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ICELAND

Selected Issues and Statistical Appendix

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Approved by European I Department

April 17, 2001

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Statistical Appendix

Iceland: Basic Data

Demographic and other data

Area	103,000 square kilometers
Population (Dec. 2000)	282,845
Natural rate of increase (1992-00)	1.0 percent
Life expectancy at birth (1995)	
Males	76.7 years
Females	80.9 years
Infant mortality (per 1,000 live births)	3
Population per physician (1990)	357
GDP per capita (2000)	US$ 30,763

Composition of GDP in 2000, at current prices	In billions of krónur	Distribution in percent
Private consumption	401.0	59.9
Public consumption	158.3	23.7
Total investment (including stockbuilding)	159.3	23.8
Total domestic demand	718.6	107.3
Exports of goods and services	229.4	34.3
Imports of goods and services	278.6	41.6
GDP at market prices	669.4	100

Selected economic data	**1998**	**1999**	**2000**
	(Annual percentage change)		
Output and unemployment:			
Real GDP at market prices	4.5	4.1	3.6
Manufacturing production	4.8	1.4	-0.7
Average unemployment (in percent)	2.7	1.9	1.3
Earnings and prices:			
Wage Index	9.4	6.8	6.7
Consumer Price Index	1.7	3.4	5.0
Money and interest rates			
M1 (end-period)	20.3	19.4	-10.5
M3 (end-period)	15.2	16.9	11.0
3-month Treasury bill yield (eop)	7.6	9.8	11.5
25-year indexed housing bond (real yield)	4.7	4.8	6.3
	(In billions of krónur)		
Fiscal accounts:			
Treasury receipts	180.8	222.6	224.2
Treasury expenditure	189.6	199.0	201.4
Treasury balance	-8.8	23.6	22.8
(In percent of GDP)	-1.5	3.8	3.4
Balance of payments:			
Current account balance	-40.1	-43.6	-68.9
(In percent of GDP)	-6.9	-7.0	-10.3
Trade balance	-25.0	-22.4	-38.4
Exports	136.6	144.9	148.4
Imports	161.6	167.3	186.8
Services and transfers (net)	-1.3	-7.0	-10.8
Gross reserves, official basis			
(Millions of SDR, end-period)	408	360	310
Exchange rate (ISK/SDR, end-period)	97.6	99.6	110.4

Sources: National Economic Institute; Central Bank of Iceland; Ministry of Finance; and IFS.

I. Iceland's Impossible Trinity—A Case for Increased Exchange Rate Flexibility[1]

A. Introduction and Overview

1. **An intense debate among economists and policymakers has been ongoing in recent years on the suitability of soft exchange rate pegs in countries with highly integrated financial and capital markets.**[2] This discussion is based on the recognition that most of the countries experiencing an exchange rate and/or financial market crisis since the mid-1990s had implemented some form of a pegged exchange rate, in contrast generally to countries with flexible exchange rate regimes. In turn, there has been a broad-based trend toward either hard exchange rate pegs or floating regimes, illustrated by a decline in the proportion of intermediate exchange rate arrangements.[3]

2. **Iceland's exchange rate arrangements, implemented over the last decade, provide a textbook example of the difficulties involved in sustaining a soft exchange rate peg in an environment of open capital accounts.** The decision on March 27, 2001, to abolish the fluctuation bands of the exchange rate peg and to adopt a floating regime, supplemented by implementation of an inflation targeting framework, reflects the authorities' recognition that a soft peg was no longer suitable for Iceland.

3. **Against this background, the paper addresses the following questions:** What were the driving economic forces for the decision to eventually abolish the soft exchange rate peg and adopt a flexible regime? Is the adoption of a floating exchange rate the most suitable regime for Iceland, and why is an inflation target an appropriate anchor for Iceland's monetary policy? The questions are addressed in Sections B and C, respectively. Section D provides some concluding remarks.

B. Iceland's Impossible Trinity

4. **In choosing a monetary policy framework, monetary authorities principally face the dilemma that exchange rate stability, monetary independence and financial market integration cannot easily be achieved simultaneously; they must choose between two of the three policy goals.** If countries are open to international capital flows, this policy

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[1] Prepared by Frank Engels.

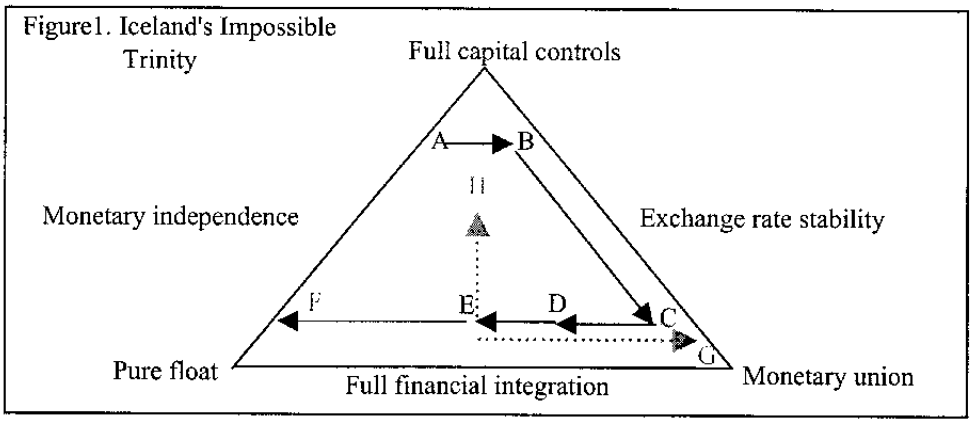
[2] See, for instance, Calvo/Reinhart (2000), Fischer (2001), Frankel (1999), and Hausmann et al. (1999).

