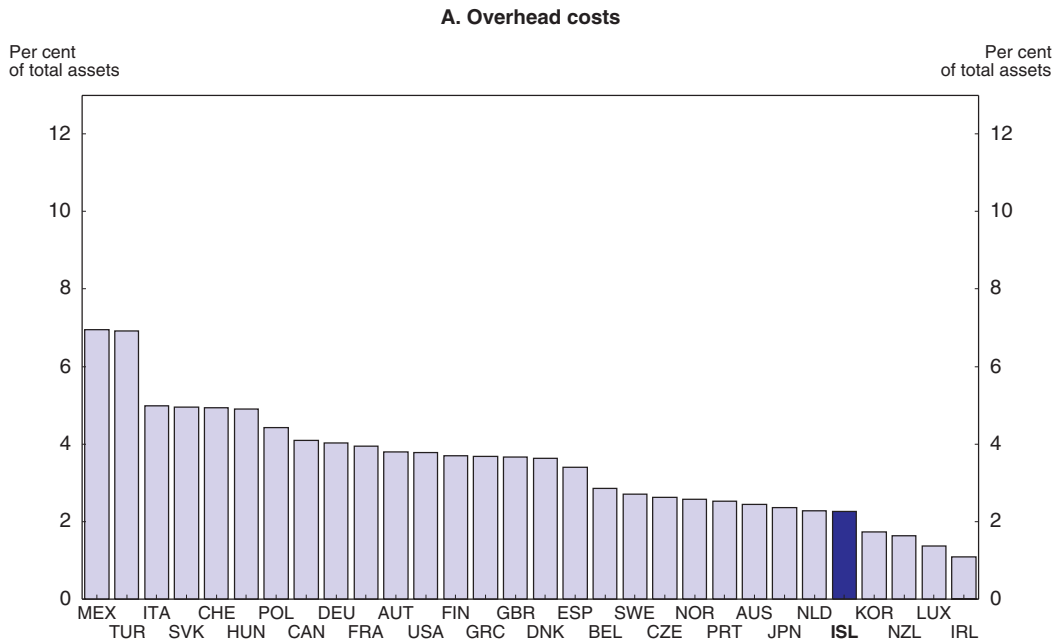
Source: Iceland Stock Exchange, Central Bank.

The banks' strategy for foreign expansion via aggressive acquisitions has involved early identification of under-priced assets and using favourable credit ratings to lower the cost of borrowing to newly acquired firms. The positive image of Iceland in the target countries has also been an advantage. However, the explanation that market observers emphasise is that banking is simply something that Icelanders do well. The Icelandic bankers are young, outward-looking, educated and highly receptive to new technology. Banking has a high status in the society. Assessing the importance of factors like these is difficult. But more objective performance measures are favourable. As measured by standard cost ratios (Figure 4.5) the Icelandic banks are efficient by international standards. Fees charged by Icelandic banks tend to be substantially lower than those charged by counterparts in other Nordic countries (Baldursson and Jonsson, 2004).

The expansion of the banks abroad has been of clear, if perhaps somewhat narrow, benefit to Iceland. The main payoff has been a larger return to capital. The banks' combined return on equity was 24% in 2003, 32% in 2004 and 42% in 2005. This has been an obvious boon to their shareholders, but also to the tax authorities, through swelling corporate tax receipts. Because the expansion has been through acquisitions rather than export of services it has involved relatively modest increases in employment within Iceland. However, headquarters, liquidity management and risk management have been concentrated in Reykjavik. Partly reflecting this, financial sector wages have risen strongly. The average salary paid by financial institutions rose by an average annual rate of 16% between 1999 and 2004, outstripping the economy-wide wage index, which rose only at a 7% rate.<sup>2</sup> Most of this divergence has occurred in 2003 and 2004.

Figure 4.5. **Bank activities: costs and interest margins**

Average 1996 to 2003



Source: World Bank, Financial Structure database and World Retail banking report, 2005.

Other repercussions of the expansion have been favourable but relatively modest. Because the expansion largely reflects acquisitions rather than aggressive lending, it has broadened and diversified the banks' asset holdings. Because it has been financed by equity and subordinated debt it has not weakened capital adequacy. So the expansion has probably lowered systemic risk – even though the range of risks to which the Iceland banks are exposed has broadened. There do not appear to have been substantial transfers of technology arising from the acquisitions – if anything, the transfers have flowed out from Iceland rather than in.

### ... followed market liberalisation...

The growth of the financial market follows a wave of market-oriented policy changes. Over the past two decades Iceland's financial system has been transformed from one that was highly regulated by international standards to one where the authorities' role now tends to be supervisory, rather than managerial (with some exceptions, discussed below). Table 4.2 provides a chronology. In general, the sector has been opened up to international capital; interest rates and other prices now reflect supply and demand; innovation is permitted and rewarded; and most institutions are now privately owned.

Table 4.2. **Financial market liberalisation in Iceland: Some important steps**

Event	Year
Financial indexation permitted	1979
Liberalisation of domestic bank rates	1984-86
Iceland Stock Exchange established	1985
Interest Rate Act: interest rates fully liberalised	1987
Stepwise liberalisation of capital movement begins	1990
Treasury overdraft facility in the Central Bank closed	1992-93
New foreign exchange regulation marks the beginning of liberalisation of cross-border capital movements	1992
Interbank market for foreign exchange established	1993
Iceland becomes a founding member of the EEA	1994
Long-term capital movements fully liberalised	1994
Short-term capital movements fully liberalised	1995
Foreign direct investment liberalised in accordance with EEA agreement	1995
Interbank money market	1998
Interbank FX swap market	2001
Privatisation of state-owned banks completed	2003

Source: Central Bank of Iceland (2005a)

Of these numerous reforms, two are most often emphasised by market observers. First, Iceland joined the European Economic Area (EEA) in 1994. Membership has involved including within Icelandic law all existing and future EU directives in the field of financial services. These opened the country up to international capital directly while facilitating trade through harmonisation and transparency. Second, government-owned commercial banks and investment funds were privatised between 1998 and 2003. This is widely perceived as having replaced a sluggish and inward-looking culture with a more entrepreneurial spirit. Furthermore, it enabled the banks to raise the equity that financed their expansion. This arguably would not have been possible under the previous structure of government ownership and control.

The extent to which this reform programme is responsible for the subsequent financial development and economic growth is unclear. The experience of other countries definitely implies that the liberalisation will have been helpful. For example, La Porta *et al.*,

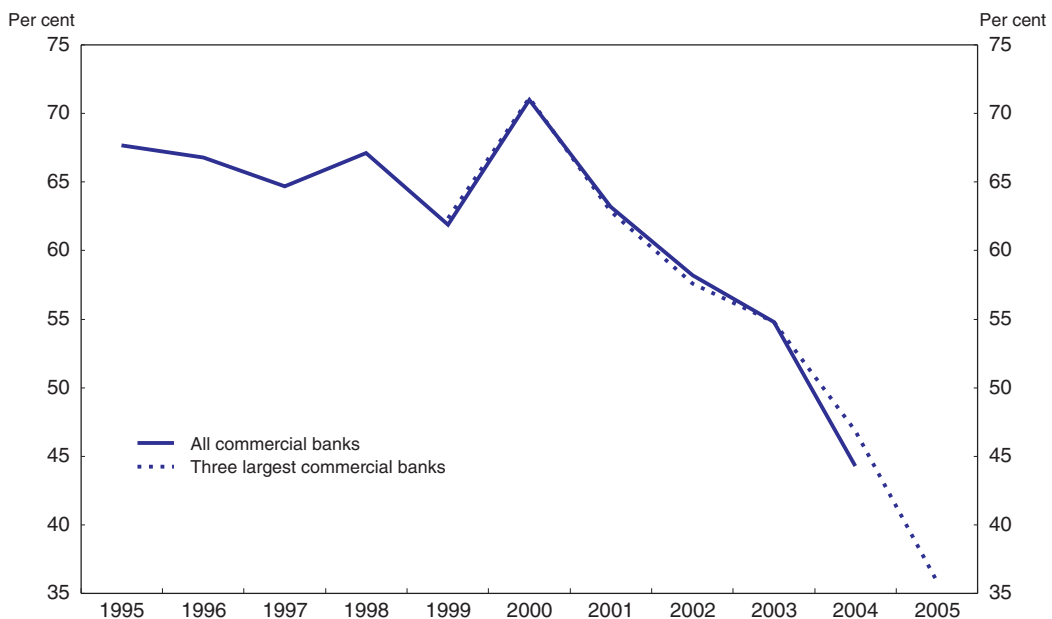
(2002) show that lower degrees of public ownership of banks are associated with both higher levels of bank development and faster economic growth. Many studies find that openness to trade in general promotes growth (for example, Sachs and Warner, 1995; Frankel and Romer, 1999; OECD, 2005). This seems to apply especially to the banking sector, where openness boosts economic performance not just of the industry itself, but more broadly. (See, for example, Kroszner and Strahan, 2006).

Direct evidence from Iceland is less clear. In part, this is because other factors, like computerisation and globalisation also boosted financial market development and disentangling relative contributions is difficult. Nevertheless, timing considerations suggest that policy was probably important. The most rapid development occurred after the major reforms of the mid to late 1990s. In particular, the rapid expansion of the banking system seemed quickly to follow privatisation. In contrast, changes in technology and global markets have been underway for some time.

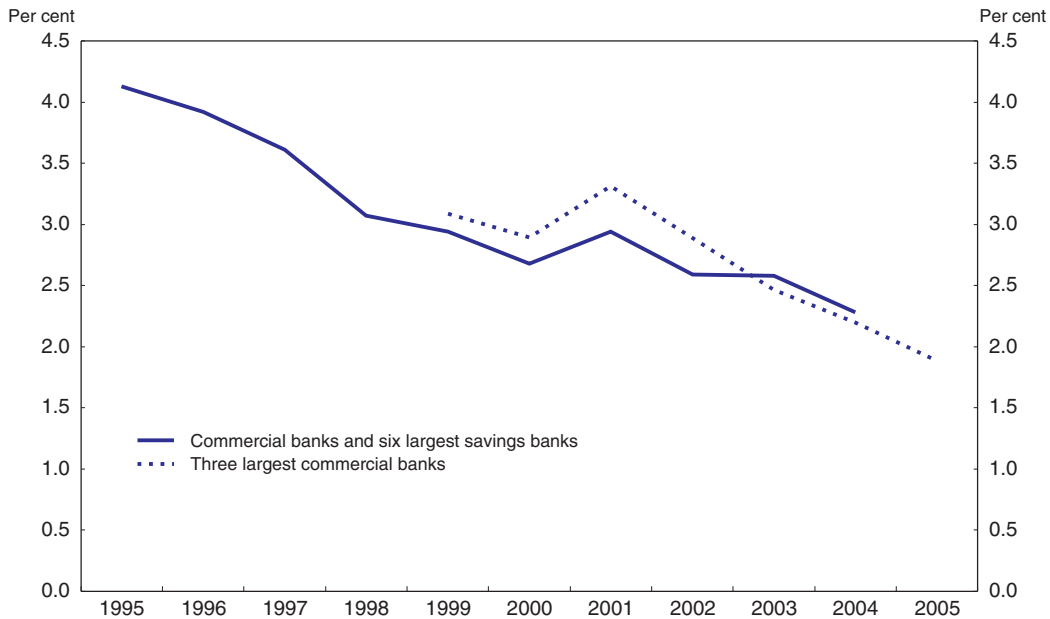
Differential speeds of adjustment are also consistent with this. Liberalisation seems to have proceeded at a faster pace in Iceland than in other countries – in part because the starting point was more interventionist. Hence the more rapid growth of the Icelandic financial industry than those of other countries also suggests the important role of policy. The clearest evidence of this growth difference is that, while Icelandic banks have been growing abroad, foreign banks have not set up operations in Iceland (though they are welcome to do so).

One of the ways in which liberalisation contributes to economic performance is through raising financial sector efficiency. For example, this can occur through aligning incentives with outcomes, by a reduction in bureaucracy, or greater exposure to trade. As shown in Figure 4.6, operating expenses have declined relative to net operating income. As shown in Figure 4.7, net interest margins have also declined dramatically. Average

Figure 4.6. **Cost/income ratio**  
Operating expenses as a proportion of net operating income



Source: Central Bank of Iceland.

Figure 4.7. **Interest margin**<sup>1</sup>

1. Net interest income as a ratio of the average between total assets at the start and end of the period.

Source: Central Bank of Iceland.

measures such as these are crude, and can be affected by many factors in addition to productivity. Nevertheless, market observers generally believe that the industry has become much more efficient following market liberalisation.<sup>3</sup>

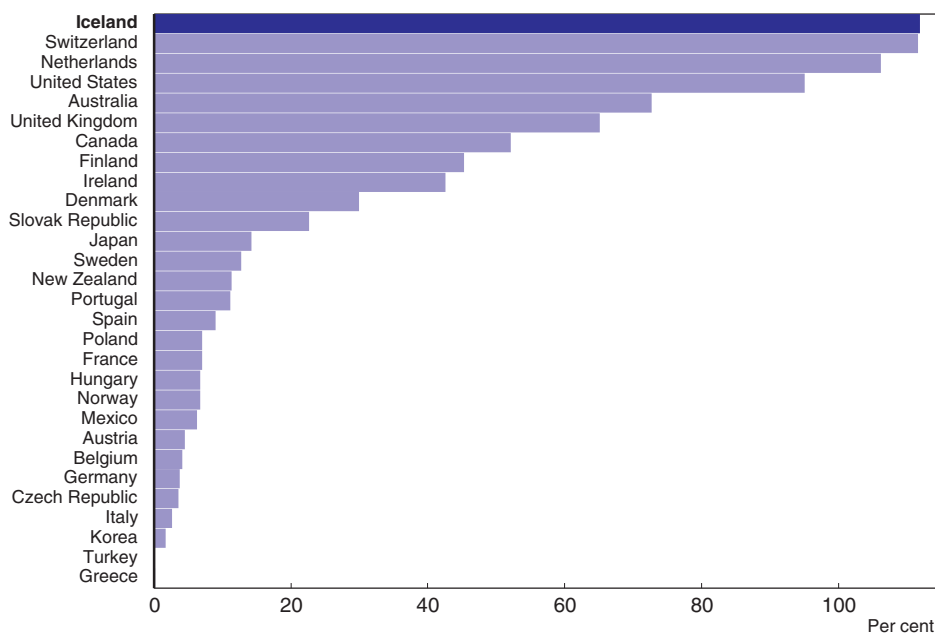
The economic literature tends to find that policy measures aimed at promoting competition and efficient operation of markets are conducive to financial development (de Serres et al., 2006). However, this does not mean that well-designed regulations aimed at correcting identifiable market failures do not have a role. Two government interventions are worth mentioning as having played an important role in the development of Iceland's markets, even though both were designed to address other issues. First, in 1984 Individual Transferable Quotas were introduced in the fishing industry. This has made a large component of Iceland's wealth much more easily traded on markets (Kristinsson, 2005). Second, contributions to pension schemes, made compulsory in 1974, have been progressively extended and increased (Gudmundsson and Baldursdottir, 2005). Net assets of pension funds now account for 39% of total assets of the credit system. Iceland now has the largest pension funds, relative to GDP, of any OECD country (Figure 4.8).

Relative to other countries, the Icelandic banking sector is extremely concentrated. Retail banking is dominated by the three main commercial banks. Of course, this reflects the small size of the Icelandic market. However, there is also a large fringe of small savings banks and pension funds that offer some financial services. Home loans are also provided by the Housing Financing Fund. Icelandic firms and governments have often gone overseas for investment banking services, though domestic banks are increasingly able to meet these demands. No foreign banks are located in Iceland. However, this does not reflect any policy impediment – to the contrary, their presence would be welcomed and their participation has been actively sought in the past (most recently, at the time of the bank



Figure 4.8. **Importance of pension funds in the economy, 2004**

As a per cent of GDP



Source: OECD, *Global Pension Statistics*.

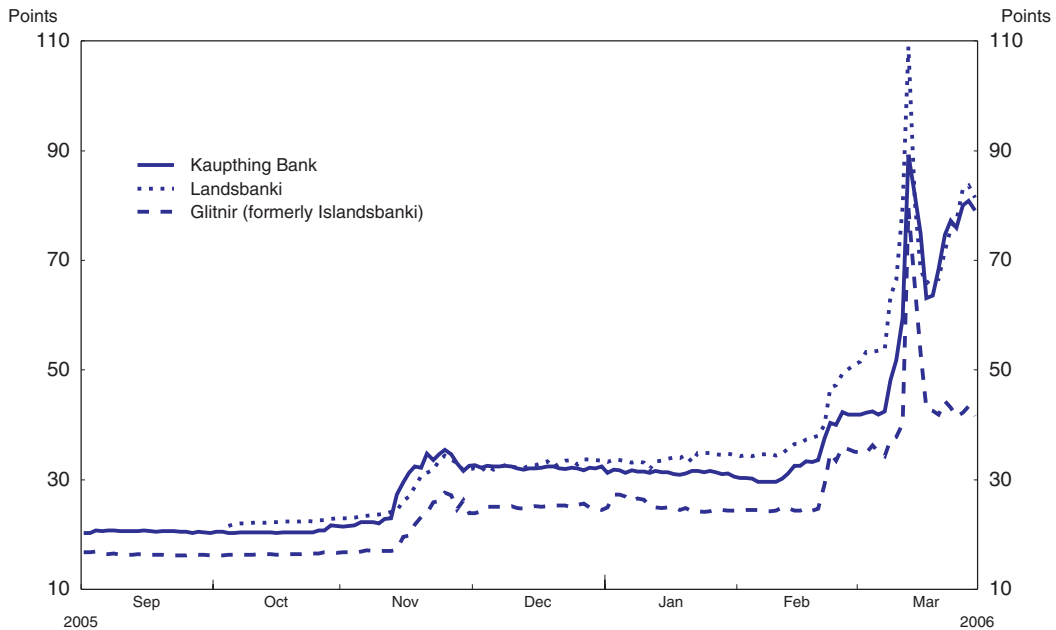
privatisations). Foreign banks have long been active in lending to governments and large businesses. Overall, the banking sector may not appear to be competitive, but it is contestable.