[3] See various reports of the Fund's *Exchange Arrangements and Exchange Restrictions* publication.

conflict, which is commonly known as the 'eternal triangle' or 'impossible trinity'[4], tends to narrow to the choice between exchange rate stability and monetary independence, i.e. the degree of exchange rate flexibility. Over the last 12 years, Iceland's approach to resolving this dilemma can be divided into two main episodes, with the liberalization of the capital account in 1995 as the main turning point.

5. **Prior to the opening of the capital account in 1995, the choice between exchange rate stability and monetary independence was governed by the necessity to adopt an exchange rate anchor for monetary policy to combat chronic high inflation.** The policy-shift in 1989 from a managed float (point A in Figure 1) to an almost rigid exchange rate peg, defined as a trade-weighted currency basket with narrow horizontal fluctuation bands of ±2½ percent (point B), was necessary following the experience with almost two decades of real exchange rate targeting, a highly accommodative monetary stance, and widespread backward-looking wage indexation. In fact, the authorities' renewed commitment to an exchange rate anchor was perceived as a credible policy-shift and contributed to reducing inflation expectations. This set the stage for moderate and forward-looking multi-year wage agreements in the early 1990s, resulting in an impressive disinflation (Andersen and Guðmundsson (1998)).

Figure1. Iceland's Impossible Trinity



6. **Iceland's subsequent move to increased financial integration pushed the country toward the bottom of the policy triangle (point B to point C) at a constant degree of exchange rate stability.** In view of the newly liberalized capital account and the economy's proneness to external and supply shocks, the authorities decided to widen the fluctuation bands of the peg to ±6 percent in September 1995 to allow for increased monetary independence (point D). In 1999 and 2000, monetary policy took advantage of the increased room for policy maneuver to contain inflationary pressures stemming from the sustained overheating of the economy. The repeated tightening of the policy stance, however, resulted

[4] Each side of the triangle represents full achievement of the particular policy goal. See Frankel (1999).

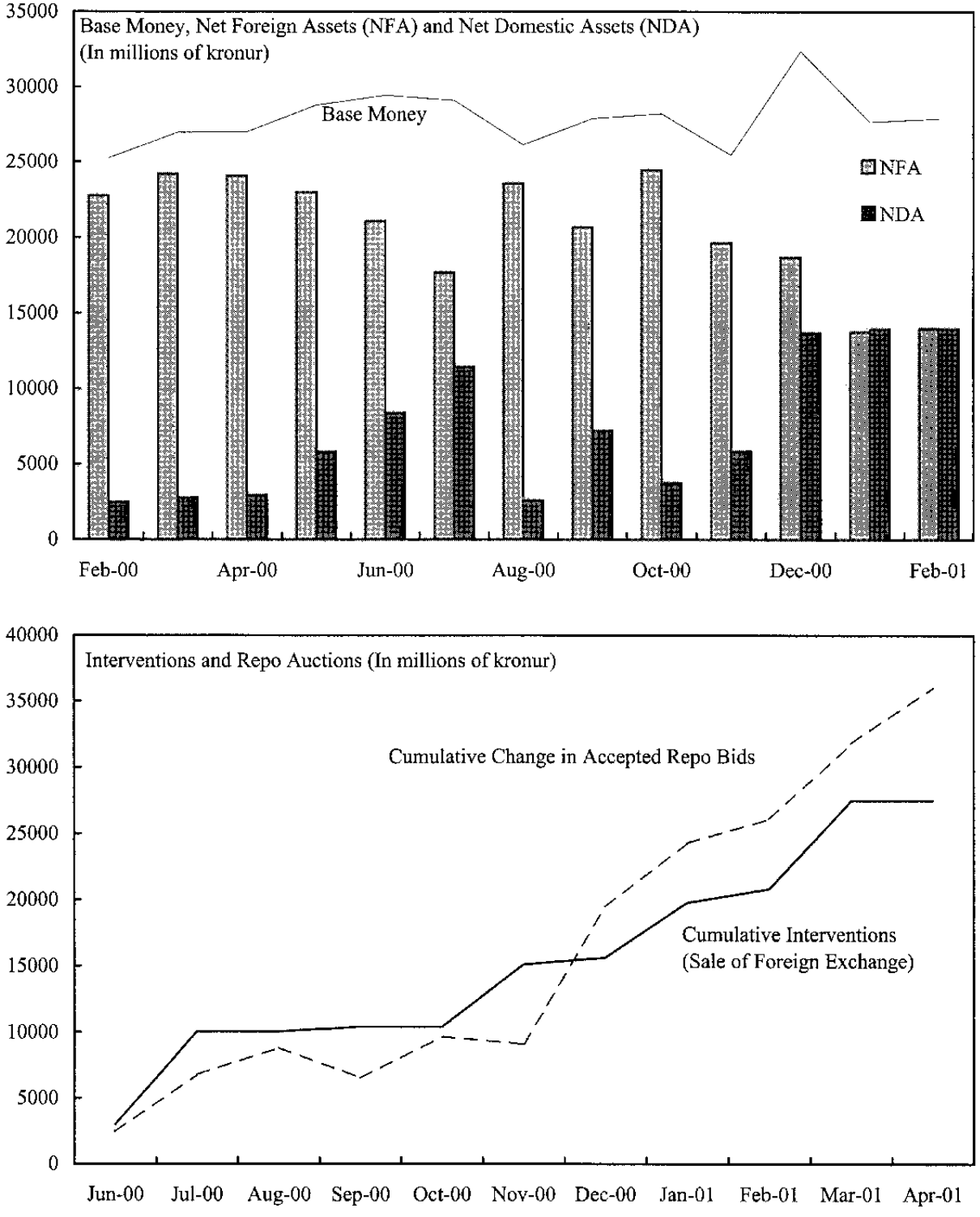
in a large positive international interest rate spread, attracted international capital flows and pushed the value of the króna upward close to its fluctuation band, making a further widening of the bands to ±9 percent in February 2000 indispensable to sustain the soft peg (point E).