### **... and has raised stability concerns...**

Many concerns have recently been expressed about the stability of the Icelandic banking system. Examples include Fitch Ratings (2006), Merrill Lynch (2006) and Danske Bank (2006). These and other observers have worried about high levels of debt and large exposures of financial institutions to house prices, share prices and the exchange rate, all of which have been at elevated levels. In response to these concerns and other factors, such as unwinding of the international carry trade, Icelandic capital markets have been highly volatile. Between mid-February and early May, the Icelandic krona depreciated by around 20% (Figure 1.4), while share prices fell by a similar amount. These realignments will have serious macroeconomic implications. For example, as discussed in Chapter 2, the exchange rate depreciation means that the Central Bank is unlikely to approach its inflation target in the absence of large interest rate increases. How far-reaching the effects will be on the financial system is not clear. Interest margins for the three main banks have increased considerably (Figure 4.9), which, at the least, will slow their expansion. Representatives of leading financial institutions have suggested that the changes to date can be easily absorbed, although a substantial contraction of the economy would make things more difficult.

The stability of the financial system seems likely to remain an issue for some time. Iceland's high current account deficit, its rapid credit growth and the volatility of the economy will always make foreign investors somewhat nervous. However, these risks are offset by several positive factors. The balance sheets of financial institutions seem healthy.

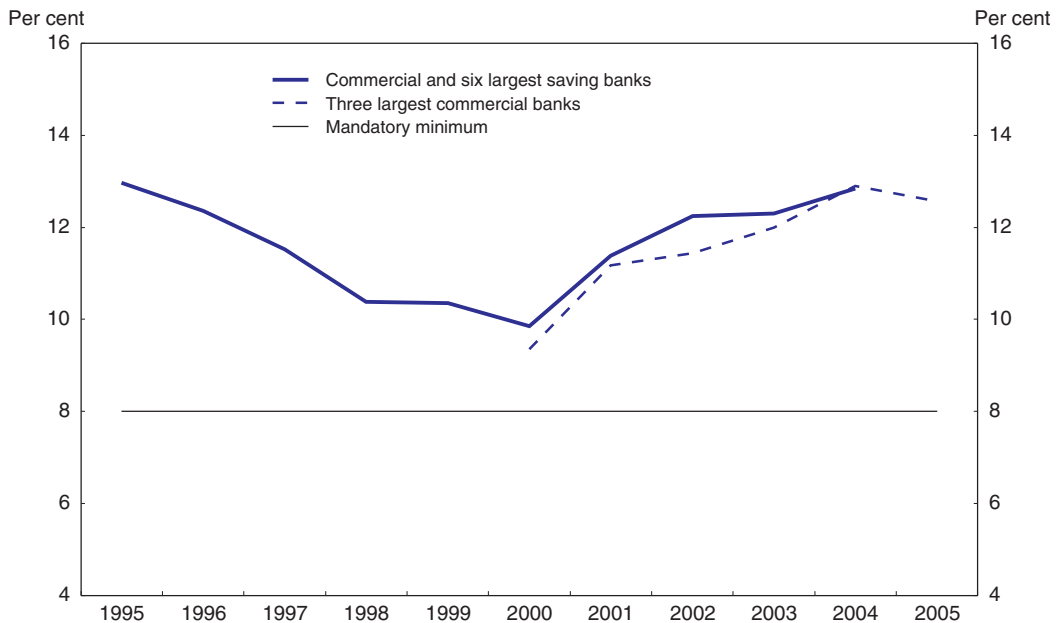
Figure 4.9. **Risk premium on Icelandic bank bonds**  
Icelandic Eurobonds maturing in 2010



Source: Central Bank of Iceland.

In particular, the major banks are well capitalised (Figure 4.10), and their assets are increasingly diversified. Much of their rapid expansion, both in Iceland and abroad, has been financed by equity and subordinated debt. Both borrowers and lenders are aware of the risks being taken and have approached them prudently.<sup>4</sup> The Financial Supervisory Authority has recently strengthened its stress testing, a welcome development. This indicates the banks could comfortably handle a simultaneous 35% fall in domestic stock prices; a 25% fall in foreign stock prices; 20% loan default losses; a 7% fall in bond prices; and a 20% depreciation of the króna. More recent stress testing has indicated robust capacity to handle large debt write-downs. Overall, the guarded assessment of financial supervisors, credit rating agencies and the IMF is that the system is broadly sound. Some market commentary is more sceptical. Detailed assessments of the state of the financial system are now published by the Central Bank in its annual *Financial Stability* reports. Because foreign investors' concerns dictate the terms at which Icelanders borrow, continued reassurance about the stability of the financial system will be necessary.

If anything, one might wonder whether the position of some financial institutions is too secure. The government of Iceland explicitly guarantees the debt of the Housing Finance Fund and guarantees the major banks implicitly. The government has never given any assurances that it would guarantee the major banks. Nor however has it denied that it would do so. Accordingly, the markets believe there is a positive probability of government support. Credit rating agencies Moody's and Fitch both justify their favourable ratings of the banks on this basis. These guarantees have been important in the growth of these institutions. However, they expose the public to a large potential liability, they skew the distribution of capital away from less-favoured institutions and they encourage excessive risk-taking. The guarantee of HFF debt is discussed in the following section. The implicit guarantee of the banks is an issue that will probably grow in importance, particularly if

Figure 4.10. **Banks' capital adequacy ratio**

Source: Central Bank of Iceland.

their operations extend further abroad. Whereas the banks used to be considered “too big to fail”, if their current growth continues, they may soon become “too big for the government of Iceland to rescue”. Accordingly, the government should consider making an explicit statement that there is no unconditional government guarantee of bank lending. It may be that the current deposit insurance system (Asgeirsson, 2005) and lender-of-last-resort facilities are sufficient to protect small deposit holders and prevent bank runs.

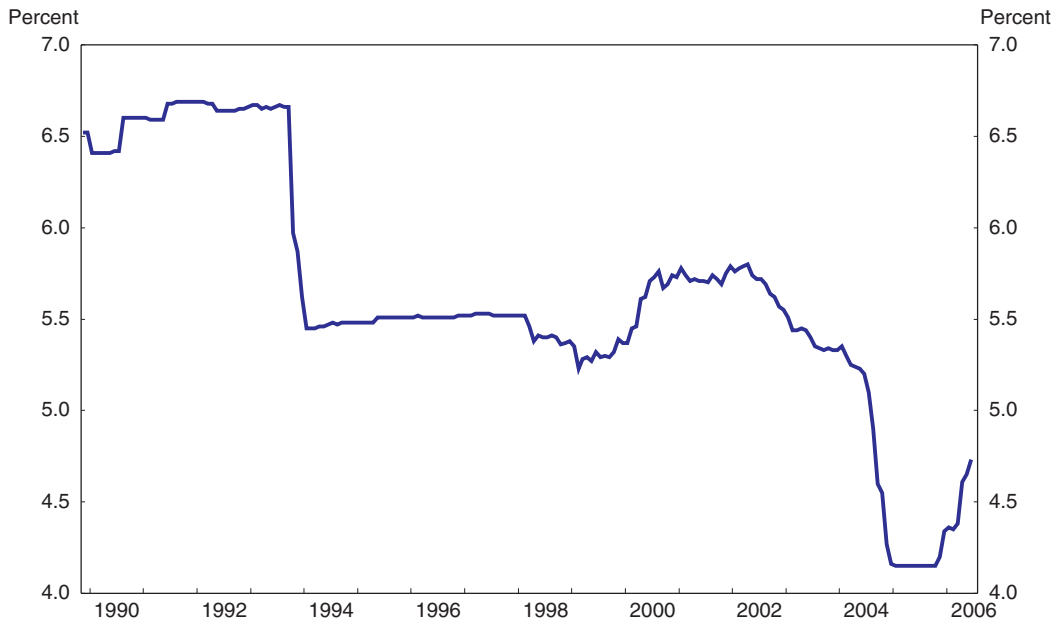
## Housing

### Recent developments

Iceland's housing market is in a state of flux. In July 2004 the publicly owned Housing Financing Fund (HFF) significantly reformed the loans it offered to home owners. The amount home-owners could borrow was raised, lending rates were lowered, and the structure of loans was simplified. In response, the private banks – which previously had offered second or third mortgages that topped-up the HFF loans – entered the market for first mortgages, offering loans at rates below those offered by the HFF.<sup>5</sup>

This increased competition has greatly improved access to home lending. Average real mortgage rates, which had fluctuated around 5½ per cent since the mid 1990s, fell to 4.15%, the lowest level for at least a generation (Figure 4.11). They have since risen slightly, but remain low. The reduction in rates was especially dramatic for bank mortgages, which fell from a rate of about 8%. These reductions were much larger than the reduction in interest rates on capital markets. In other words, margins narrowed considerably (though changes in the structure of funding costs make it difficult to measure or show this clearly). Loan conditions were also liberalised. For example, whereas first mortgages used to have loan-to-value ratios of 65-70%, a ratio of 90% is now common and zero-deposit loans are possible under strict conditions. Associated with this, there has been a great expansion in the

Figure 4.11. **Mortgage rates**  
Weighted average, indexed

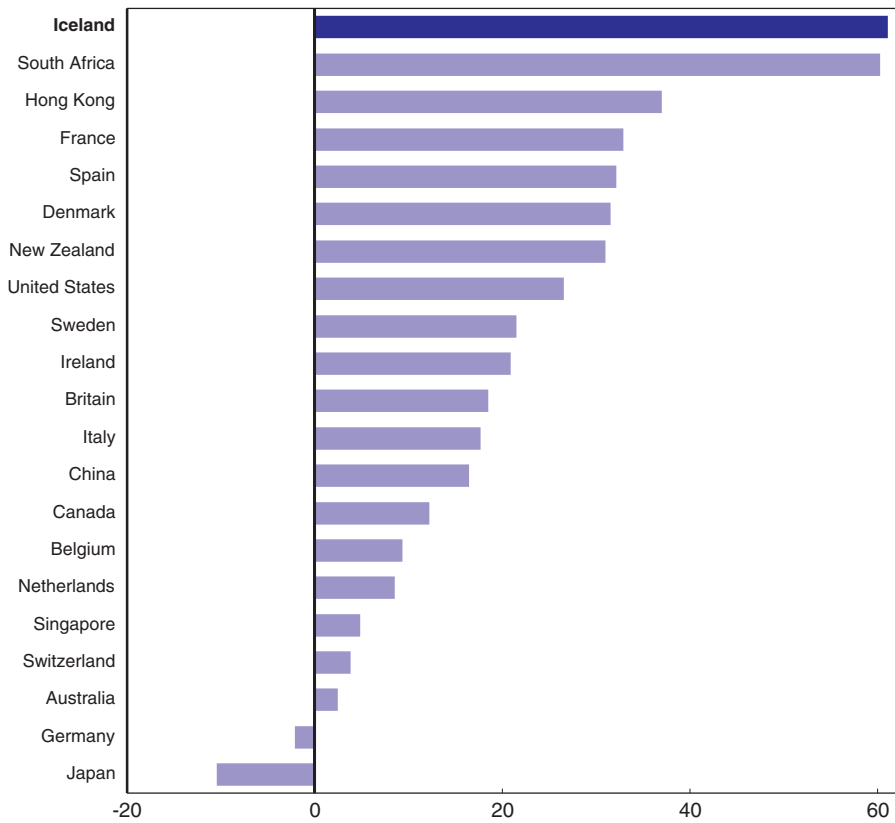
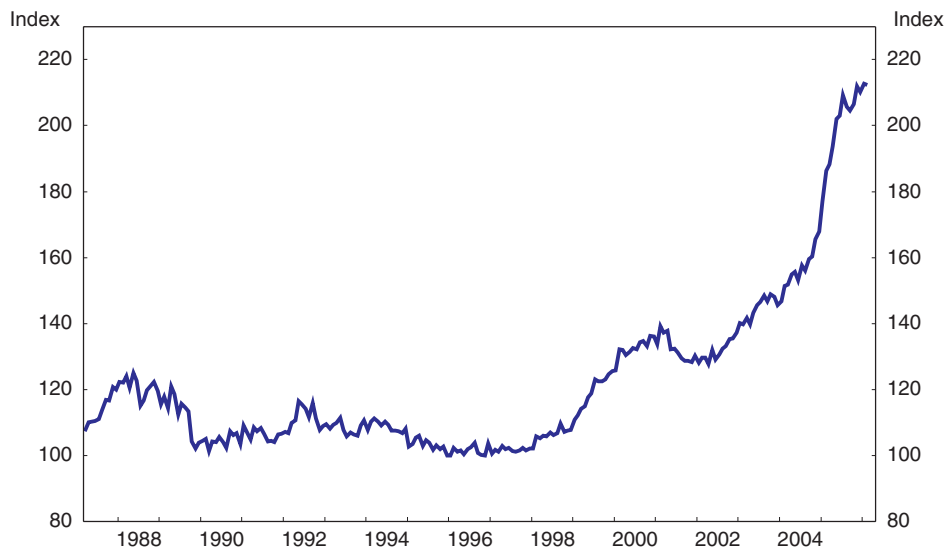


Source: Landsbanki.

variety of loans available. A recent *Monetary Bulletin* (Central Bank of Iceland, 2005b) lists 32 different kinds of mortgage available, varying by interest rate, maturity, indexation arrangements, scope for refinancing, and currency of denomination and so on. Icelandic home buyers appear to have more flexibility and choice than those in many other countries, with the qualification that rates are higher, as discussed below. (For cross-country comparisons of mortgages, see Green and Wachter, 2005.) The result of these changes is that many Icelanders, previously locked out of the housing market, became able to buy a home. Others were able to purchase larger houses. This improved access to housing is perhaps the single most tangible benefit to households of the process of financial liberalisation.

These developments have had many consequences (Karlsdottir, 2005; Eliasson and Petursson, 2006). One is a boom in the housing market (to which rising household incomes also contributed). Residential construction expenditures rose 14% in real terms in 2004 and a further 10% in 2005. More dramatically, the price of housing in the Reykjavik region has risen 60% over the last two years, as shown in Figure 4.12, the largest increase in the OECD. Given the abundance of free land within commuting distance of the centre of Reykjavik, and that zoning regulations in Iceland are relatively liberal, one might expect this spike in prices to be reversed over time, as extra supply comes on line. However, it is not clear that investors share this expectation – it is commonly thought that they are bidding high in the expectation of further capital gains, not losses. (Another interesting feature of Figure 4.12B is a sharp rise in prices from 1999 to 2001. This followed an increase in the maximum term of HFF mortgages, from 25 to 40 years).

The boom in home lending is one of the main factors underlying the recent increase in household debt, shown earlier in Figure 1.7. Much of the surge in debt reflects home

Figure 4.12. **House prices****A. Percentage change from 2003 Q4 to 2005 Q4****B. Price in real terms of detached residential housing in the Greater Reykjavik Area**

Source: The Economist, Statistics Iceland, Central Bank of Iceland.

refinancing and equity extraction, which was difficult under the pre-2004 arrangements. In particular, many homeowners have borrowed from banks, using the proceeds to pay off their old HFF loans, which were at older and hence higher rates. Repayments of HFF loans during 2005 amounted to ISK 128 000 million – some 30% of the HFF’s stock of loans at the beginning of the year. In many cases, households took the opportunity to raise their overall mortgage. This equity extraction has financed much of, and possibly boosted, the 12% surge in consumption expenditure in 2005.

This boom in consumption and housing expenditures greatly aggravated the overheating of the economy. Because of this, the government and Central Bank have suggested that the move by the HFF and the banks represented unfortunate timing. But the nature, if not the extent, of these developments were known well in advance and should have been offset. As discussed in Chapter 2, a liberalisation of lending conditions is a relatively easy shock for monetary policy to respond to.

Real home lending rates in Iceland, at an average of 4½ per cent, are about 1 to 2 percentage points higher than real mortgage rates in the United States and Europe (Table 4.3). However, this should not be taken as a sign of imperfection in the Icelandic housing market. As the table also shows, other interest rates in Iceland, most notably those facing the government and HFF, are also relatively high. Although direct measures of borrowing costs for the banks are not available, margins on residential lending appear to be quite low, and in some cases, negative.<sup>6</sup> Rather, high real interest rates reflect macroeconomic conditions. Investment (including housing) in Iceland has greatly outstripped domestically provided saving, resulting in substantial borrowing from overseas. High real interest rates are necessary to attract this lending. (In other terms, overseas borrowing means a current account deficit which, other things equal, leads to expectations of exchange rate depreciation. To compensate lenders for the expected exchange rate loss, interest rates need to be higher than in other countries).