7. **While Iceland managed to maintain its soft exchange rate peg throughout 2000, the fundamental and interrelated policy conflicts between price stability, exchange rate stability, and external competitiveness became increasingly apparent.** As monetary policy relied, inter alia, on an exchange rate anchor to achieve low and stable prices, shocks to the real exchange rate induced inflation-deflation cycles, with domestic prices and wages essentially having to accommodate such shocks. This points to a policy conflict between price and exchange rate stability, which was intrinsic to a country like Iceland with its pegged exchange rate and substantial fluctuations of the real exchange rate. While the gradual widening of the fluctuation bands may have lessened these tensions, it set the stage for a policy conflict between price stability and external competitiveness. Given that the adjustable peg of the króna provided some degree of policy independence to pursue the objective of price stability, the CBI repeatedly raised its policy interest rate. The inflow of foreign capital attracted by the positive interest rate differential resulted in a prolonged nominal appreciation of the domestic currency, thus aggravating the prevailing external imbalances.

8. **The combination of financial liberalization, a soft exchange rate peg, and shortcomings in the supervision of the financial system further contributed to the accumulation of external imbalances, triggering downward pressure on the króna.** Given the unrestricted access to foreign capital at relatively favorable interest rates, domestic agents either issued foreign denominated debt or borrowed from domestic financial institutions, with the latter intermediating foreign credit to domestic non-financial institutions and the private sector. Policy interest rate hikes were rendered less effective, given a highly interest inelastic lending policy of domestic banks. Shortcomings in the regulatory and supervisory framework allowed banks to overstate their capital base, providing further leeway to banks to expand their lending activity. Moreover, the soft exchange rate peg may have set the stage for moral hazard, with domestic agents perceiving the adjustable peg as an implicit guarantee against a potential depreciation. Negative news on the total allowable fish catch for the 2000/2001 fishing season eventually resulted in the perception that the large current account deficit was not sustainable, leading to downward pressure on the króna.

9. **Notwithstanding the room for policy maneuver provided by the widened fluctuation bands of the peg, the CBI's ability to prevent downward pressures on the exchange rate remained fairly limited against the backdrop of highly integrated capital markets.** The CBI was eventually forced to intervene massively in the foreign exchange market to defend the peg against increasing downward pressures. Moreover, given that the interventions were followed by increases in the accepted bids at repo auctions, the adverse domestic liquidity impact of the interventions was roughly neutralized by a more-than-offsetting rise in outstanding repos (Figure 2). This may have added to the downward

Figure 2. Iceland: Sterilization of Interventions



Source: Central Bank of Iceland.

pressure on the króna.[5] In the end, the authorities decided on March 27, 2001, to abolish the fluctuation bands of the peg, and to adopt a flexible exchange rate regime (point F).

C. The Need for Increased Exchange Rate Flexibility

10. **While Iceland's soft exchange rate peg had clearly become unsustainable in an environment of highly integrated capital markets, the authorities' decision to allow the króna to float raises two questions.** First, why not have chosen an alternative exchange rate arrangement? As pointed out by Fischer (2001), countries with a liberalized capital account can adopt a hard peg solution (point G), choose among a wide spectrum of flexible rate arrangements (points between G and F, but preferably between E and F), or impose capital controls in order to be able to conduct an independent monetary policy while maintaining a soft exchange rate peg (point H). Second, why is an inflation target a suitable new anchor for monetary policy?

11. **As regards hard-peg arrangements, either the adoption of a currency board or membership in a currency union would have been potential options.** The adoption of a currency board would have most likely resulted in an abrupt decline of the risk premium of the króna, and thus allowed for lower domestic interest rates, with the CBI loosing monetary independence. Empirical evidence, however, suggests that there is virtually no correlation between shocks to the Icelandic economy and shocks to its main trading partners (Table 1), due mostly to Iceland's high degree of export specialization (Guðmundsson et al. (2000)). Given the loss of monetary independence, the costs of asymmetric shocks would have to be born by domestic labor markets through highly flexible wages and labor mobility. The latter, however, is clearly limited by Iceland's geographic location, and real wage flexibility, even though relatively high by international standards, is thought to have fallen due to the successful disinflation. As regards the option of joining a currency union, Buiter (2000) considers the pros and cons of Iceland adopting the euro as legal tender. It is stressed that any form of 'euroization' would not only lack political legitimacy but also political accountability, unless Iceland joined the EU and participated in the EMU. The latter, however, is not under active consideration by the Icelandic government, given its earlier decision to wait and see, whether other Nordic countries and the UK would eventually participate in the EMU.[6]

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[5] Foreign exchange interventions may also have generated the perception among market participants that exchange rate rather than price was the main objective of monetary policy. Lack of clarity on the monetary policy objective, in turn, may have contributed to a decline in the credibility of the soft exchange rate peg.

[6] This topic was discussed with the authorities in the context of the 1999 Article IV consultations. See SM/99/90.

12. **Capital controls, while appealing on theoretical grounds, have proved to be of limited effectiveness and efficiency over time as suggested by a wide range of country experiences (Edwards (1999), Ariyoshi et al. (2000)).** The imposition of capital controls would have also implied a reversal of the 1995 decision to fully liberalize short-term capital flows. Moreover, in order to be effective and prevent prolonged speculation against the króna against the backdrop of extremely large external imbalances, the maintenance of a soft exchange rate peg would have required in any event a significant widening of the fluctuation bands (i.e. a point somewhere between E and F in Figure 1). At the same time, however, this would have weakened the exchange rate as nominal anchor for monetary policy.

13. **In choosing the optimal degree of exchange rate flexibility, it is essential to take into account the structural characteristics of the domestic economy (Eichengreen et al. (1998).** Notwithstanding the small size and openness of the Icelandic economy, which would normally argue for a fixed exchange rate, several structural conditions suggest that a flexible exchange rate regime should serve Iceland better in future (Table 1). Supply shocks, that is shocks to the real exchange rate, appear to be the dominant source of output variation in Iceland, and its business cycle is virtually uncorrelated with that of its main trading partners. In such circumstances, there is a need for increased nominal exchange rate flexibility and independence of domestic monetary policy to weather shocks. In fact, Iceland's proneness to real exchange rate shocks is due to the high share of commodity-based products—notably marine products—in overall exports, and to the relative openness of the economy. That said, supply shocks, be they temporary or permanent, could be partially accommodated by nominal exchange rate changes in a flexible exchange rate regime, rather than by changes in the domestic price level within a fixed exchange rate arrangement. Moreover, Iceland's high integration in international capital markets and limited labor market flexibility also argue for the adoption of a flexible exchange rate.

14. **A frequently used argument against the adoption of flexible exchange rates is that increased nominal exchange rate flexibility might involve greater uncertainty about future competitiveness of export and import-competing industries**. This argument is of limited relevance to Iceland, given that the previous exchange rate peg was based on a trade-weighted currency basket that allowed for unlimited flexibility of bilateral exchange rates, such as between the króna and the dollar, or the króna and the euro. As a consequence, the margins of Iceland's export and import-competing industries have already been exposed to currency risks under the previous exchange rate regime. Given that the trade-weights of the euro area and the US in the exchange rate index are roughly balanced, and in view of the divergence of euro and dollar exchange rate movements, the variability of the exchange rate index of the króna is not expected to increase due to a floating of the currency.[7] In any event,

[7] This, however, would not prevent an increase in the variability of bilateral exchange rates under the new regime, which may then unduly affect the margins of Icelandic exporters, as roughly 75 percent of the exports are invoiced in foreign currency terms. While a complete

(continued)

the impact of nominal exchange rate fluctuations on competitiveness is mainly of a short-term nature, and long-run changes in competitiveness are caused by real exchange rate changes, a variable over which monetary policy exerts no sustained impact.

Table 1. Iceland: Structural Conditions of the Icelandic Economy

Size	Population: 282,845; GDP: US$ 8.6 billion.
Openness	Exports and imports of goods and services in percent of GDP (1990-2000): 68.3 percent.
Degree of export specialization	Share of commodity-based exports in overall exports (1999): 68 percent; Share of marine products in merchandise exports (1999): 67.4 percent; Share of marine products and aluminium exports in merchandise exports (1999): 83 percent.
Real exchange rate variability	Standard deviation of year-on-year monthly exchange rate changes in percent: 1979.1-2001.2: 6.81; 1989.9-2001.2: 4.14.
Terms of trade variability	Standard deviation of annual terms-of-trade changes in percent: 1960-99: 5.1; 1989-99: 2.8.
Real wage flexibility	The standard deviation of real wage growth exceeds the standard deviation of output growth significantly, thus implying relative flexible wages.
Labor mobility	International labor mobility is limited due to Iceland's geographic location. An increase in output by one percentage point is expected to result in a net immigration of about 125 people.
Sources of shocks	Structural vector auto regressions for the period 1950-98 show that resource shocks (changes in the fish catch) and terms of trade shocks explain approximately 50 percent of short-term output variations, over 90 percent of the variation in consumption, and some 80 percent of short-term investment changes. Permanent domestic supply shocks become increasingly important with a larger forecast horizon. In the long run, domestic supply shocks account for 75 percent, 45 percent and 25 percent of variations in output, consumption and investment, respectively.
Symmetry of business cycles	Iceland's output growth, terms of trade developments, and export growth are not significantly correlated with fluctuations in the EU area and most of the OECD countries.

Sources: Guðmundsson, Pétursson, and Sighvatsson (2000); staff estimates.

analysis of invoicing effects also needs to take into account the currency denomination of imports, this data has not been available.

15. **The adoption of a flexible exchange rate arrangement requires that a new anchor for monetary policy be chosen.** Highly transparent and easily understood by the broad public, an inflation target raises the potential for lowering inflation expectations (Mishkin (1999)). It therefore clearly provides a nominal anchor for the path of the price level and, due to its forward-looking nature, helps to tie down inflation expectations through its direct constraint on the value of domestic money. At the same time, the central bank's commitment to achieve an inflation target helps to avoid the time-consistency problem of monetary policy promoting short-term output gains at the cost of higher future inflation. Moreover, and in contrast to money targeting, the nominal anchor in an inflation targeting framework is effectively insulated from velocity shocks.