**Table 4.3. Home mortgage rates**

As of March 2006

	Average real mortgage rate	Real 10-year government bond yield
Iceland	4.5	4.2
United States	3.7	2.3
United Kingdom	2.2	1.7
France	2.6	1.8

Source: For Iceland, Central Bank. For other countries, real mortgage rates represent the average nominal long-term fixed-rate mortgage rate (obtained from Freddie Mac, the Bank of England, and the ECB) less expected inflation, measured as the yield spread on inflation-indexed 10-year government bonds (obtained from Federal Reserve Bank of St Louis, Monetary Trends, 28 March 2006).

### **Reform of the HFF**

The current situation, in which the Housing Financing Fund is in direct competition with the private banks, is undesirable and probably unsustainable. In particular, problems arise because the HFF enjoys substantial benefits that its competitors do not: a government guarantee on its debt, exemption from corporate income tax, and no requirement to generate a return on its equity. The most important of these advantages is the government

guarantee, which may lower the interest rates on HFF loans by something like a quarter to a half a percentage point.<sup>7</sup> These distortions impair the efficient allocation of resources because loans do not fully reflect the cost of funds. They also redistribute wealth from the general taxpayer (who bears the liability of the guarantee) to home owners – a relatively prosperous group – with the subsidy increasing (up to a limit) with the size of the home loan. Perhaps most important for the long run, the distortions impair enterprise and innovation. New products that could be offered to home borrowers are unable to compete on their merits.

Arguments in favour of the HFF retaining a strong presence in direct mortgage lending are varied and have evolved over time. In the past, HFF lending was motivated by the lack of willingness of the private sector to lend. But now, with the private banks actively competing for this business, that rationale no longer holds. It may seem as though continued lending by the HFF is unnecessary. However, there remain widespread concerns as to what may happen should the HFF withdraw from direct mortgage lending.

In particular, the banks appear to be neither willing nor able to lend to some kinds of home buyers, such as those outside the greater Reykjavik area. This partly reflects the costs of establishing a branch network in remote locations. Perhaps more important is the illiquidity of rural property and hence the difficulty of appraising it or using it as collateral. Similarly, private banks may be unwilling to lend to low-income earners if these borrowers are perceived to be a higher risk. Assisting these borrowers may be desirable on equity grounds. Furthermore, by filling these gaps in the market, the HFF promotes home ownership, which is valued both for direct externalities and cultural reasons.

A secondary argument for retention of direct mortgage lending by the HFF is that it appears to be doing this job fairly well. At least, customer approval ratings are high. Of course, those ratings may simply reflect the subsidised nature of the loans. Allowing fair competition would test that.

Several policy proposals have been suggested to deal with these conflicting considerations. One option that may seem attractive to outsiders is privatisation of the HFF. However, this is not feasible in the short-term, given the Fund's current structure. In particular, the bond market relies on the HFF to provide government-guaranteed debt. Furthermore, privatisation would require restructuring the HFF as a limited liability corporation, with equity from the government and subject to tax. Nevertheless, these factors may well change over time. Mortgage-backed securities may become a reasonable substitute for HFF bonds, and the government could issue more long-term debt on the domestic market.

Another option, to which the government has said it is attracted, is for the HFF to become a wholesaler. This would involve buying mortgages from banks, bundling them into pools, and then selling them on the bond market in the form of mortgage-backed securities. The role played by Fannie Mae and Freddie Mac in the United States is an example. This idea is partly based on the perception that the HFF has a clear advantage over private banks in the raising of funds on capital markets for purposes of mortgage lending. This reflects economies of scale, name-recognition, and the accumulation of expertise. Wholesaling would exploit these advantages while permitting free competition in direct lending.

Many issues would need to be resolved were the HFF to move into wholesaling. One is whether or not wholesaling functions should retain a government guarantee. It would be

possible for wholesaling functions to be conducted by privately owned firms. Indeed, Kaupthing has announced its intention to issue mortgage-backed bonds. The common view amongst economists (for example, Frame and White, 2005) is that guaranteeing the liabilities of a wholesaler (such as the implicit guarantee of Fannie Mae and Freddie Mac) mis-prices risk, restricts competition and distorts the allocation of capital. In contrast, Green and Wachter (2005) argue that a guarantee facilitates risk-pooling. Another issue is whether a wholesaler should also conduct direct mortgage lending. While this may provide economies of scope, it could also give rise to conflict of interest problems. In particular, it could be difficult to simultaneously serve as a customer of mortgage-lenders, while also being their competitor. Accordingly, consideration should be given to whether the HFF should be split into two separate entities.

Development of a wholesale market would be desirable. For example, development of a liquid wholesale (or “secondary”) market for mortgages would make entry into the retail (or “primary”) market easier, facilitating competition. However, it would not address the problems in the market for direct mortgage lending noted above. Whether the HFF should wholesale mortgages is a distinct, and less important, question from whether it should engage in direct mortgage lending, and on what terms.

One means of neutralising the distortions in the housing market would be for extra limits to be placed upon HFF borrowing. For example, in June the Government announced reductions in the HFF’s loan-to-value ratio and in the ceiling below which the HFF could lend. Although this approach is desirable from a macroeconomic perspective and reduces some distortions, it does not eliminate them, and it raises complications. In particular, it artificially limits whatever benefits may arise from the HFF presence in retail lending (admittedly, those benefits are in dispute). For example, it may prevent rural homeowners from obtaining finance. And it makes the process of financing a house more complicated.

A simpler, more flexible approach would be for the HFF to pay the government a fee in return for the government guarantee and the other advantages it enjoys. Assuming the HFF maintains its margins, its rates would then rise above those charged by the private banks to their best customers. Hence the market share of the Fund would decline further. As noted above, there are possibly some sectors of the market, such as rural housing, that the banks would initially leave to the HFF. Accordingly, gaps in the private market would be reflected in differences in interest rates. Essentially, market forces would determine when and where the HFF would continue operations. In contrast, a “top-down” decision to limit HFF lending may leave borrowers being unable to find lenders.

At higher interest rates, the incentive for private banks to enter gaps in the market would grow. Furthermore, market structures would adapt over time. In particular, an active sub-prime market could develop.<sup>8</sup> So the imposition of a fee might prove to be a transitional measure, leading to the gradual removal of the HFF from direct mortgage lending.

### **Arguments against a fee**

A fee would increase interest rates, possibly substantially.<sup>9</sup> This is sometimes considered to be a major political obstacle to reform of the HFF. But it is also the central objective. Home buyers are currently enjoying a subsidy for which there is no clear rationale. This subsidy exposes taxpayers to a potentially large cost. Now, (mid-2006) seems to be a particularly convenient time to remove this distortion. As discussed in Chapter 2 on monetary policy, the Iceland economy needs to slow down and interest rates



need to rise. This can be done either through housing policy or monetary policy. Either way will be painful. The advantage of using housing policy is that it places more of the adjustment on the housing sector. This sector is relatively well placed to bear this burden, given that resources are over-stretched, real lending rates are near historic lows (Figure 4.11) and asset prices have soared (Figure 4.12). In contrast, tightening monetary policy would raise the exchange rate. This would further burden the traded goods sector which has already been squeezed. That said, a fee-based approach can, in principle, be phased in gradually, in order to minimise disruptive changes in market structure.

A slightly different concern is that higher interest rates would discourage particular kinds of borrowers. In present circumstances, that is desirable from a macroeconomic view. However, in the longer term, there are valid reasons for wanting to lower borrowing costs to particular kinds of borrowers. For example, externalities from home ownership justify targeted subsidies (Glaeser and Shapiro, 2002). Or one may wish to help poor people or those in rural areas. The difficulty, however, is that providing subsidised HFF loans to these people is a poor method of helping them. The subsidy is dissipated among all borrowers, including those to whom it is not intended. As a result, it tends to get capitalised into house prices, leaving the intended beneficiaries no better off. And the size of the subsidy increases in proportion to the size of the loan (up to a ceiling), rather than the reasons for assistance. In general, direct subsidies from the budget are both a more transparent and a more cost-effective way of meeting social objectives. If the objective is to promote home ownership, then a means-tested grant to first-home owners would be appropriate. Australia and several states in the USA provide examples. “Fiscal limits” are not an argument against this. Taxpayers are already providing a (probably larger) subsidy – but, because it is a contingent liability, it is hidden.<sup>10</sup> Indeed, targeted grants might also achieve, at lower cost, many of the objectives of the tax deduction for mortgage interest payments (a policy that is outside the scope of this chapter) and thus help ease overall fiscal constraints.

A related concern, (emphasised by the HFF, 2005) is that uniformity of lending rates, irrespective of costs, promotes “social cohesion”. This argument seems most clearly directed against the alternative policy of directing housing subsidies to segregated rental accommodation. Such a policy is indeed popular in many countries. However, the argument is not obviously applicable to comparisons with policies that encourage broad home ownership. Other OECD countries have substantial variations in mortgage rates without this appearing to create social stratification. In any case, mortgage rates are likely to vary more according to *when* they were taken out, than *where* or *from whom* they were taken out.

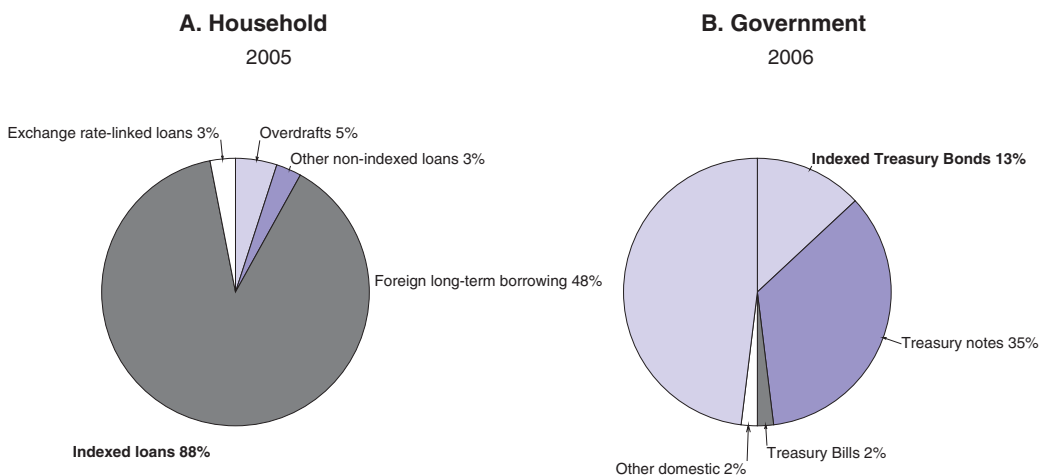
Finally, there are concerns that competitive pressures in the mortgage market would weaken were the HFF to withdraw. The market might then become dominated by the three large commercial banks. However, at present, there exists a large fringe of mortgage lenders, such as savings banks and pension funds. Were the commercial banks to raise their lending rates, this fringe would no doubt grow, restricting any abuse of market power. Development of an active market in mortgage-backed securities would make entry into the market for direct mortgage lending easier.

## Indexation

### Background

A distinctive feature of Iceland's financial markets is the common practice of indexing loans to the inflation rate.<sup>11</sup> As Figure 4.13A shows, almost all household debt is indexed. About 80% of bonds traded in the capital market are indexed. The main exceptions are loans denominated in foreign currency or those of short maturity. These exceptions happen to be the two main ways in which the government borrows, though 13% of government debt is also indexed (Figure 4.13B). By law, short-term bank loans or deposits cannot be indexed.

Figure 4.13. **Composition of debt**



Source: Central Bank of Iceland, National Debt Management Agency.

Indexation became common in the 1970s, when inflation rates often exceeded 100% a year. One might have expected demand for indexation to fade as the inflation rate fell and became more predictable. Instead, the share of inflation-indexed loans in total household debt has remained near 90% since the early 1990s. This is despite considerable variation in loans on offer, as noted in the previous section. Similarly, the Debt Management Agency has been issuing unindexed bonds in order to develop a liquid market. However, the Agency believes these unindexed bonds still command a risk premium, albeit a small one.

Compared with other countries, Iceland's use of indexation is quite unusual, though the difference is of degree rather than kind, and narrowing. Other examples of widespread indexation of loans include Finland from 1953 to 1968, Israel, and much of Latin America. These countries have also had a tradition of high and unpredictable inflation. The practice has possibly gone furthest in Chile (for a summary, see Shiller, 1998), where almost all financial transactions are indexed and prices are routinely quoted in indexed units. However, in OECD countries, almost no private debt and only a small but growing share of

public debt is indexed. Among the G7, the UK government began issuing indexed debt in 1981, followed by Canada in 1991, the USA in 1997, France in 1998, Italy in 2003, Japan in 2004 and Germany in 2006. The practice is also spreading rapidly in smaller countries, though again the total amount of indexed debt remains small.

### **Benefits and costs**

Perhaps the main reason for indexing loans is that it gives borrowers and lenders more security. Without indexation, lenders run the risk of having the real value of their assets eroded by unexpected inflation, as happened in the 1970s. At the same time, borrowers run the risk of having the real value of their debts increase, should prices fall unexpectedly, as happened in the Depression. Indexation removes both these risks. In contrast to insurance, which shifts risk (to those who can bear it better), indexation *reduces* risk, making both sides of the transaction better off. This is because indexation lets borrowers and lenders negotiate over what they care about, namely purchasing power of real goods and services, rather than something unreliably related to this, namely money. Accordingly, indexation seems sensible when inflation risks are large: in particular, for longer-term contracts when inflation is variable.

There are, however, some qualifications to this. Perhaps the most serious problem with indexation is that it makes transactions a bit more complicated. Other things equal, people prefer to negotiate loans in the same units with which they conduct all their other business – that is, money. There is also a common aversion to the extra mathematical calculations involved. Simplicity may also reflect considerations of familiarity, and will vary with circumstances, as discussed below.

Another qualification is that the best index for indexation purposes differs with individual circumstances and is not always the consumer price index. In general, the appropriate index is that which is most closely correlated with income (for borrowers) or expenses (for lenders), so as to minimise the unpredictability of *net* income. The consumer price index suits defined-benefit pension funds (such as that for State Employees), whose liabilities increase with inflation. Indexing assets to inflation helps keep the funds in actuarial balance. The consumer price index is also useful for most households, whose incomes and expenses rise in line with aggregate inflation. Of course, the consumer price index is an average, and individual circumstances will typically differ from the average. For example, Shiller argues that indexing to the average wage rate or to national income could do somewhat better at stabilising households' interest burdens. But these indexes are highly correlated with the consumer price index, so the difference may be small. A more important difference is that Icelandic firms tend to earn much of their income in foreign currency. Hence borrowing in foreign currency can provide them more predictable profits than indexing their loans to the domestic price level. At the other extreme, it may be prudent for banks with unindexed deposits to avoid indexing their loans altogether.

Among non-economists it is sometimes thought that indexation is bad for borrowers because it raises loan repayments. This view appears to have been influential in legislation restricting indexation. The argument seems to be that indexation provides payments to lenders (at the borrower's expense) that they would not otherwise receive. But that only applies when an increase in inflation is unexpected, as in the 1970s. When inflation is expected, lenders will demand compensation for the erosion of the real value of their wealth. Nominal interest rates will rise, leaving real interest rates little affected.<sup>12</sup> Indexation simply provides a certain payment of interest that would otherwise be expected

but uncertain. As long as expectations are not systematically biased then downward surprises in inflation are as likely as upward surprises. In practice, the Central Bank of Iceland (2003) found that ex-post real interest rates on unindexed loans have been similar to those on indexed debt, though more variable. This is as one might expect. Furthermore, and contrary to the popular view, real interest rates on indexed loans actually averaged slightly less than those on unindexed debt.

The above considerations are ones that private parties can appropriately weigh themselves. However, indexation does give rise to wider policy concerns, which may justify government intervention.<sup>13</sup> For example, indexation of financial arrangements may help to reduce the distortionary effects of inflation on taxation of capital income. It may reduce the arbitrary redistributions of wealth that accompany changes in inflation. It may help to stabilise the economy. It may boost the credibility of monetary policy. It may reduce the effectiveness of monetary policy. It may boost investment. And so on. Many of these effects are complicated and subject to important qualifications. And none have clear, strong policy implications. For example, although monetary policy implications are often raised, the Central Bank of Iceland appropriately considered these to be unimportant and barely discussed them in its survey of indexation. Given that the arguments are mixed and speculative, an overall assessment is difficult. Nevertheless, most writers on these issues have emphasised the wider benefits of indexation rather than its costs.

### **Policy responses**

The thrust of the economic literature is that indexation usually reduces the costs of inflation, both to the parties involved and possibly to wider society. Given this, many economists conclude that indexation should be encouraged, albeit mildly. However, an alternative, though common, view is that in reducing the costs to inflation, indexation makes it too easy to live with – it undermines public support for the painful measures needed to reduce inflation. Under this view, indexation should be opposed because it reduces the probability (in political economy terms) of adopting policies that make things a little worse in the short run, even if they will make things much better in the long run. This argument is more applicable to seriously dysfunctional political systems (it is most frequently advanced in Latin America) than to Iceland.

If indexation benefits the parties and wider society, why is it so rare? Many economists have puzzled over this issue and there is no clear answer (see, for example, Shiller, 1997, with accompanying discussion; or Fischer, 1986). Perhaps the most widely accepted explanation is that the issue is one of familiarity and tradition. This need not be irrational. Standardised contract terms, which do not vary across time or across individuals, economise on information and transaction costs. Standardisation explains why indexation arrangements are slow to change. It also explains the wide variety across different countries (but homogeneity within countries) in the form of mortgage contracts with respect to duration, variability of interest rates, and so on.