16. **In view of Iceland' s proneness to shocks, it is important to understand how monetary policy would respond to shocks under an inflation targeting regime.** As an inflation target is a *domestic* nominal anchor, the focus of monetary policy shifts to the domestic cycle. Given their impact on the central bank's inflation forecast, domestic demand shocks would automatically be offset by monetary policy through interest rate changes. Overseas demand shocks, however, have typically no long-term impact on the domestic price level and, therefore, trigger no policy response under an inflation target. A tightening of overseas monetary policy, for example, would result in a real depreciation of the domestic currency, inducing import prices to rise. However, imported inflationary pressures are usually offset over time by the response of overseas prices to the tightening of monetary policy. Moreover, the real depreciation might lead to a temporary increase in the competitiveness of domestic exports, thus resulting in a nominal appreciation, which would counterbalance the first-round effect of the overseas demand shock on domestic prices.[8] Supply shocks, however, are more difficult to cope with under an inflation target (Mishkin and Posen (1997)). If a negative supply shock were to occur, output would shrink and inflation would rise. Given this first-round effect on domestic prices, however, central banks would run the risk of attempting to offset a supply shock by raising interest rates and, hence, would act pro-cyclically and contribute to increased output variability. This problem highlights the importance of central banks conducting inflation forecast targeting, that is, to ensure that monetary policy feeds back from projected inflation rather than the inflation outcome. Likewise, as terms-of-trade shocks or any other shock to the real exchange rate typically induce only one-off price level shocks, monetary policy should be accommodative.

[8] If an overseas demand shock were to influence domestic output and inflation through a permanent change in net exports, monetary policy under an inflation targeting regime would need to offset the shock.

D. Conclusions

17. **The abolition of the fluctuation bands by the Icelandic authorities can be seen as the final step of a consistent and gradual move toward increased exchange rate flexibility. Supplemented by the adoption of an inflation targeting regime, the new monetary policy framework should suit Iceland better.** Given the progressive widening of the exchange rate bands during the past decade, the floating of the króna and adoption of an inflation targeting regime provide a suitable new framework for the monetary authorities in coping with aggregate shocks. In contrast to the previous exchange rate peg, the new regime allows monetary policy to focus on the domestic cycle and to respond to shocks to the domestic economy. Moreover, the inflation targeting framework provides a highly transparent nominal anchor, which is not dependent on a stable relationship between monetary aggregates and inflation, but rather is based on the central bank's inflation forecasts. The CBI's relatively reliable inflation forecasts over the past few years have helped it earn confidence.[9] This policy shift, however, has required a coherent institutional and operational environment. And indeed, most preconditions for the new regime to succeed are either in place or expected to be introduced in the near term. Chapter II reviews the extent to which Iceland appears to satisfy, or soon should meet, this broad range of institutional and operational pre-requisites.

[9] In fact, Icelandic labor unions have supported a switch to an inflation target given the focus of monetary policy on expected inflation.

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II. Iceland's New Monetary Policy Framework—A Preliminary Assessment[10]

A. Introduction and Overview

18. **On March 27, 2001, the Icelandic government and the Central Bank of Iceland (CBI) jointly announced the floating of the Icelandic króna, accompanied by adoption of an inflation targeting framework** (CBI (2001a)). At the same time, new draft central bank legislation was published (CBI (2001b)). All together, these decisions mark a fundamental change in Iceland's exchange rate and monetary policy, namely a shift from an exchange rate peg with horizontal fluctuations bands to a flexible exchange rate regime, and a replacement of the exchange rate with an inflation target as new anchor for monetary policy.

19. **The viability of a monetary policy framework is to a large extent determined by the coherence of its institutional and operational environment, which facilitates the achievement of the main objective of monetary policy.** The framework also needs to place sufficient emphasis on country-specific factors such as the depth of financial markets or the degree of openness of the economy. In an inflation targeting regime this requires that central bank legislation, the design of the inflation target, and the accountability and transparency of monetary policy are conducive to achieving the targeted inflation rate. Moreover, the central bank needs to be capable of producing reliable inflation forecasts and to conduct monetary policy effectively, which in turn requires a profound knowledge of the transmission mechanism of monetary policy and an effective operational target.

20. **Against this background, this chapter provides a preliminary assessment of Iceland's newly adopted monetary policy framework.** Section B provides an overview of Iceland's central bank legislation in terms of its soundness as legal framework for successful inflation targeting. Section C considers the effectiveness of the transmission mechanism of monetary policy and its impact on the inflation projections of the CBI. Section D then reviews specific design features of Iceland's inflation targeting framework relative to the arrangements and experiences of other inflation targeters.[11] Section E summarizes the findings and provides some concluding remarks.

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[10] Prepared by Frank Engels.

[11] The review of international experiences with inflation targeting is based on Bernanke, Laubach, Mishkin, and Posen (1999), Blejer, Ize, Leone, and Werlang (2000), Debelle (1997), Haldane (1995), Mishkin (1997, 1999, 2000), Schaechter, Stone, and Zelmer (2000) as well as a wide range of country-specific information disclosed through the Internet web sites of the central banks of inflation targeting countries.

B. Central Bank Legislation

21. **The legal framework of central banks usually confirms the objectives of monetary policy and provides the scope for the central bank to meet these goals.** Establishing both price stability as the main objective of monetary policy and instrument independence for the central bank are of special importance to the sustained success of inflation targeting.[12] Iceland's draft legislation meets these criteria.

Instrument independence

22. **There is a worldwide trend towards increased independence for central banks.** Independent central banks are more successful in achieving low and stable inflation, while at the same time they deliver comparable outcomes for real output and unemployment (Alesina and Summers (1993); Berger, de Haan and Eijffinger (2000)). In an inflation targeting framework, it is of particular importance that the central bank has the discretion to formulate policies in order to attain its policy objective(s) and to secure the credibility of the regime.