Such inertia would have several implications for Iceland. First, it would mean that overseas experience need not provide a useful model, particularly when Icelandic traditions are different. Second, it means that although Icelandic borrowers may prefer indexed debt, foreigners may have different preferences. Hence financial products aimed at international investors, such as government bonds, may find better market terms if they are unindexed. This point is discussed below. Third, there may be co-ordination problems

in moving from one equilibrium to another that may justify government involvement – analogous to daylight saving.<sup>14</sup>

At present, there are several legal prohibitions on the indexation of banking transactions in Iceland. Banks are prohibited from indexing deposits of less than 3-years maturity and loans of less than 5 years maturity. The rationale for these restrictions is unclear. Although lists of problems with indexation are common (see, for example, the 1998 OECD *Economic Survey of Iceland*) these usually do not specify a market failure that would clearly justify the restrictions. For example, there may be circumstances when borrowers would face lower interest with an unindexed loan (specifically, if inflation is expected to be higher than the interest rate differential, though how that would arise is unclear). But they can decide for themselves whether that is worth the risk that those expectations turn out to be wrong. Similarly, it may be imprudent for financial intermediaries to have indexed assets and unindexed liabilities. But this is just one of many risks these institutions face and it can be dealt with in the same way; namely provision should be made for any exposure to inflation risk. The “problems” of indexation (complexity, unfamiliarity) may make it unpopular but they do not require that it be prohibited. As the Central Bank and many others have concluded, whether or not loans should be indexed is a decision that should be left to the market.

### ***Implications for government borrowing***

Whereas the government need not (and arguably should not) take a stand on the pros and cons of private borrowing, an assessment of these is unavoidable in deciding whether or not to index its own debt. There are many considerations involved in this, of which the most important is the effect on borrowing costs. How to minimise borrowing costs will vary with market conditions and expectations of inflation. If inflation is expected to be higher than the difference between the yields on indexed and non-indexed debt, then issuing unindexed debt will lower the expected cost of borrowing. This might arise if foreign investors are more familiar with unindexed debt; or if investors have unindexed liabilities they wish to hedge. But ordinarily, one would expect investors to prefer indexed debt and hence for this to be more profitable. This is most clearly the case for borrowing from defined-benefit pension funds, whose liabilities rise with inflation.

A secondary objective is reducing risk. Unindexed loans have fixed repayments in nominal terms and hence appeal to risk-averse borrowers who suffer from money illusion. But the Icelandic government presumably cares more about real interest costs, which are more predictable with indexed debt. Nominal debt might provide a hedge against productivity and certain other shocks, however, it compounds the risk arising from aggregate demand shocks. In any case, the relevant covariances are small relative to the variance of inflation. So indexed debt might be expected to lower the variability of the overall debt portfolio, in real terms.

A third objective of debt management is the promotion of liquid financial markets. Whereas the above considerations seem to favour borrowing at indexed rates, this consideration may justify borrowing in nominal terms. In particular, the National Debt Management Agency has been issuing long-term unindexed bonds to promote benchmarks. The amounts involved are relatively small (ISK 3 billion so far in 2006). Liquid bond markets represent a public good that may be beneficial to the allocation of capital and hence economic growth, as discussed in the beginning of this chapter. A parallel situation has recently emerged in Australia, where a succession of government surpluses threatened

to drain the bond market of liquidity. After review and consultation, the Australian government decided to issue bonds in excess of its borrowing needs in order to maintain liquid benchmarks (Comley and Turvey, 2005). The issues however are not identical, in part because the heavy reliance on government-guaranteed indexed debt in Iceland reduces the need for nominal benchmarks.

Recent market conditions have struck some observers as favourable to retiring unindexed debt and borrowing at indexed rates. In May 2006, the yield differential between indexed and unindexed 8-year government bonds was around 4½ per cent – well in excess of the Central Bank’s inflation target of 2½ per cent and the government’s inflation forecast. So if the government was confident in its forecast or the ability of the Central Bank to reach its target, there would be an arbitrage opportunity. The combination of a low real yield plus low expected inflation compensation would be substantially less than the high payments on unindexed debt. A coordinated policy of borrowing at indexed rates while monetary policy aims inflation toward the target (both policies are already justified on other grounds) would lower expected borrowing costs. Willem Buiter (2006) makes a similar argument in the UK. (He attributes the wide yield differential there to “insatiable” demand for indexed debt by pension funds and life assurance schemes.)

The difficulty with this proposal is that the government is committed to issuing nominal debt to increase bond market liquidity. Although the benefits of this strategy are difficult to quantify, they may be important. Reconfiguring an issuance strategy of a sovereign borrower would be a significant step and would probably not be worthwhile to exploit temporary trading opportunities. Nevertheless, if substantial inflation premiums persist, this strategy should be reassessed.

The preceding support for indexation of debt does not, of course, imply that other indexation arrangements are necessarily desirable. In particular, the issues concerning indexation of wages are very different – largely because wages are renegotiated, whereas debt repayments are not. For example, indexation of wages raises the *status quo* underlying wage negotiations. This would lead to higher nominal wage claims (according to bargaining theory and empirical research on framing effects) and hence to inflationary bias. Furthermore, whereas economies without wage indexation tend to suffer from downwards *nominal* wage rigidity, economies with indexation have downwards *real* wage rigidity, which impairs wage flexibility more. On the other hand, wage indexation reduces negotiation costs and provides workers and firms with more certainty. But for the present, with nominal wages in Iceland rising on average by 8% a year, far in excess of the inflation rate, these potential issues are not of pressing importance.

## Financing innovation

### Problems

A limitation of the Icelandic financial system, shared with other countries, is that innovative start-ups seem to have difficulties raising finance. In particular, the lack of venture capital is widely missed. Since the bursting of Iceland’s version of the dot-com bubble in 2001, discussed below, investors appear to have become much more wary of investing in small, high-risk firms.

These difficulties are not unique to Iceland. Innovative start-ups are perceived to have unusual difficulties raising finance in most OECD economies. Furthermore, the increased caution is appropriate, to some extent. It is now clearer than it was that the financial

prospects of innovative small firms are often weak. It can take substantial time and expertise to evaluate new business plans. Hence, even if markets were working well, it is not clear that the benefits of financing innovative start-ups would be worth the costs. Nevertheless, there are two main reasons for suspecting that this is an area where normal market forces may not work well and that government intervention, or unusual market structures, may be warranted.

First, whereas an innovator may often pay the full costs of researching and developing a new idea, they typically only receive a fraction of the benefits. Successful innovations are likely to be imitated, with competition eroding away initial profits. Griliches' (1992) survey concluded that the social return to expenditures on research and development was perhaps between 150% to 200% of the private return. From the perspective of small countries like Iceland, this margin would probably seem smaller, given that the spillovers are more likely to benefit foreigners. In addition to these externalities, the tax system penalises risk-taking. Income and capital gains from successful innovation are taxed, but losses from unsuccessful endeavours can not always be offset by reductions in other tax liabilities.

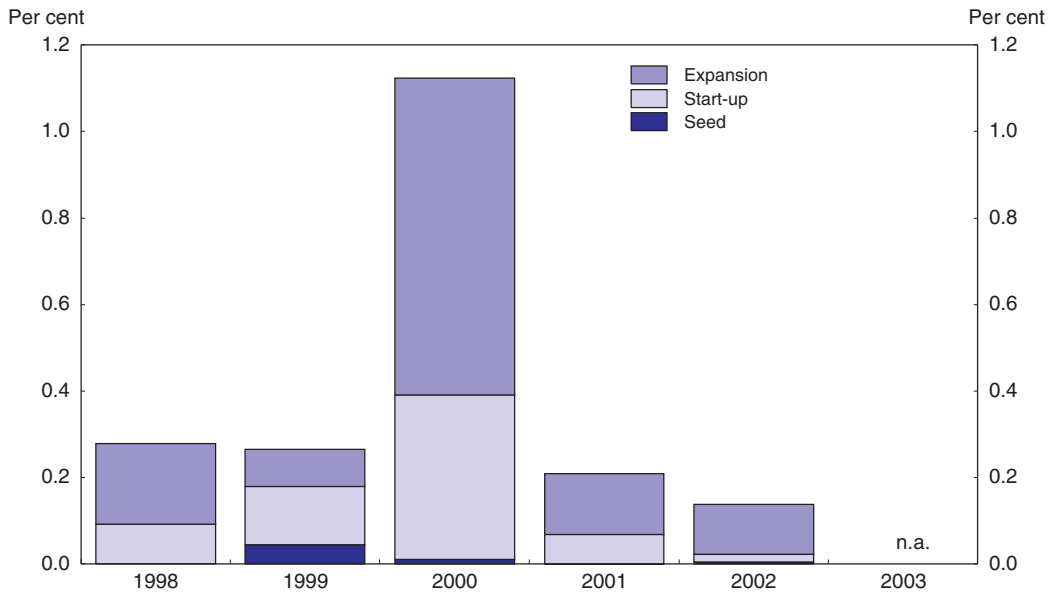
Second, information asymmetries mean that finance will often not be provided for worthwhile projects. Because investors cannot fully control what entrepreneurs do, the entrepreneur may not put everything into the business that he should – a problem called moral hazard. Because investors often know less about projects than the entrepreneur, projects seeking external funding are more likely to be those with poor prospects – the good projects being internally financed. This is called adverse selection. These informational problems affect some firms more than others. They mean that businesses tend to rely on internal finance more than they should, which is easier for established firms already making substantial returns than it is for start-ups. Often the informational problems can be overcome by firms posting collateral – but that is usually difficult for firms investing in research or development. Adverse selection affects innovative firms, the prospects of which are difficult to evaluate, more than firms in traditional lines of business. In short, one may expect private markets to inadequately finance innovative start-ups with intangible assets. These kinds of firms are often the focus of policy.

### **Venture capital**

A private sector response to these information asymmetries is the venture capital industry. For surveys, see Gompers and Lerner (2001) or, using broader definitions, OECD (2004). This is a form of private equity that specialises in financing innovative young companies. It typically involves unusually heavy oversight and control for a short and strictly-limited period. However, the line distinguishing venture capital from more passive mutual funds is not always clear, particularly in the data. For a long time the venture capital industry was concentrated within the United States. It is perceived to have been instrumental in the development of the American computer, internet and communications industries, and hence to the acceleration in aggregate productivity in America. Partly reflecting a desire to emulate this success, venture capital has more recently spread to most other developed economies, including Iceland.

In the late 1990s, Iceland had a thriving venture capital industry, at least for financing firms at the expansion stage of development (once commercial sale of a product starts). Indeed, on some measures, total venture capital investment, as a share of GDP, was the largest in the OECD (OECD, 2006a). Then, as in other countries, it collapsed (Figure 4.14). Indeed, the collapse in Iceland was more dramatic than elsewhere. According to estimates

Figure 4.14. **Venture capital investment**  
As a percentage of GDP



Source: EVCA Yearbooks 1998 to 2004.

from the European Venture Capital Association (EVCA), private equity investment in new businesses fell to tiny levels – around 0.2% of GDP – in 2001 and 2002. Investments at early (“seed” and “start-up”) stages of development, which were already small, virtually disappeared. The reduction in activity led to the dissolution of the Private Equity Association. The EVCA, the principal source of information on this subject, no longer considers the sector in Iceland large enough to monitor.

Explanations for the rise and fall of the venture capital industry vary. A common view is that the initial boom reflected overly-optimistic assessments of the profitability of new technology. When those assessments turned out to be unrealistic, financiers became sceptical of new investment proposals. The result has been that funding for innovative start-ups has dried up. The few remaining sources of start-up finance have felt compelled to take much larger equity shares in projects than they would ordinarily prefer, for want of other willing partners.

Whether countries like Iceland can support a thriving venture capital industry is unclear. In the short-term, memories of the recent collapse are probably too current to generate enthusiasm for this. In the longer term, were venture capital to develop in countries such as Iceland, it would probably have to be in very different form from that which has succeeded in the United States, for example. Venture capital, as practiced there, requires a vibrant equities market, conducive to initial public offerings. This enables venture capitalists to commit to transferring full control back to the entrepreneur. Because of the thinness of the Icelandic market and the dominance of bank financing, this exit strategy is unavailable in Iceland. Furthermore, sizeable turnover in start-ups is arguably needed to develop the specialised expertise and reputations that make venture capital



successful. This is difficult to develop in small countries – or, indeed, outside the few select cities and regions where it is currently concentrated.

### **Policy responses**

Even were the venture capital industry to revive, this would not address the externalities arising from innovation. Hence there remains a rationale for government involvement. Policy makers around the world have struggled with the problems of financing innovation and have developed a wide range of responses. None of these are ideal. Indeed, some government responses are often felt to be worse than the problem they attempt to cure. Even where the appropriate policy is relatively settled (for example, most countries have similar patent laws), it still involves serious tradeoffs. But more commonly, the appropriate policy is far from obvious. (OECD, 2006a, provides an overview and introduction to the literature.)

For basic research, the social benefits typically dwarf the private benefits. This is usually supported through government grants either directly through research bodies or indirectly through universities and other educational institutions. Financial markets are usually not involved. Issues involved in Iceland in funding basic research, and innovation policy more generally, are discussed in OECD (2006b).

To promote commercially-oriented innovation most OECD countries provide tax concessions for research, experimentation and development. These are intended to bring private returns and social returns into closer alignment. They avoid having government officials pass judgment on the merits of investment proposals. They do not, however, directly address the financing problems posed by information asymmetries. Recent analyses of tax incentives generally find small positive effects on the level of research and development effort and patenting activity (see OECD, 2006a, for references). However, Iceland is one of several countries that has not followed this approach. By maintaining a broad corporate tax base, the corporate tax rate has been kept low (18%), the tax code is relatively simple and political demands for less worthwhile concessions are easier to resist. Moreover, one company, deCODE Genetics, accounts for almost half of all business expenditures on research and development.<sup>15</sup> So, unless a cap were placed on the concession, it would flow disproportionately to a small group of stockholders, which may seem undesirable on equity and political grounds. (Such a cap could, however, be justified by the extra difficulties facing small start-ups, noted above).

### **The New Business Venture Fund**

An alternative is for governments to subsidise lending to innovative start-ups. This occurs in Iceland through the New Business Venture Fund. This is a separate company owned by the Icelandic government and under the supervision of the Minister of Industry and Commerce. The fund was the outcome of a reorganisation of the banking sector in 1997 when four sectoral credit funds were merged into the Icelandic Investment Bank and New Business Venture Fund. The purpose of the Fund is to strengthen the Icelandic economy and expand its internationalisation. This is to be achieved through participation in innovation-oriented investment projects and by helping develop marketing skills in companies. The Fund provides start-up capital and invests in early stage and expanding companies in return for an ownership stake (typically 20% to 25%) of the firm. Grants and loans are also given.

The NBVF was provided with an initial allocation of ISK 5 billion in 1998. It did poorly, in part because of the global decline in stock markets. Its only noteworthy success was financing the Blue Lagoon, now a popular tourist attraction. The fund received an additional ISK 1 billion in 2004 and a further ISK 1 billion in December 2005 (part of the proceeds of the sale of Iceland Telecom). With few of its investments attaining viability, promotion of innovation has so far been limited. It is hoped that, with time, many of its projects will eventually come to fruition. However, contrary to initial hopes, the payoff from nurturing small firms is now perceived to often be a decade or more away.

The disappointing performance of the NBVF is not unusual. Its American equivalent, the Small Business Investment Companies (SBIC) program, has had a similar – albeit longer and better documented – experience. The program was set up in 1958 to provide matching funds or loan guarantees from the government for innovative start-ups. In their surveys of the venture capital industry, Gompers and Lerner (2001) and Lerner (2002) conclude that most SBIC investments turned out to be ineffective or fraudulent. They find that the program combined excessive bureaucracy with inadequate supervision. The program has been substantially revised several times, but performance has still been poor, generating negative returns on equity (Brewer *et al.*, 1996). However, while these problems give rise to scepticism about government sponsored investment programs they are not necessarily fatal. Indeed, the literature (see, for example, the preceding references) suggests many lessons and recommendations aimed at correcting past mistakes.

In considering the fortunes of the NBVF, the success of its sister fund, the Icelandic Investment Bank (FBA) is also instructive. This started at the same time as the NBVF and was also formed from state-owned investment credit funds. However, it was run along private sector lines. Initially worth ISK 8 billion in 1998, it made substantial profits and was privatised the following year with a successful initial public offering (IPO) at a valuation of ISK 9.5 billion. It merged with Islandsbanki, now Glitnir, in 2000 with an even higher valuation. Those who invested in the IPO (about 3% of the nation) have seen a 15-fold return on their money. Officials of the company attribute their success, relative to the NBVF, to the difference between private and public sector environments. For example, it is seen as important to give employees greater incentives to perform, which typically means more variable (though higher, on average) compensation.

The relative performance of the two funds is also relevant for the creation of a new fund currently under consideration. The government has proposed that a further ISK 1.5 billion of the proceeds from the sale of Iceland Telecom go to a new investment fund. The intention is that pension funds, financial enterprises and others would contribute further equity, so that the fund's capital could reach ISK 6-10 billion. The fund would be directed toward financing firms in their "early expansion" phase, where there is perceived to be a gap in the market. This is a slightly later stage of development than the focus of the NBVF. In view of the above discussion, this fund may have better prospects of success if it is run along private-sector lines, including private-sector compensation. This would presumably be the expectation of financial institutions, were they to join.