23. **Instrument independence is guaranteed in the legal framework of all inflation targeters.** Emerging market economies adopted instrument independence prior to shifting to an inflation targeting regime, whereas some industrialized countries either continue to provide an override clause to the government (Canada, Australia, New Zealand) or allowed for instrument independence subsequent to the implementation of an inflation target (Sweden and the U.K.). The legislation of all inflation targeting central banks also either limits or prohibits direct central bank credit to the government in order to reduce or prevent the monetization of fiscal deficits.

24. **While Iceland's present Central Bank Act provides neither institutional nor operational independence to the CBI, a proposal for revised central bank legislation, published on March 27, 2001, grants instrument independence to the CBI.** According to the draft legislation, the CBI's conduct of exchange rate policy is conditional on the consent of the Prime Minister, and central bank credit to the government is ruled out explicitly. The draft bill also contains no provisions for consultations between the CBI and the government other than the exchange of information on economic developments and government finances.

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[12] Goal independence, however, is not necessarily required, as pointed out by Debelle and Fischer (1994). It is argued that the responsibility for setting monetary policy goals should be assigned to the government, as it may better reflect society's preference structure for inflation.

Monetary policy objectives

25. **If inflation targeting is strictly pursued, the ultimate goal of monetary policy is the achievement of the publicly announced inflation target.** However, central bank legislation of inflation targeting countries does not contain explicit provisions for a specific inflation target. An inflation targeting regime therefore benefits from establishing a clear legislative mandate for price stability as the primary objective of monetary policy. Additional goals should only be subsidiary to price stability. Central bank legislation of inflation targeting countries, however, varies with respect to the clarity attached to the paramount policy goal. Only in New Zealand, Poland, and Spain, and Finland, was price stability established as the primary policy goal in the legislation at the time of the adoption of inflation targeting. While the central bank legislation of most industrialized countries provides multiple policy goals, in practice the achievement of price stability has become the ultimate objective.

26. **While Iceland's present Central Bank Act still contains multiple policy objectives and does not explicitly specify the principal goal, draft legislation published on March 27, 2001, establishes price stability as the primary policy objective.**[13] On agreement with the Prime Minister, the CBI can declare a numerical inflation target. The CBI shall also promote other policy goals, such as the stability of the financial system, and support the government's economic policy, but only on the condition that such support is consistent with the ultimate objective of monetary policy. In granting instrument independence to the CBI and defining a primary monetary policy goal, the draft Central Bank Act clearly provides a strengthened legal and institutional basis for a successful implementation of inflation targeting. The timing of the proposed legal changes, and the publication thereof, reflect the authorities' intention to achieve further credibility and public support for the new framework of monetary policy.

27. **With the abolition of the fluctuation bands of the exchange rate index, monetary policy has become exogenous.** The conduct of monetary policy is no longer restricted by the limited exchange rate flexibility of a soft peg in pursuing its primary goal of achieving a low and stable rate of inflation. This should further increase the credibility of the new framework. Notwithstanding the floating of the króna, however, the authorities recognize the importance of exchange rate volatility in a small open economy. The joint declaration provides central bank intervention if excessive volatility were to occur and threatened the achievement of the inflation target and/or financial system stability. Recalling the political and operational difficulties encountered by New Zealand when the Reserve Bank was perceived as being unconcerned about exchange rate volatility, the authorities' commitment not to ignore

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[13] Prior to the proposed legislative changes, gradual consensus had evolved on the achievement of a low and stable inflation rate as well as financial system stability as principal objectives of monetary policy. Accordingly, changes in the operational target of monetary policy aimed primarily at containing inflation over the last few years.

exchange rate changes is of particular importance for sustained success of Iceland's newly adopted monetary policy framework.

28. **Draft legislation also allows the Central Bank to pursue the stability of the financial system.** While not inconsistent with an inflation targeting framework, a vulnerable banking system may limit interest rate flexibility. Moreover, a fragile financial system raises the risk that financial institutions may need to be bailed out, resulting possibly in an inflationary liquidity injection that may limit the scope for monetary tightening. If, by contrast, monetary tightening were required to meet the inflation target, it could expose already fragile institutions to additional risks, threatening the stability of the financial system. Against this background, the increased risk exposure and limited capacity of Iceland's banking system to absorb shocks could possibly limit the effectiveness of inflation targeting, if interested rate hikes aimed at containing inflation were to be delayed or avoided. However, the exit from the soft exchange rate peg, which appears to have contributed to the risk accumulation of the private sector in the past, should put an effective brake on excessive foreign borrowing and domestic onlending practiced by domestic financial institutions under the former regime. This should help securing financial system stability over the medium term.

29. **Draft legislation requires explicit coordination between the goals of monetary and fiscal policy.** The exchange of information between the government and the CBI on economic developments and public finances is crucial for the following reasons: First, with Iceland's Treasury pursuing a strategy of early retirement of public debt, fiscal policy may create lower inflation expectations and facilitate the achievement of the inflation target over the next few years. This in turn may result in lower interest rates and subsequently a lower debt service burden for the government. Second, given that the government holds its accounts with the CBI, sound liquidity forecasting of the CBI requires a frequent exchange of information. Finally, potential changes in indirect taxes may exert temporary affects on inflation dynamics and—if not excluded from the definition of the inflation target—need to be integrated in the Bank's inflation projections.

C. Operational Target and Transmission Mechanism of Monetary Policy

30. **The effectiveness of monetary policy operations depends—under any monetary policy framework—on a speedy transmission of changes in the operational target of monetary policy to the real economy, channeled through domestic financial markets.** In an inflation-targeting framework, however, the time lag between changes in the operational target and the ultimate monetary policy objective can be long, as all inflation targeting central banks use short-term interest rates as operational target to achieve their inflation target. Successful inflation targeting therefore requires a particularly good understanding of the transmission mechanism.