## Concluding remarks

Looking to the future, the government has recently suggested that Iceland may develop into an international financial centre. It wishes to build on the factors that have underpinned Iceland's financial success, such as a business-friendly environment; low

**Box 4.1. Recommendations regarding financial markets****Financial Stability**

Although supervisory and ratings agencies believe the financial system is broadly sound, nervousness on the part of international investors dictates the terms at which Icelanders can borrow. So recent strengthening of stress testing by the Financial Supervisory Authority is welcome.

- Continue efforts aimed at assessing the robustness of the financial system and take supervisory steps, if needed, to address possible shortcomings, including related to liquidity management and market access.
- Consider an explicit denial that the government unconditionally guarantees bank debts.

**Housing**

Advantages the Housing Financing Fund (HFF) has over other housing lenders prevent fair competition, distort the allocation of resources and impede innovation. The social objectives of the fund could be addressed more transparently and cost-effectively through targeted transfers.

- Charge the HFF a fee reflecting the cost of the government guarantee. This would presumably result in a substantial reduction in the role of the HFF in direct mortgage lending.
- Promote home ownership through a means-tested grant for first home owners, rather than cross-subsidisation of mortgage rates.
- Continue to explore the possibility of the HFF wholesaling mortgages. This could involve splitting the HFF's retail and wholesale operations into separate entities.
- Consider restructuring the HFF as a limited liability company, subject to tax, with a view to possible future privatisation.

**Indexation**

Indexation of loans for inflation is generally sensible for borrowers and lenders and may have wider benefits to society. It should be encouraged rather than discouraged.

- Remove restrictions on indexation of bank loans and deposits

**Financing innovation**

The financing of innovative start-ups is a difficult issue where best-practice guidelines are not obvious. That said, the experience of the New Business Venture Fund has been disappointing. While lessons have been learned, there is understandable reluctance to repeat past failures.

- Consider whether government sponsored investment funds should be run along private-sector lines.

taxes; and an outward-looking, educated and entrepreneurial workforce. Iceland has done well through harmonisation and integration into the international economy. So there is little attraction to following the Luxembourg model, which is considered to involve exploiting regulatory differences. Nor is the Swiss model of private banking considered attractive. Because “people like to visit their money”, Iceland’s relative isolation would be a disadvantage. Rather, the government hopes that niche opportunities will be pursued – both by current Icelandic institutions and by foreign institutions that might establish a presence in Iceland.

More generally, Iceland's program of financial liberalisation over the past two decades appears to have been successful so far. It has established a thriving financial sector that appears highly responsive to market needs. Access to capital has greatly increased. From a financial vantage point, Iceland's growth prospects are bright. Yet there is more to be done. The housing market is distorted, with an unsustainable institutional framework and government interventions that do not appear to be meeting their objectives. And government involvement in the indexation of loans and the financing of start-ups has not worked well. So liberalisation can and should continue. Recommendations along these lines are in Box 4.1.

## Notes

1. This is the standard statistical category. In practice, the numbers are dominated by the three large commercial banks.
2. Olafsdottir, Isleifsson and Wiium (2005). This estimate is based on annual reports. Trade union surveys point to a slightly lower rate of increase.
3. For example, bank margins will vary with changes in the slope of the yield curve, the rate of inflation, changes in fees and so on. In practice, market participants suggest that these influences do not account for the trends shown in Figures 4.6 and 4.7.
4. For example, even though foreign currency home loans are available at lower interest rates than conventional loans, home buyers have avoided these (they account for 2% of all mortgages). As discussed in the following section, most borrowers and lenders have hedged their long-term loans against inflation risk.
5. The move by the private banks was not purely a response to the HFF (Kaupthing Bank was already actively considering entry) and it would probably have happened anyway, if somewhat later.
6. As of early 2006, the Housing Financing Fund was borrowing at a real interest rate that fluctuated between 4 and 4¼ per cent. The marginal cost to private banks of borrowing that matched the maturity and other characteristics of home loans would be somewhat higher. Yet Kaupthing and Glitnir were lending at real rates of 4.15 and 4.35 respectively, below their probable cost of funds. These losses were only partially offset by associated improvements in the average quality of the banks assets and by extra business arising from the loans (for example, borrowers are typically required to maintain current accounts with the bank).
7. The value of the guarantee will be easier to reliably estimate once the mortgage backed securities of Kaupthing Bank become actively traded. In the meantime, a rough indication is the implicit government guarantee of Fannie Mae and Freddie Mac in the USA. Empirical studies suggest this is worth about 30-40 basis points (Frame and White, 2005). The HFF's guarantee may be worth somewhat more due to its explicit nature and its more limited diversification. On the other hand, the indexed nature of HFF loans lowers its market risk. Market risk also differs due to different repayment behaviour in the two countries, though quantifying this is difficult. An alternative gauge of the guarantee might be interest premia in the short-term capital market, where the HFF competes against the private banks. But applying this to long-term debt (as would finance housing) is difficult.
8. Judging from foreign experience, subprime lending operates slightly differently to the main mortgage market. Subprime loans typically involve substantial penalties to repayment (to prevent adverse selection) and more thorough than usual monitoring and screening.
9. HFF lending rates would probably increase by more than the original fee. This is because, if the HFF's mortgage pool becomes concentrated on less-profitable borrowers, its average costs would increase. Furthermore, the banks are likely to respond to higher HFF rates by both raising their own rates and increasing market share.
10. The subsidy from a government guarantee is often zero for many decades, then enormous when a crisis occurs. For example, the banking crisis in Finland in 1990 cost taxpayers the equivalent of 8-10% of GDP. Crises at the same time in Norway and Sweden cost 4-5% of GDP. The bailout of savings and loan institutions in the USA in the late 1980s cost about 5-7% of GDP (Central Bank of Iceland, 2005c).

11. The Central Bank of Iceland (2003) and Jónsson (1999) provide discussions of financial indexation in Iceland.
12. This, of course, is an approximation. Considerations of taxation and monetary policy mean that inflation may affect real interest rates, in ways that would be unaffected by indexation. In theory, the effect of indexation on real interest rates is ambiguous. Risk aversion means that savers require a premium in the form of higher rates when inflation is unpredictable, which indexation can offset. On the other hand, risk averse lenders would demand lower rates, which indexation can also offset.
13. There is a large literature on this subject, mainly directed to the question of whether governments should issue indexed bonds. (The consensus is “yes”.) Studies directed at private indexation arrangements include Shiller (1997), Dornbusch and Simonsen (1983), OECD (1973) and Fisher (1986).
14. Coordination problems are typically cited to justify government encouragement of indexation. In principle, they could be used to justify discouragement of indexation, but examples are hard to find.
15. deCODE attracted international fame several years ago when the Icelandic parliament moved toward giving the company an exclusive license to compile a database of genetic, medical and genealogical information from the Icelandic population. That project, inspired in part by the remarkable homogeneity of the Icelandic gene pool, was controversial. deCODE has since proceeded to compile integrated databases from 100 000 Icelanders (over half the adult population) on a voluntary basis, which it has been using for drug discovery.

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## Chapter 5

# Adapting the education system to a changing environment

*This chapter reviews Iceland's performance in skills accumulation against the backdrop of a rapidly changing economic environment and discusses directions for further improvements. Since the late 1990s, the government has considerably raised expenditure on education, which is now among the highest in the OECD relative to GDP. Nonetheless, Iceland continues to have one of the largest shares of those in the working age population who have not attained upper secondary or higher qualifications, and educational achievements of 15-year olds are not outstanding relative to the country's advanced state of economic development. This is all the more unsatisfactory because spending per student in the compulsory education sector exceeds the OECD mean considerably, even after controlling for differences in per capita GDP. Measures to improve outcomes include curriculum adjustments and an enhancement of teaching evaluation and quality. While ensuring that students acquire a satisfactory basic set of competencies, there is room for reducing the average duration of primary and secondary education, which is quite long by international comparison. In contrast to upper secondary attainment, that for the tertiary sector is above the OECD average, and higher education has to cope with an enormous rise in participation. With a view to maintaining quality in the face of these developments, the government has introduced legislation that is welcome. However, it does not address the issue of tuition fees, which are authorised in the private but not in the public sector.*

## The changing structure of the economy requires adjustments in the area of human resources

The Icelandic economy has changed markedly over the last few decades. The importance of the primary sectors of agriculture and fisheries has declined considerably. Certainly, the latter still dominates the country's exports, at least until production in the new aluminium plants comes on stream. But, as noted in the previous chapter, financial intermediation now employs more people than fisheries. Over seven out of ten workers are already employed in the service sector. At the same time, structural reforms have transformed the economy and have made it more global and competitive. As it becomes more internationalised and less dependent on primary activities, demand for a highly educated workforce will increase significantly. As discussed in Chapter 1, the present (and probably continuing) vast expansion of the aluminium sector reflects the authorities' view that Iceland should diversify its export base by diminishing its dependence on fisheries, while simultaneously taking advantage of its wealth of renewable energy resources. If well-managed, this shift will raise national income, but ultimately economic success and a continuously rising standard of living will depend on the country's skills base and the ability of its workforce to respond to changing market needs. Investment in, and improvement of, human capital is crucial to further developing fast-growing activities, such as technology and knowledge-intensive industries, whose share of total value added – albeit rising – is still quite low by international comparison (Figure 5.1).

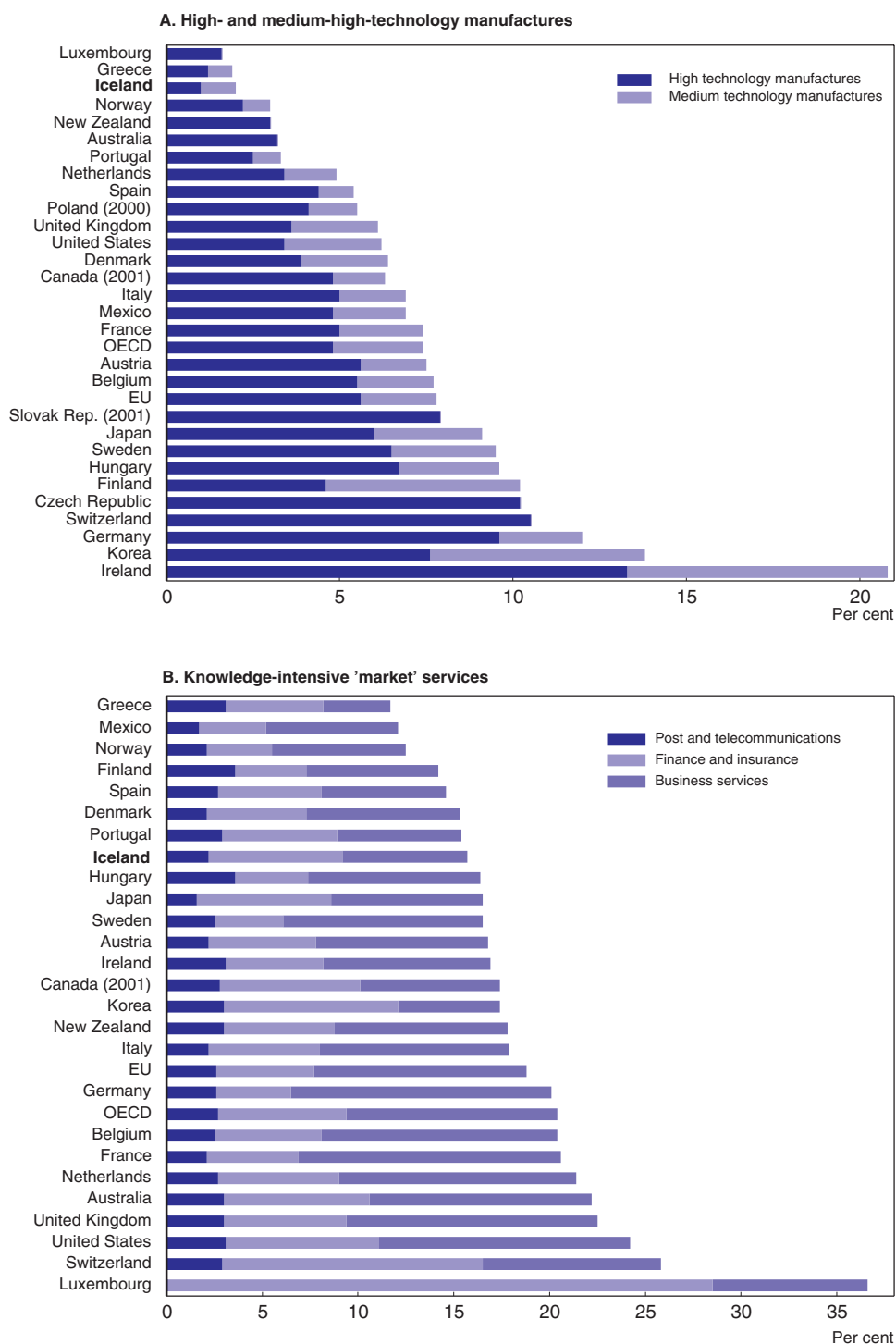
## Expenditure on education has been raised considerably

The authorities have increasingly stressed the importance of human resource development for Iceland's capability to diversify and its future economic performance. Accordingly, public spending on education – which accounts for the bulk of total expenditure on educational institutions – has been increased considerably. By 2002, the last year for which comparable data are available (OECD, 2005a), Iceland's total education spending had reached 7½ per cent of GDP, about 2 percentage points more than ten years earlier and the highest level in the OECD (Figure 5.2, Panel A). Since then, it seems to have grown broadly in line with national income. Given Iceland's relatively young population, expenditure per student is less outstanding, but still exceeds the OECD mean by more than one-tenth (Figure 5.2, Panel B). This differential largely reflects very high expenditure on compulsory education, with per student spending at the primary and lower secondary level surpassing the OECD mean by one-third and one-fifth, respectively. Educational expenditure per student at the compulsory level in relation to GDP per capita – which can be interpreted as the resources spent on young people relative to a country's ability to pay – exceeds the OECD mean by about 5%.

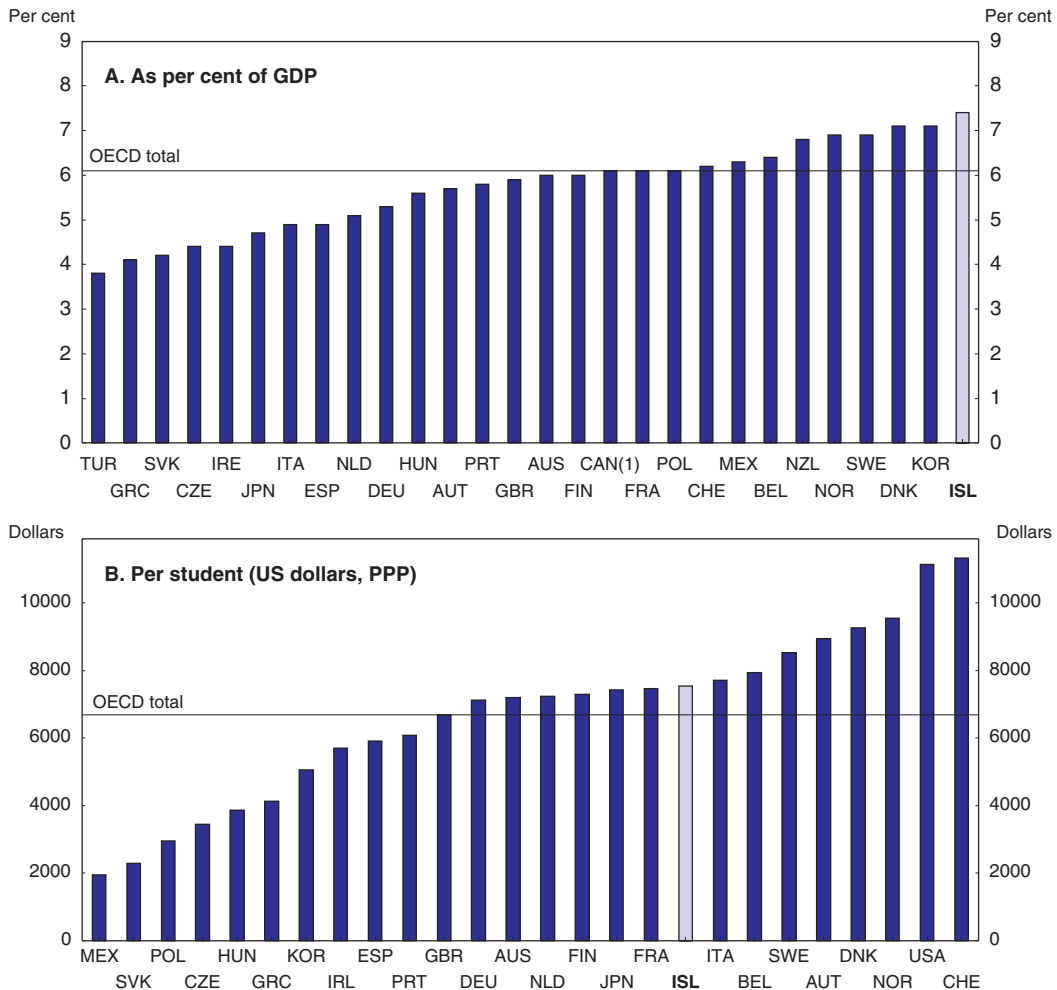


Figure 5.1. **Technology- and knowledge-intensive industries**

Share of total gross value added, 2002



Source: OECD, Science, Technology and Industry Scoreboard 2005.

Figure 5.2. **Expenditure on educational institutions, 2002**

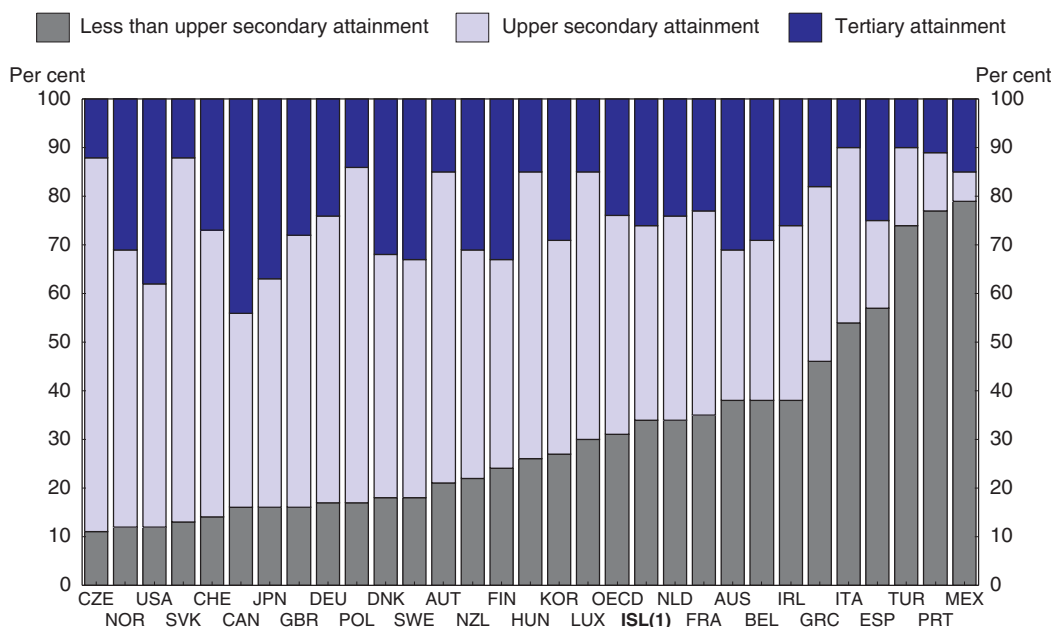
1. Data refer to 2001.

Source: OECD, *Education at a Glance*, 2005.

## Outcomes have improved but could be better

### **Educational attainment is still unsatisfactory**

Despite increased funding, educational attainment has remained low by international comparison. Iceland's workforce continues to be characterised by a gap in the skill spectrum between the low skilled and highly skilled. Both the share of those with only compulsory education (more than one-third) and those with tertiary education (more than a quarter) is higher than on average in the OECD (Figure 5.3). This situation has not changed fundamentally despite a rise in enrolment at the upper secondary level by more than 10% in the five years to 2004 (at the same time, the number of students at the higher education level increased by more than half). Although the enrolment rate of 16-year olds has exceeded 90%, it drops fast, especially in rural areas. For 17-year olds the average rate is already 10 percentage points lower, and for 18-year olds some 18 points lower. In some rural areas the decline in the first and second years of upper secondary education is as

Figure 5.3. **Educational attainment of the population aged 25-64, 2003**

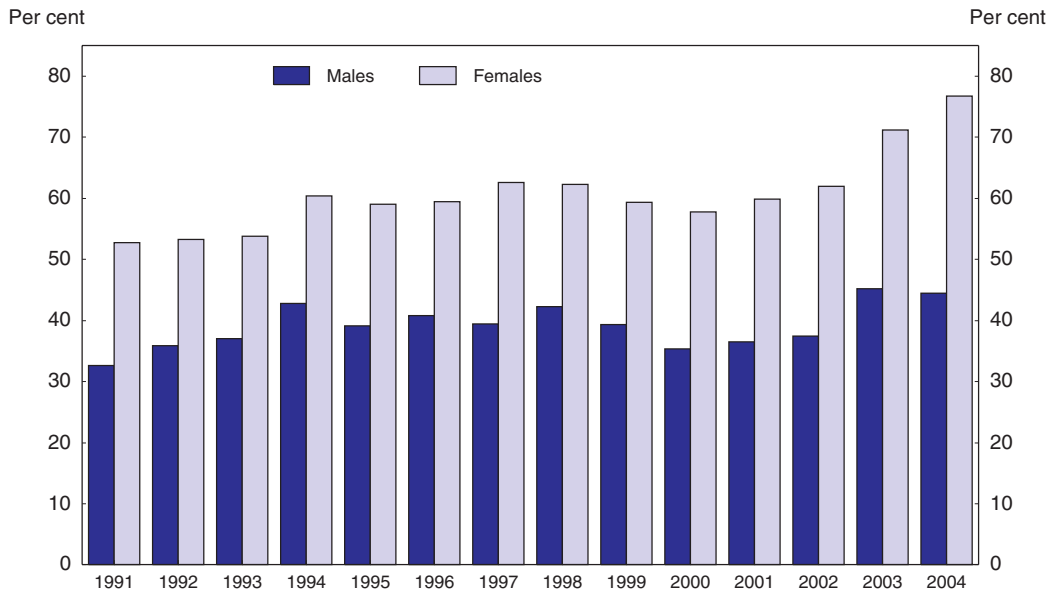
1. Data refer to 2002.

Source: OECD, *Education at a Glance*, 2005.

much as 15 and 28 percentage points, respectively. The favourable labour market situation plays a role, together with a flexible education system that allows students to quit school temporarily. Moreover, the relatively high dropout rate may in part reflect the emphasis placed on the academic line of studies rather than vocational training. Only about one-third of upper secondary school students opt for such a track (as compared with about one-half in the OECD), and the number of those graduating with vocational qualifications has not grown during the past decade, even falling in many trades (Ministry of Education, 2005). By contrast, the number of students passing the matriculation examination (which allows university entry) as a percentage of those aged 20 (when students generally graduate from upper secondary education) has increased, though mainly for females (Figure 5.4). For young males, the matriculation rate is still very low, at around 45%, and not much above its previous peak in the late 1990s.

It may be asked whether the persistent “skills gap” should be a matter of concern. Indeed, despite its changing structure, the economy is still relatively resource-based and labour intensity in primary sectors is rather high. This has arguably had a dampening effect on the demand for skilled labour. At the same time, the development of a welfare society has stimulated the creation of jobs that require a university education. Moreover, incentives for the low skilled to upgrade their skills are weak. In stark contrast to other OECD countries, the employment rate of those who have attained upper secondary qualifications is hardly different from that for workers with only compulsory schooling (Table 5.1). For the latter, compared to the OECD benchmark, the probability to be employed is, respectively, one-quarter and two-thirds higher for males and females. A significant rise in employment rates is only achieved by those with tertiary qualifications. The picture is similar for unemployment rates, although in this respect there is a more systematic (negative) relationship with educational attainment. However, the proportion of university

Figure 5.4. **Students passing the matriculation examination**  
As percentage of 20-year-olds



Source: Statistics Iceland (2005), Statistical Yearbook.

Table 5.1. **Labour market outcomes and educational attainment**  
2002

	Iceland	OECD mean	Iceland's rank	Iceland as a % of OECD mean	Iceland	OECD mean	Iceland's rank	Iceland as a % of OECD mean
	Number of 25 to 64-year olds in employment as a percentage of the population aged 25 to 64				Number of 25 to 64-year olds who are unemployed as a percentage of the population aged 25 to 64			
<b>Lower secondary education</b>								
Males	92	73	2/30	126	3.0	6.9	25/30	43
Females	82	49	1/30	167	2.7	5.1	23/30	53
<b>Upper-secondary education (ISCED 3A)</b>								
Males	91	83	1/29	110	2.7	4.1	22/29	66
Females	84	66	1/29	127	2.5	4.1	20/29	61
<b>Post-secondary non-tertiary education</b>								
Males	95	85	1/16	112	1.8	4.0	11/16	45
Females	85	73	2/16	116	1.5	4.6	14/15	33
<b>Tertiary education, Type B</b>								
Males	95	88	2/25	108	2.8	3.5	17/25	80
Females	92	76	1/25	121	1.0	3.0	21/24	33
<b>Tertiary education, Type A and advanced research programmes</b>								
Males	98	89	1/30	110	1.2	2.9	27/30	41
Females	94	78	1/30	121	1.7	3.3	24/30	52

Source: OECD (2006).

graduates among the unemployed has tended to rise in recent years, possibly indicating some mismatch between job creation and skill development (Ministry of Education, 2005). There is a serious hazard in projecting such a distribution forward, however. At a minimum,

maintaining high employment levels for the less skilled will – in a globalising world economy – put increasing strain on the relative wage such people can expect to earn; these same pressures are likely to increase the skill premium in wages for the higher educated.

Against this backdrop, it is worrying that Iceland is falling behind in the middle part of the skill distribution. As shown in Chapter 1, the share of the population that has attained at least upper secondary education has grown much less than abroad so that the qualification gap relative to the OECD average is greater for young Icelanders than for older ones. Recent research suggests that the returns of human capital in terms of higher economic growth are more sensitive to the average skills of the entire population, as opposed to the share of individuals who acquire high levels of skills, and that the proportion of individuals who have very low levels of literacy and numeracy acts as a drag on growth (Coulombe *et al.*, 2004).

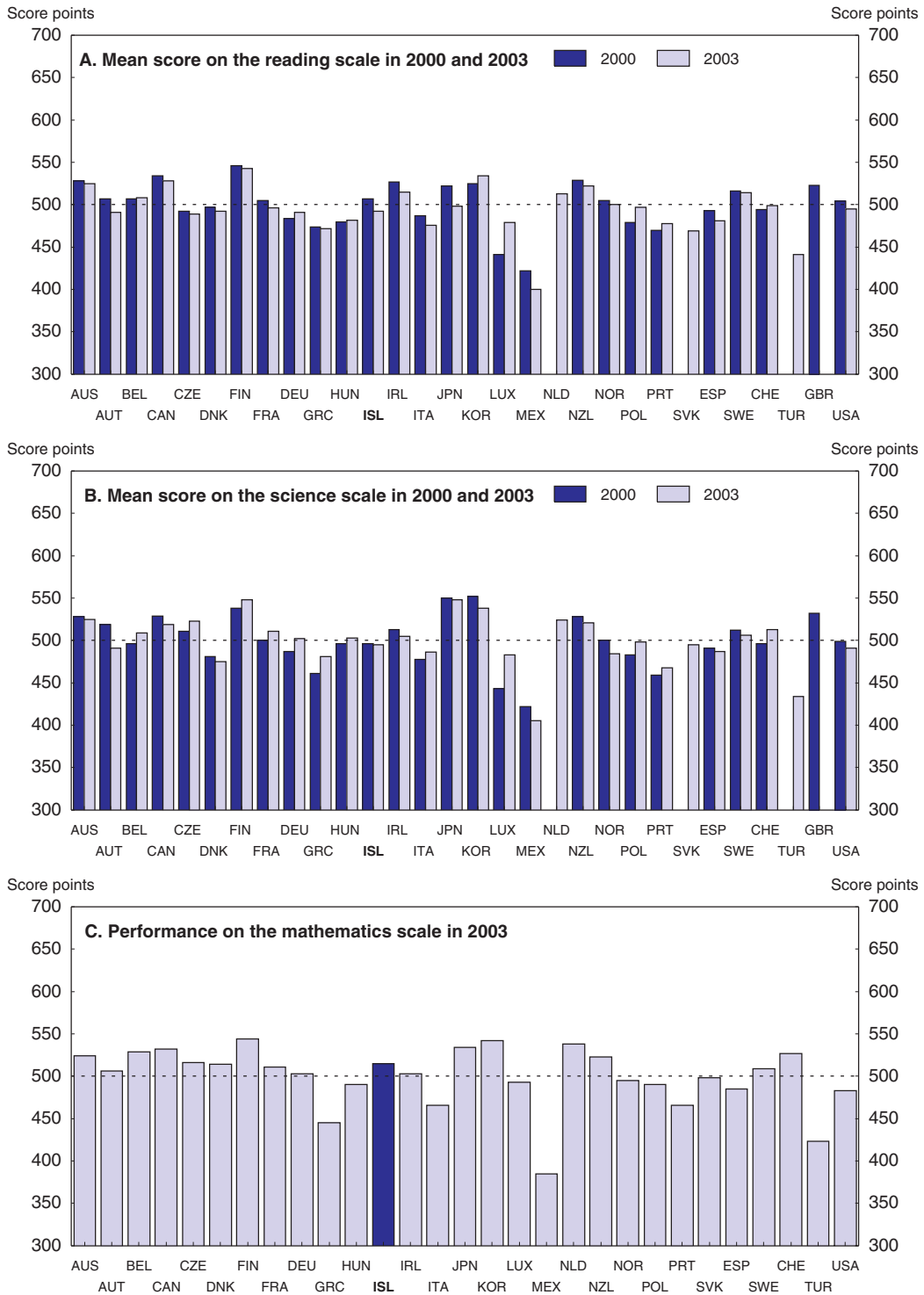
### **Educational achievement is affected by poor results in rural areas**

Considering the high per student expenditure on compulsory education in Iceland, the PISA study shows modest achievements at the level of lower secondary school. Finland, the best performer, has on average around 10% better test scores, despite spending about 20% less per student on compulsory schooling (OECD, 2004). In 2003, Icelandic students at age 15 performed better than the OECD average on the mathematics scale, but test scores on the reading scale dropped below the OECD benchmark compared to the results in 2000, while those on the science scale remained slightly sub-par (Figure 5.5). This is in line with longer-term developments. Since the 1990s (OECD, 1997), performance in mathematics has improved, moving from below to above the OECD average, science scores have remained broadly stable, and reading literacy has tended to deteriorate.

An analysis of the 2003 PISA results (Table 5.2) shows that the social background has a significant positive effect on outcomes in Iceland as generally elsewhere, although the impact is the weakest among OECD countries. Conversely, by international comparison, gender has the strongest influence, with boys systematically underperforming across all test fields. Iceland is the only member country where female students score better in mathematics than male ones (OECD, 2004). Contrary to most other countries, grade does not play a role because the Icelandic system does not practice any student selection (in terms of streaming or grade repetition) so that virtually all students in the sample are at the same grade. An immigration background and the language spoken at home have a significant negative impact on test results, but not independent from each other. “Soft” variables such as the school climate and student/teacher relations matter more than indicators of the school infrastructure and quality of educational resources. Computer resources at school are not found to make a difference, while computer access at home – which is very high in Iceland (OECD, 2005b) – has a significant positive impact (provided it is used for educational purposes). The equation that best explains the Icelandic test scores includes, in addition to the basic variables gender and parents’ occupational status, variables for student/teacher relations and computer facilities at home (see Annex 5.A1).

A recent study (Olafsson *et al.*, 2006) draws attention to the fact that the PISA 2003 results for mathematics are strongly influenced by poor achievements of male students in rural areas (Table 5.3). Girls in rural areas perform no worse than girls in urban areas and even have higher average scores in some cases. Significant gender differences are only observed in rural Iceland, with the exception of the quantity subscale, where the difference is marked everywhere in the country. A possible explanation for these outcomes is the

Figure 5.5. PISA test scores



Source: OECD Factbook 2005.

Table 5.2. **Factors influencing 2003 PISA scores in selected OECD countries<sup>1</sup>**

	Grade	Gender	Occupational status of parents (*100)	Immigration status	Ability grouping	Extra-curriculum school activities	R <sup>2</sup>	Number of observations
Australia	0.74	-0.13	3.45	-0.13	<i>ns</i>	0.17	0.16	11 661
Austria	0.64	0.23	2.65	-0.41	-0.91	0.63	0.36	4 308
Belgium	1.29	0.06	2.62	-0.45	0.21	0.71	0.44	8 121
Canada	1.06	<i>ns</i>	2.67	-0.13	<i>ns</i>	0.04	0.16	24 995
Czech Republic	0.81	<i>ns</i>	3.99	<i>ns</i>	-0.22	0.17	0.18	5 987
Denmark	1.10	<i>ns</i>	3.14	-0.60	<i>ns</i>	<i>ns</i>	0.14	3 728
Finland	0.97	-0.28	2.74	-0.66	<i>ns</i>	<i>ns</i>	0.12	5 655
Germany	0.95	0.14	2.71	-0.45	-0.52	0.47	0.42	3 741
Greece	0.69	<i>ns</i>	3.11	<i>ns</i>	<i>ns</i>	0.31	0.19	4 126
Hungary	0.83	-0.07	4.41	<i>ns</i>	0.09	0.36	0.28	4 247
<b>Iceland</b>	<b><i>ns</i></b>	<b>-0.57</b>	<b>1.87</b>	<b>-0.65</b>	<b>0.05</b>	<b>-0.18</b>	<b>0.06</b>	<b>2 840</b>
Ireland	0.43	-0.04	4.05	<i>ns</i>	<i>ns</i>	0.23	0.17	3 283
Italy	1.06	<i>ns</i>	2.66	0.11	-0.30	0.38	0.22	10 928
Japan	<i>ns</i>	<i>ns</i>	2.53	-0.53	-0.36	0.28	0.07	4 143
Korea	0.62	<i>ns</i>	2.50	<i>ns</i>	0.12	0.57	0.12	5 197
Luxembourg	1.05	<i>ns</i>	2.70	-0.34	-0.28	0.25	0.33	3 682
Netherlands	1.07	0.12	2.57	-0.46	-0.21	1.13	0.40	3 532
New Zealand	1.17	-0.06	3.59	-0.22	-0.08	<i>ns</i>	0.16	3 644
Norway	0.76	-0.22	3.58	-0.57	-0.12	<i>ns</i>	0.12	3 779
Poland	1.98	<i>ns</i>	4.33	<i>ns</i>	<i>ns</i>	-0.06	0.22	4 207
Portugal	1.35	0.17	2.31	-0.42	<i>ns</i>	-0.10	0.52	4 428
Slovak Republic	0.41	<i>ns</i>	4.01	-0.79	-0.15	0.24	0.18	6 959
Spain	1.67	<i>ns</i>	2.19	-0.21	<i>ns</i>	0.09	0.32	9 678
Sweden	1.30	-0.15	3.17	-0.69	0.06	0.09	0.17	4 376
Switzerland	0.81	<i>ns</i>	2.18	-0.74	-0.44	0.75	0.33	7 684
Turkey	0.53	<i>ns</i>	3.35	<i>ns</i>	0.43	0.65	0.27	4 213
United Kingdom	0.32	-0.21	4.07	-0.15	<i>ns</i>	0.07	0.14	8 349
United States	0.67	<i>ns</i>	3.26	-0.26	<i>ns</i>	<i>ns</i>	0.16	4 192

1. This table shows the coefficients estimated for each country individually by regressing the explanatory variables shown against 2003 PISA scores, which are summarised by the first principal component of the four PISA test scores (mathematics, science, reading, problem solving) as the dependent variable. France and Mexico are not included due to missing observations of school level data.