31. **Innovations in the operational target of monetary policy are transmitted to the real economy through interest rate changes along the yield curve (interest rate channel), changes in the supply of bank credit (bank lending channel), and—of**

particular relevance in an open economy such as Iceland—exchange rate changes (exchange rate channel). The effectiveness of these transmission channels is to a significant extent determined by the degree of financial market development and capital account liberalization.

32. **The transmission of policy interest rate changes throughout the yield curve is well developed in Iceland, due mostly to widespread borrowing at flexible interest rates.** However, shallow domestic financial markets and shortcomings in systemic liquidity arrangements mitigate the effectiveness of the bank lending channel and make it difficult to track policy changes in yield curve developments. The exchange rate channel appears to have weakened on account of hedging and increased competition. All in all, the CBI is well aware of the length of the transmission lags. Empirical research on the transmission mechanism is conducted on an ongoing basis, and the findings form an important base for both the Bank's inflation forecasts and the timing of its policy decisions.

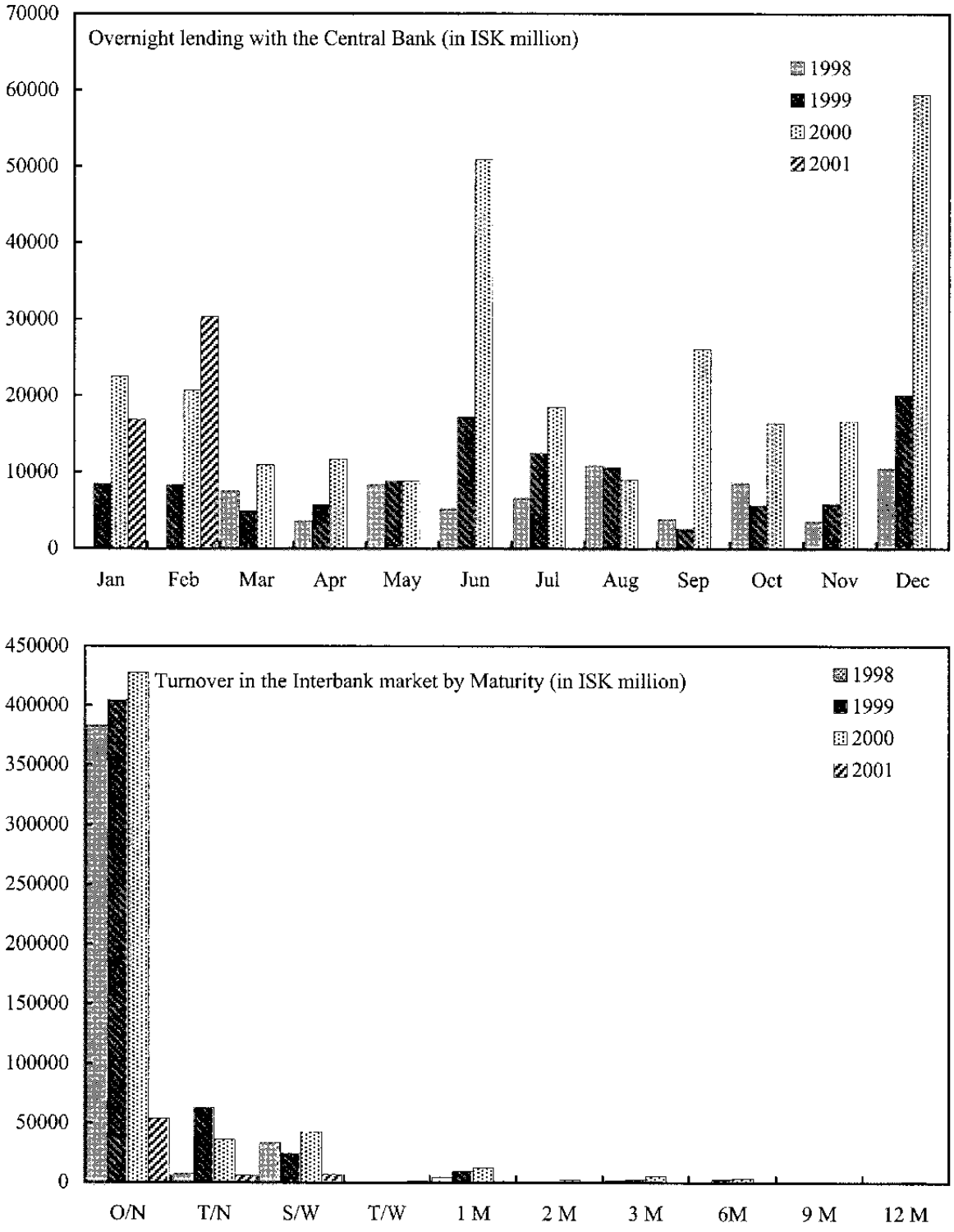
Degree of financial market development

33. **The transmission of interest rate changes through the interest rate channel is one of the fastest among OECD countries.** The unwinding of capital controls and financial sector reforms have contributed to a rapid development of Iceland's financial system, including well-developed institutional and legal frameworks. Against this backdrop, recent econometric research for Iceland suggests a swift transmission of monetary policy innovations through the interest rate channel (Pétursson (2000a)). Changes of the repo rate have a significant within-month effect on the money market rate for 3-month treasury bills, which is then transmitted with a one-month lag along the yield curve to the bond market rate, and subsequently to banks' lending rates. All in all, the transmission of monetary policy innovations throughout the yield curve is maximized at a two-to-nine month horizon, with interest rates on nominal bank lending responding almost *pari passu* to changes in the repo rate.