Source: PISA 2003, Secretariat calculations.

so-called “Jokkmokk” effect (a term from Sweden), according to which the boys in rural areas would be attracted by well paid jobs and away from learning, while girls’ lack of similar opportunities would steer them towards pursuing their studies. What is puzzling, however, is that in reading literacy there is no significant difference in the performance gap in favour of girls between rural and urban areas. To investigate the validity and stability of the PISA mathematics results, the above study compared them with the Icelandic National Examination for 10th graders, which allows yearly comparisons, and broke down the rural region into smaller areas for a more detailed analysis. It found that the regional and gender difference in PISA is replicated by Icelandic examination results, but that the latter fluctuate considerably from year to year and region to region. A drawback of the national examinations at the end of compulsory education is that they are optional (see below), while the PISA sample covers the vast majority of the student population. In any case, the 2003 findings deserve attention, although it remains to be seen whether they will be reproduced in the current PISA round.

Table 5.3. **The performance of Icelandic students in mathematics in PISA 2003 by geographical area**

		Mathe- matics	SE	Space and shape	SE	Change and relation- ships	SE	Uncertainty	SE	Quantity	SE
Reykjavik	Girls	526	3.8	512	3.9	519	3.7	536	4.1	532	3.8
	Boys	518	4.1	505	4.2	512	4.3	538	3.8	509	4.3
	Total	522	2.8	509	2.8	515	2.7	537	2.5	520	2.7
Outer Reykjavik area	Girls	524	4.7	513	4.9	514	5.1	535	5.0	531	5.7
	Boys	516	4.1	505	4.6	515	4.9	535	4.8	508	4.8
	Total	520	2.8	509	3.0	514	3.0	535	2.8	519	3.1
Rural	Girls	520	3.4	509	3.8	511	3.8	527	3.8	523	3.6
	Boys	496	3.5	485	3.5	494	3.7	508	3.5	488	3.7
	Total	507	2.6	497	2.6	502	2.6	517	2.6	505	2.8
Total	Girls	523	2.2	511	2.3	514	2.3	532	2.4	528	2.3
	Boys	508	2.3	496	2.4	505	2.4	524	2.5	500	2.5
	Total	515	1.4	504	1.5	510	1.4	528	1.5	513	1.5

Source: Olafsson et al. (2006).

## Reforms at the primary and secondary level

During the past decade, Iceland's educational system has undergone major modifications. In the middle of the 1990s, legislation governing the system was changed for every school level. Although some of the reforms were fully enacted only in recent years, new ones are already being prepared. The following sections examine to what extent the institutional setup may help explain the educational outcomes reviewed above and whether envisaged reforms are likely to address the identified shortcomings.

### Compulsory education

A major reform implemented in the mid-1990s was the devolution of responsibility for compulsory education (until the age of 16) to the municipalities in return for a greater share of personal income tax revenues. In addition, a special fund was set up in order to offset the effects of different per capita income levels and school sizes. Municipalities now decide about the establishment and running of compulsory schools and bear the cost of their construction and operation (teaching, administration, but not educational materials). The central government's role is limited to monitoring the implementation of laws and regulations (including national curriculum guidelines), the publication of educational materials and the organisation of co-ordinated national examinations. This reform, which became effective in August 1996, reflected a general trend in Iceland towards decentralisation and the presumption that increased local autonomy would have positive effects on educational performance.

The pick-up in Iceland's educational expenditure-to-GDP ratio coincided with the transfer of responsibility for compulsory schooling to the municipalities. Outlays at the local government level (which also includes part of the cost of pre-school education) account for almost two-thirds of the rise in the ratio in the six years to 2003, although student numbers at the other levels of education that are financed by the central government increased much more. The rise in outlays reflects a strong expansion of teaching personnel: from 1998 to 2005, the number of teachers in compulsory schooling grew by 22% (37% in terms of full-time equivalents). With student numbers rising by only 5% over the same period, the pupil-to-teacher ratio fell to below 10. In terms of full-time



equivalents, it is just over 10, as compared to an OECD mean of over 15. Although there is no longer a legal ceiling, the average class size has declined and is the third-lowest in the OECD. While the strong rise in teaching staff is the major factor boosting labour costs, substantial wage increases have also played a role. To some extent, an adjustment was required since a lengthening of the school year, which used to be extremely short, limited the possibility for teachers to have a second job. By 2003, teachers' pay was still quite low by international comparison (though some municipalities offer various fringe benefits such as inexpensive housing). However, the gap *vis-à-vis* the OECD average is much smaller if salaries are related to the actual teaching time. With the latter only about one-third of the total statutory working time, net teaching time at the compulsory level in Iceland is among the lowest in the OECD. A re-organisation of teachers' working time combined with an increase in pupil/teacher ratios and class sizes would entail resource and cost savings that would allow the employment of a more qualified teaching staff and might, in the end, have a positive effect on educational achievements.

Relatively low pay may have affected average teacher qualification. PISA 2000 found that the percentage of students in schools with teachers possessing a third level (ISCED5A) qualification in the language of instruction was almost 50 points lower than on average in the OECD (OECD, 2005c). This might help explain the downtrend in reading literacy scores to below the OECD average. According to PISA 2003, principals evaluated the share of students in schools where instruction is hindered by a shortage of qualified science and mathematics teachers at about one-third, while it was not much above zero in countries like Korea and Finland (OECD, 2004). As to the lack of experienced teachers, the situation was less severe but still much worse than in the best performing countries. Although the econometric analysis summarised above did not find a significant influence of the proportion of licensed teachers on educational achievements (in addition to other factors such as the socio-economic background), the strong regional differences in this respect are worth mentioning. While in the capital area more than 90% of the compulsory school teachers have a licence, this share can be as low as 60% in some rural areas. In principle, employing a teacher without full qualification as specified by law is not permitted. Such a person can only be (temporarily) hired when no fully qualified teacher is available. In order to ensure a high quality of education, this rule needs to be adhered to more strictly, although this has to be complemented by incentives to attract more qualified teachers to rural areas (OECD, 2005d). A committee is currently reviewing teacher education and training with a view to making proposals for improvements in this area. While any reforms that would lead to an increased supply of qualified teachers are welcome, it is clear that, to a large extent, the shortage of qualified personnel reflects the unusually low pupil/teacher ratio and small average class size. There is international evidence that the expansion of the teaching force in order to staff a policy of smaller classes is not only unlikely to lead to significant learning gains but can also lead to a decline in the in the average quality of new teaching recruits (OECD, 2005d).

The success of the education system in Finland, a leader in the PISA scores, has been attributed, among other things, to school autonomy, curriculum diversity and the absence of student selection (Schleicher, 2006). With the reform in the mid-1990s, the Icelandic system has moved significantly in this direction. Teachers are appointed and schools are run by local authorities. Although the national authorities issue curriculum guidelines, there is considerable room for latitude. Schools devise their own study programmes within the framework thus laid down and may determine the balance and time budget between subjects (although the national guidelines indicate the number of teaching hours to be devoted to each

subject for each school year). There is no selection or streaming by ability. Pupils at the compulsory level automatically move up from one grade to the next at the end of each year, with the weakest students getting remedial teaching provided by an extra teacher. Yet, the fact that decentralisation has not produced the same positive results as in Finland raises the question whether in Iceland all the pre-requisites are in place for such an approach to work. The counterpart to school autonomy needs to be increased accountability. Hence, adequate monitoring and evaluation mechanisms are crucial.

Current legislation stipulates that all compulsory schools are to adopt methods of evaluating their activities, including instruction and administrative practices. This is to provide information on factors such as quality control in operating schools, the educational achievement and careers of pupils, and teaching practices and their impact on educational outcomes. At five-year intervals, the internal evaluation procedures of schools are in turn subject to an evaluation by the national authorities. The results of the first round of this exercise were not very encouraging. 64% of the schools were found to have unsatisfactory self-evaluation procedures and another 20% to have partially satisfactory procedures (Ministry of Education, Science and Culture, 2004a). Schools have gradually become more positive towards internal evaluation. However, should the next round of evaluation of self-evaluation procedures not show significantly better results, more emphasis on external evaluations – which can be carried out at the initiative of the Ministry of Education or upon a formal request from an outside party – might be desirable, as well as increased transparency about the results and any follow-up. At the moment, it is up to the municipality and the school to decide whether and how they present the results of external evaluations to stakeholders, and the municipality is responsible for implementing any improvements. It is clear, though, that evaluators need to be trained and evaluated themselves and that adequate evaluation frameworks and tools need to be provided.

Another example is student assessment. In principle, examinations and other forms of assessment are carried out by individual teachers. Assessment is therefore not standardised between schools and teachers and the way in which reports on pupils' progress are compiled varies greatly. There are some nationally co-ordinated examinations that are composed, marked and organised by the Educational Testing Institute. In grades 4 and 7, pupils have to take such examinations in Icelandic and mathematics. At the end of the 10th and final year of compulsory education pupils can sit examinations in a number of subjects. But this is no longer obligatory. Pupils can move to upper secondary education without such an examination (and regardless of their results in compulsory school, although there are different admission requirements to the different programmes of study). As noted, the result is that most of them start upper secondary education, but only to drop out of school in large numbers soon afterwards. An obligatory national examination at the end of compulsory schooling might provide an incentive for students to finish their studies, if they choose to do so, with better educational achievements than so far reported by the PISA surveys.

Finally, some measures that are envisaged in the context of the planned reduction of the duration of upper secondary education (see below) may also serve to improve educational achievements at the end of compulsory schooling. In particular, the educational content corresponding to the present first-year upper secondary courses in Icelandic, English, Danish and mathematics is to move down to compulsory schooling. This is considered to be feasible given the increase in class hours in the past decade. Care has to be taken, however, not to crowd out other essential subjects while providing adequate effective teaching time for the enhanced curriculum.

### **Upper secondary education**

In stark contrast to developments at the compulsory level, expenditure pressures at the upper secondary level – which is controlled and funded by the central government (except for a municipal contribution to school construction) – have been well contained. The number of teachers has increased less than that of students, and the student/teacher ratio is not much different from the OECD average. Thus, the major issues at the upper secondary level are high drop-out rates entailing low attainment rates generally, and for vocational qualifications in particular. The authorities have tried to improve outcomes through performance management agreements with schools and by basing the funding of schools on the number of students taking examinations. Moreover, they have broadened the choice of subjects and striven to clarify study requirements. Nonetheless, adjustments of study materials and the educational content of instruction to some institutional changes since the mid-1990s (in particular the lengthening of the school year) have been lagging. Recently, reform efforts have focused on the duration of education, which is unusually long. As noted, Icelandic students complete their matriculation (university entrance) examination generally at the age of 20, whereas in most other countries students finish comparable programmes at the age of 18 or 19.

Discussions about a restructuring of the study programmes leading to the matriculation examination and ways of reducing their duration have been going on for a while. But before embarking on new fundamental reforms, it has been considered preferable to gather experience with the effects of the extension of compulsory schooling from 9 to 10 years in the early 1990s and the new national curriculum guidelines issued in the late 1990s. Reform efforts gathered momentum following a lengthy consultation process that culminated in the publication of a White Paper (Ministry of Education, Science and Culture, 2004b). The chances that the recommended reforms will be implemented have increased after the Ministry of Education and the Icelandic Teachers Union reached an agreement on the adjustment period given to schools for adapting to the revamped educational structure and a number of accompanying measures such as teacher re-training.

The centre-piece of the government's reform proposal is a shortening of the duration of upper secondary education from four to three years, as in the other countries of the European Economic Area and in accordance with the Bologna Agreement. This should allow young people to commence their university studies one year earlier and extend their working career and lifetime income. As an alternative, a shortening of compulsory education from ten to nine years was discussed but finally rejected (although it is not unusual in member countries), because it would oblige children in remote areas to leave home earlier and imply earlier selection, which is considered undesirable. The reform's impact on educational content would be limited by the transfer of some subject matter to the compulsory level, as noted above, and by the addition of five days of classes to each semester of upper secondary classes. Emphasis would be placed on schools retaining their flexibility and offering a variety of educational options. The restructuring of the system would provide the opportunity to re-examine national curricula, reorganise programmes and take other measures to further reduce dropout rates (such as reinforcing educational counselling). The challenge will be to implement the reduction of the length of studies leading to matriculation without weakening core competence achievement of graduates. This underlines the importance of enhancing educational quality by restructuring programmes and ensuring coherence across school levels. While it is true that the

lengthening of the school year provides some scope for reducing the duration of schooling without lowering educational quality, net teaching hours are unusually low (the situation at the upper secondary level is not much different from that at the compulsory level described above). An alternative route would have been to encourage pupils to complete their studies faster, a possibility that exists but is rarely used (although an increasing number of female students take their matriculation examination already at the age of 19).

One of the more enduring challenges remains the issue of vocational and technical education which – like in some other OECD countries – suffers from a lack of parity of esteem, in particular at the upper secondary level. Although graduations in vocational programmes at the upper secondary level have picked up, they are not much above their previous peak in the second half of the 1990s. There is a shortage of skilled individuals in the service sector, and Icelandic experts consider that the share of upper secondary school students that opt for a vocational track ought to be more than twice as high as it currently is (OECD, 2006). In the context of the envisaged re-organisation of the school system, vocational and practical training is to be amplified, and participation in these types of education is to be encouraged by simplifying arrangements and increasing vocational counselling. Supplementary studies enabling students from vocational programmes to attain matriculation will continue to be offered. But the fact that the Ministry of Education had to declare expressly to universities that such upper secondary degrees are equivalent to others explains some of the difficulties in promoting the vocational track. Attitudes in society, and even in the school sector, towards general academic studies leading to matriculation strongly influence pupils' choice of programmes. In 2003/04, the last year for which statistics are available, the share of graduates with a vocational matriculation examination was only one-seventh. It is important that students graduating from vocational areas in secondary education find offers in higher education that match their interests within a well-developed vocationally-oriented sector at the tertiary level.

## The transformation of higher education

Problems at the tertiary level are quite different. While the upper secondary level has been struggling to increase participation, the higher education sector has to cope with the consequences of an enormous expansion over the past decade or so, which has seen student numbers more than double. Enrolment of 20 to 29-year olds in tertiary education has reached one-third of this age group, which places Iceland fourth among OECD countries, and, in addition, enrolments by older people have increased substantially. The emergence of mass higher education and the fact that the sector has become more diverse – with a strong increase in programmes and diplomas offered and a higher proportion of students enrolled in private institutions – raise issues of funding and quality control. The following sections discuss, in turn, the legislative reform underway and the issues of tuition fees (not addressed by the reform) and foreign study of Icelanders (which has proportionally declined).

### **Past and current reforms**

The 1997 Universities Act represented a watershed in the definition, organisation and governance of higher education, shifting the focus of policy to outcomes and the internal efficiency of institutions. The emphasis is now on attainment rather than access. All establishments are called upon to undertake research. At the same time, in order to introduce competitive elements in the system and thus enhance quality and efficiency, the

sector has been opened to private parties. Moreover, institutions have been granted extensive autonomy. In return, they have been made more accountable and have to optimise their resource use. To this end, the authorities negotiate with them performance-related agreements (or service contracts in the case of private institutions, which entitles them to public funding). Some results of these reforms have been encouraging. A performance audit of the University of Iceland – by far the largest in the country – found that the institution is run in a relatively cost-effective manner compared with equivalent European universities, given its high operating efficiency, while its performance in many areas of teaching and research is also fairly high (National Audit Office, 2005). More generally, however, there has been some concern that the number of graduates has not risen at the same pace as enrolments and that the tremendous rise in student numbers, along with the increased diversity of the system, might have adversely affected the quality of higher education. There is a clearly need to clarify the profile and specific role of new institutions in the higher education system and to strengthen the rather incipient system of institutional monitoring, quality assurance and accreditation.

New legislation governing higher education that is to enter into force on 1 July 2006 addresses such concerns. While no longer distinguishing between public and private institutions, the new law introduces more stringent criteria for recognition and quality control. The authorities will issue rules that stipulate the requirements which higher education institutions have to fulfil in order to achieve certification (including personnel qualification and an internal quality system). The certification – which existing institutions will also have to seek – will be limited to specific fields of study and can be revoked. The authorities will also issue a qualification framework regarding higher education (and diplomas listed in the law), and institutions will have to account for their compliance with the framework. Moreover, the new law defines the objectives and strengthens the existing rules regarding quality assurance of instruction and research, which are to be carried out both by internal evaluation and regular external evaluation. It stipulates explicitly that establishing mechanisms of internal quality assurance is a prerequisite for institutional certification. Finally, the legislation gives more leeway to the government regarding the funding of higher education institutions, but it leaves the authorisation to collect fees in state universities to special laws concerning each university.

### **Tuition fees**

The strongly rising demand for higher education and the institutions' efforts to upgrade their post-graduate and research activities have put considerable fiscal pressure on the government. There are mechanisms in place to keep spending under control. The funding formula for teaching and facilities is based on the number of active, that is, full-time equivalent, students and not the number of enrolments. And the payment to an institution cannot exceed the budgeted level, which is based on the maximum number of full-time equivalents the government agrees to fund (and study categories). Still, the government's education spending is currently growing at double-digit rates and demographic developments suggest that fiscal pressures are likely to remain strong. Thus, both the government and the higher education institutions face some difficult choices. If the current rise in expenditure is deemed unsustainable, institutions – that are now competing among themselves for funding, students and staff – might have to limit student intake to their teaching budget and develop their post-graduate programmes and research at a slower pace. And/or they would have to make further attempts to restrain costs and

streamline operations, for instance by reducing or even discontinuing the teaching of certain subjects, further limiting students' access to some subjects, or stepping up student progress requirements. Finally, however, an assessment must be made as to whether public institutions' revenues cannot – and should not – be increased by complementing public funding with a student contribution.

There are economic incentives for individuals to contribute to the cost of higher education. A large and growing body of international evidence shows that those who acquire higher education qualifications enjoy considerable private benefits in terms of labour market outcomes. Although such benefits seem to be smaller than in many other countries, available Icelandic estimates of the private internal rate of return to higher education suggest that they are attractive, even in relation to the high real rate of interest prevailing in Iceland (Table 5.4). Another argument in favour of higher education fees is that they increase the responsiveness of institutions to the needs of students and can therefore be seen as important drivers for improving the quality of education. Furthermore, fees may assist in reducing the average duration of study, which is relatively long in Iceland. Another specific Icelandic feature is that private institutions receive state support to the same extent as the public institutions and can also charge tuition fees (which account for one-third of their revenue), whereas public institutions are only authorised to charge registration fees (which are minor). This distorts competition in various fields of study. Equity concerns that are often expressed can be addressed by the use of student loans. A student loan scheme already exists and is relatively large in relation to GDP by international comparison. It provides students with index-linked loans at a 1% interest rate. Repayment starts two years after the completion of studies and its speed depends on the person's income. This scheme could be improved in some ways. For instance, it currently penalises self-reliance since the amount a student can borrow depends on his/her previous year's income; students can draw on their loans only at the end of each semester and may find themselves obliged to take out commercial loans meanwhile; and its study requirements de-bar most part-time students from the scheme (OECD, 2006). The experience of countries that have combined an increase in education fees with an improvement in student loan facilities suggests that there are no significant adverse effects on participation (Blondal et al., 2002).

Table 5.4. **Returns to education**

2003

	Males	Females
Private rate of return on higher education	5.0	10.8
Social rate of return on higher education	5.6	9.8
Private rate of return on upper secondary education	7.2	4.2
Social rate of return on upper secondary education	7.9	4.7

1. Figures calculated according to OECD standards as published in *Education at a Glance*, 2001.

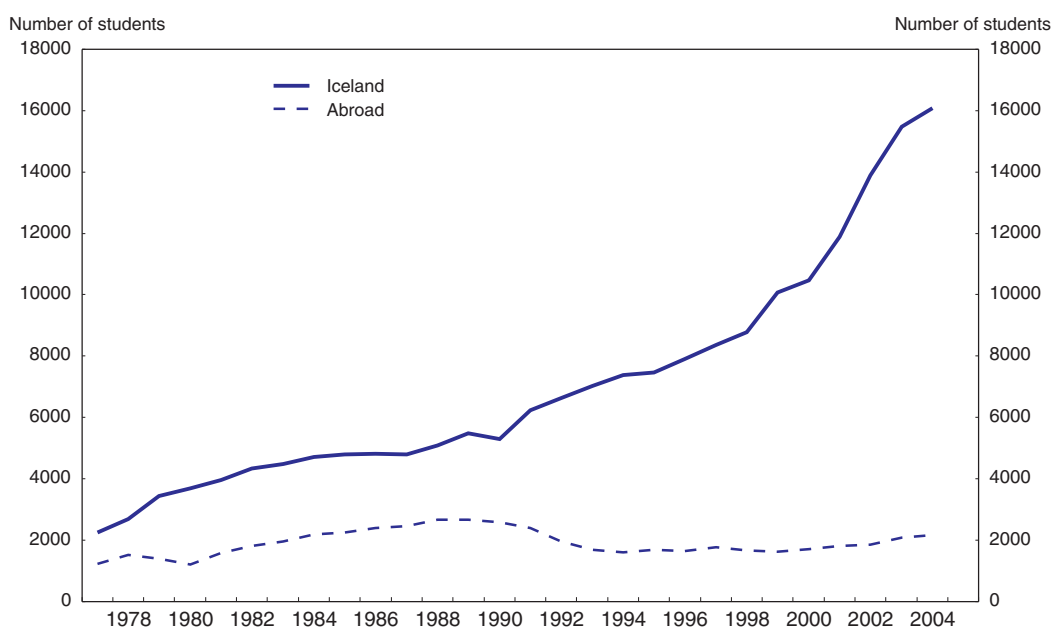
Source: Institute of Economic Studies, University of Iceland.

### **Internationalisation**

Given the geographically peripheral nature and small population of the country, higher education in Iceland has always had a strong international dimension in the form of cross-frontier studies. The recent rapid expansion of the tertiary system has

“repatriated” higher education – brought it home – in the sense that the proportion of those studying abroad has declined sharply (OECD, 2006). While in 1988, the year when the highest number of students was enrolled at foreign universities, their share was around one-third, the number of wandering scholars as a proportion of all Icelandic students has now dropped to one-seventh (Figure 5.6). Special factors – such as the marked decline in those studying in the United States in recent years – have played a role, but the impact of the growth in the home system is evident (Jonasson, 2004). It has been pointed out that the proportion of Icelanders studying abroad is still above the 10% objective of the original ERASMUS programme. Also, OECD figures that are obtained from the countries of destination rather than the Icelandic student loan fund show a somewhat higher ratio. Still, on present trends, students seeking education abroad will soon be a small minority.

Figure 5.6. **Icelandic students at the tertiary level at home and abroad**



Source: Statistics Iceland.

Student mobility is particularly important to reinforce Iceland’s research capacity and drive towards a knowledge economy. In this perspective, what matters most is that international ties continue at the graduate and doctoral stage (OECD, 2006). Unfortunately, available information suggests that the general trend described above is not limited to undergraduates. The development of higher education in Iceland towards a more and more comprehensive system has clearly adversely affected student mobility. In this context, the question arises whether the country, with its small population, should try and offer high quality programmes in all disciplines and fields. It would seem to be obvious that this is difficult, if not impossible, for the highest academic degree programmes. Many postgraduate programmes have already been organised with the intention of allowing students to take part of their courses abroad. This approach should be generalised. The public student loan fund does not discriminate against graduate students who study outside the country, which is welcome. But at the undergraduate level, loans to pay tuition

### Box 5.1. Recommendations regarding human resource development

#### Compulsory education

The devolution of responsibility for compulsory education to the municipalities is largely in line with emerging “best practices” in the OECD. But in Iceland it has not been an unmitigated success so far. While per student spending has increased strongly, educational achievements as measured by literacy and numeracy tests have on average stagnated. And the strong expansion in the teaching staff has not been accompanied by a rise in average qualification. Some adjustments may therefore be warranted.

- Strengthen evaluation procedures in schools to assure that, where posts are filled by unlicensed teachers, job performance is nonetheless up to standards.
- More generally, focus on teacher quality rather than quantity and increase class size to reduce cost pressures.
- Re-enforce central government quality control if schools’ self-evaluation procedures continue to remain unsatisfactory.
- Increase the effective teaching time to accommodate the planned transfer of subject matter from the upper secondary to the lower secondary school level.

#### Upper secondary education

Despite rising enrolment, upper secondary attainment is unsatisfactory because of high drop-out rates. Planned reforms will reduce the duration of upper secondary education, which is long by international comparison, by one year while lengthening the school year somewhat.

- Make sure that the reduction in the length of upper secondary education is matched by increasing effective teaching time and appropriate curriculum adjustment so that core competence achievement of graduates is not substantially weakened.
- Encourage high performance students to complete both lower and upper secondary education ahead of schedule, making use of existing flexibility in the system.
- Encourage potential drop-outs to select vocational programmes through increased counseling, a broader choice of programmes and re-enforced “bridges” from upper secondary vocational tracks into tertiary education.

#### Higher education

The explosion of tertiary enrolment over the past decade has led to spending pressures and risks affecting the quality of higher education. Legislative changes address these problems to some extent. The rapid expansion of the higher education sector and development of a more comprehensive system has crowded out – traditionally frequent – studies abroad.

- Implement quickly the new legislation that aims to ensure educational quality by stricter certification and evaluation requirements for higher education institutions.
- Introduce tuition fees for public institutions, given that private returns to higher education are substantial. This would tend to make institutions more responsive to student needs, encourage students to complete studies more quickly and provide a much needed source of finance. At the same time, student loan facilities could be improved.
- Instead of trying to offer a full range of tertiary programmes, encourage studies abroad, in particular at the graduate and doctoral stages of university education.



fees abroad are not provided if a similar programme is available in Iceland. The government may want to review this restriction in the context of a possible introduction of tuition fees in public institutions. Obviously, for investment in “students abroad” to be successful, most of them will in the end have to return to Iceland. This seems to be largely the case, but it would be helpful if it could be confirmed by data that are not just based on anecdotal evidence.

## Concluding remarks

Like the country more generally, Iceland’s education system has undergone radical changes over the past decade or so. Despite the reforms and strongly increased public funding, Iceland’s performance in generating a skilled labour force is not yet satisfactory, with no improvement in educational achievements at the end of compulsory schooling and a persistent gap between low skilled and highly skilled in the labour force. At the same time, higher education is struggling to maintain quality standards in the face of a strong student inflow. Some recommendations on how to improve outcomes are provided in Box 5.1.

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## ANNEX 5.A1

*PISA results for Iceland*

The OECD's Programme for International Student Assessment (PISA) assesses student knowledge and skills in mathematics, science, reading and cross-curricular competencies at age 15, that is towards the end of compulsory education. The 2003 round of PISA focused on mathematics, with less testing time devoted to reading, science and problem solving. PISA assesses students' ability to reflect on their knowledge and experience in these areas and to apply them to real world issues (literacy concept). It includes questions regarding student socio-economic and psychological characteristics, school resources and teaching environment, and education system characteristics. In principle, PISA uses non-random sampling to select students for test, but in the case of Iceland – given the size of the population – the sample covers all 15-year olds.

Instead of estimating individual equations for scores in each of the four test fields, the analysis of the PISA 2003 data below summarises information regarding student performance by the first principal component of the test scores in mathematics, reading, science and problem solving. This can be justified on the grounds that the interest of the analysis lies with the overall design of the school system and students' success within this system independent of their field of excellence. Moreover, the first component captures 85-90% of the total variance across test fields. The estimations control for the fact that students from the same school are likely to have similar test results. A detailed description of the estimation methodology can be found in Annex 4.A2 of the 2006 *Economic Survey of Luxembourg*.

Table 5.A1.1 shows the results of the baseline equation, which includes the variables found to be most relevant for Iceland, that is, gender (one for a girl, two for boy) and the student's socio-economic background as measured by the highest occupational status of parents (educational background and resources at student's home provide similar results). There is no control for grade or age because this is not relevant in the case of Iceland since there is hardly any difference for students in these respects. As can be seen from the Table, even when controlling for the socio-economic background, an immigration status or a language spoken at home that is different from either the official or the test language both have a significant (negative) impact on test results, but not jointly.

Adding indicators of educational quality to the baseline equation does not improve the results. Variables such as the quality of physical and educational infrastructure (buildings, library and instruction materials), the proportion of certified teachers and computer availability have no additional significant impact on test scores (Table 5.A1.2). By contrast, school climate indicators (student/teacher relations, attitude towards school, teacher support and disciplinary classroom climate) are significant when included in the

Table 5.A1.1. **Immigration and language**

	Baseline	Immigration and language		
		A	B	C
Gender	-0.592*** (-6.55)	-0.584*** (-6.52)	-0.583*** (-6.38)	-0.574*** (-6.34)
Parents' occupational status	0.018*** (8.06)	0.019*** (8.11)	0.019*** (8.11)	0.019*** (8.24)
Immigration status		0.613*** (-3.11)		-0.389 (-1.57)
Language spoken at home			-0.857*** (-2.46)	-0.515 (-1.28)
Number of observations	3 273	3 241	3 220	3 188
R square	0.05	0.06	0.06	0.06

Note: t-Statistics in parentheses. Significance levels are indicated by asterisks: \*\*\*: 1% level, \*\*: 5% level, \*: 10% level. Source: PISA 2003, Secretariat calculations.

Table 5.A1.2. **School educational resources**

	Baseline	Education quality			
		D	E	F	G
Gender	-0.592*** (-6.55)	-0.577*** (-6.01)	-0.577*** (-6.01)	-0.527*** (-6.35)	-0.551*** (-5.44)
Parents' occupational status	0.018*** (8.06)	0.018*** (7.75)	0.018*** (7.23)	0.018*** (6.77)	0.017*** (6.67)
Quality of physical infrastructure		0.000 (1.22)			
Quality of educational resources			0.007 (0.10)		
Proportion of certified teachers (%)				-0.081 (-0.50)	
Computer availability					0.823 (1.14)
Number of observations	3 273	2 894	2 961	2 718	2 773
R square	0.05	0.05	0.05	0.05	0.05

Note: t-Statistics in parentheses. Significance levels are indicated by asterisks: \*\*\*: 1% level, \*\*: 5% level, \*: 10% level. Source: PISA 2003, Secretariat calculations.

baseline equation (Table 5.A1.3). Contrary to computer facilities at school, computer facilities at home (computer, software, internet access) are in general favourable to test scores. However, the use made of them is important: education-related use improves scores, while unrelated use (such as internet use to download music) does not (Table 5.A1.4).

Finally, when retaining the initially significant variables to test their joint impact on the PISA 2003 scores, the baseline variables (gender and socio-economic background), immigration status, school climate and computer facilities at home all have a significant impact, while school infrastructure (in particular computer resources at school) still do not play a significant role. Yet, although the joint impact equation improves the results of the baseline equation, its explanatory value is relatively limited (Table 5.A1.5).

Table 5.A1.3. **School climate**

	Baseline	School climate			
		H	I	J	K
Gender	-0.592*** (-6.55)	-0.535*** (-6.18)	-0.489*** (-5.79)	-0.550*** (-6.47)	-0.530*** (-6.35)
Parents' occupational status	0.018*** (8.06)	0.018*** (7.71)	0.017*** (7.60)	0.018*** (8.00)	0.018*** (7.89)
Student-teacher relations		0.260*** (7.97)			
Attitude toward school		0.302*** (9.40)			
Teacher support		-0.220*** (5.25)			
Disciplinary classroom climate		0.248*** (5.08)			
Number of observations	3 273	3 264	3 261	3 243	3 242
R square	0.05	0.08	0.08	0.06	0.06

Note: t-Statistics in parentheses. Significance levels are indicated by asterisks: \*\*\*: 1% level, \*\*: 5% level, \*: 10% level.  
Source: PISA 2003, Secretariat calculations.

Table 5.A1.4. **Use of computer**

	Baseline	Computer use			
		L	M	N	O
Gender	-0.592*** (-6.55)	-0.644*** (-7.19)	-0.586*** (-6.61)	-0.572*** (-6.55)	-0.457*** (-4.95)
Parents' occupational status	0.018*** (8.06)	0.017*** (7.35)	0.018*** (7.61)	0.018*** (7.75)	0.018*** (8.23)
Computer facilities at home		0.306*** (5.73)			
Internet use for information		0.078** (2.08)			
Use of educational software		-0.073** (2.16)			
Internet use to download music		0.122*** (-4.43)			
Number of observations	3 273	3 273	3 240	3 230	3 236
R square	0.05	0.06	0.05	0.056	0.06

Note: t-Statistics in parentheses. Significance levels are indicated by asterisks: \*\*\*: 1% level, \*\*: 5% level, \*: 10% level.  
Source: PISA 2003, Secretariat calculations.

Table 5.A1.5. **Joint impact**

	Baseline	Joint impact	
		P	Q
Gender	-0.592*** (-6.55)	-0.573*** (-6.69)	-0.538*** (-5.67)
Parents' occupational status	0.018*** (8.06)	0.017*** (7.09)	0.016*** (5.85)
Immigration status		0.633*** (-3.24)	-0.698*** (-3.58)
Computer availability			0.655 (0.99)
Student-teacher relations		0.245*** (7.55)	0.260*** (7.43)
Computer facilities at home		0.250*** (4.87)	-0.261*** (4.49)
Number of observations	3 273	3 233	2 735
R square	0.05	0.09	0.09

Note: t-Statistics in parentheses. Significance levels are indicated by asterisks: \*\*\*: 1% level, \*\*: 5% level, \*: 10% level.  
Source: PISA 2003, Secretariat calculations.



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