34. **The empirical finding of a relatively swift propagation of monetary policy changes throughout the term curve can be attributed mainly to the structure of Iceland's financial markets.** First, approximately half of the borrowing in Iceland carries flexible interest rates, which typically contributes to a fast response of financial markets to policy interest rate changes. Second, the small size of Iceland's money and capital markets facilitates *per se* the transmission of interest changes. In fact, the domestic T-bill market, characterized by small issuances and a focus on 3-month bills, is not yet properly developed, and the interbank money market has remained very thin for maturities beyond overnight (Figure 3). Consequently, the CBI has the ability to *de facto* determine the yield curve up to 12 months.

35. **Shallow financial markets, however, have limited shock-absorption capabilities.** Large transactions are likely to induce significant price reactions, which do not necessarily reflect the developments of other short-term interest rates, exposing market participants to increased liquidity risks. Iceland's capital markets are indeed highly fragmented, and foreign

Figure 3. Iceland: Overnight Lending with the Central Bank and Interbank Market Turnover



Source: Central Bank of Iceland.

participation has been fairly limited. Bond yields have been volatile in recent months on account of both large transactions and/or market imperfections. To the extent that such transactions coincided with policy interest rate changes, it has been increasingly difficult to track the impact of the Central Bank's interest rate decisions on yield developments (CBI (2001c)). The latter is likely to have mitigated the signaling effect of changes in the operational target, which in turn weakened the interest rate channel and made it more difficult to infer changes in inflation expectations from yield curve developments.

36. **While the instrument set of the CBI constitutes an adequate framework for effective monetary policy operations, weaknesses in systemic liquidity arrangements appear to have limited the CBI's ability to control liquidity effectively.** A swift transmission of changes in the operational target of monetary policy through the bank-lending channel requires that the central bank have at its disposal an effective policy instrument to influence the short-term liquidity of domestic banks. The CBI's monetary policy instruments resemble to a large extent those of the European Central Bank[14], with the 14-day repo rate as the main operational target. Changes in the repo rate provide a clear signal of a revised policy stance, as the CBI tries to control liquidity by determining the yields of weekly auctions. However, interventions, coupled with a low outflow of funds from the Treasury's current account with the Central Bank, led to increased liquidity demand by domestic banks. Interbank interest rates on several occasions exceeded the repo rate and, due to the proximity of the repo rate to the CBI's overnight lending rate, have been close to the standing lending facility of the CBI. As a consequence, the Bank's overnight lending facility became a favorable liquidity source for domestic banks, depressing turnover in the interbank market (Figure 3). Moreover, domestic credit institutions appear to have relied on the fixed-price repo agreements in excess of what has been needed to meet reserve requirements. Generous access to central bank liquidity may then have been used as a sustained source of financing for the recent expansion of domestic banks' balance sheets, limiting the effectiveness of the transmission mechanism of monetary policy through the bank lending channel.

37. **A further deepening of domestic money and capital markets along the lines recommended in the context of the Financial System Stability Assessment Program (FSAP) is desirable.**[15] Reforms should include a move toward fixed-quantity repo auctions over the medium term and a re-centering of the repo rate within the CBI's interest rate corridor. This would improve the robustness of the liquidity provision through the interbank market, strengthen the bank lending and interest channel of the monetary transmission mechanism, and eventually facilitate inflation projections.

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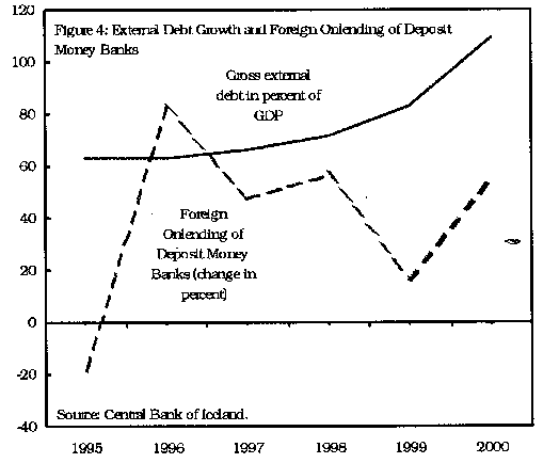
[14] For a detailed discussion of the development of monetary policy instruments and financial markets in Iceland, see SM/99/94, chapters IV and V.

[15] See Financial System Stability Assessment (FSSA).

Capital account liberalization

38. **Financial liberalization, by expanding opportunities to borrow abroad, is likely to weaken the transmission of interest rate changes through the bank-lending channel.** A tightening of monetary policy is less effective, if the change of the policy stance results in a positive interest rate spread, and domestic market participants turn to foreign borrowing—intermediated through domestic financial institutions. This holds particularly in a country with a fixed exchange rate regime, given that an exchange rate peg, if perceived as credible, is likely to fuel the perception of limited exchange rate risks among domestic agents, thus providing further incentives to borrow abroad.

39. **Evidence suggests that financial liberalization in Iceland has led to a weaker bank-lending channel of the transmission mechanism of monetary policy.** Given the prevalence of an adjustable exchange rate peg until end-March 2001, Iceland's sustained economic boom resulted in a gradual tightening of the monetary policy stance and a positive international interest rate differential, which in turn attracted foreign capital and led to a trend appreciation of the Icelandic króna from early 1999 until mid-2000. Indeed, household indebtedness and debt-equity ratios of enterprises grew substantially over the last few years, and the leverage ratio of banks rose sharply despite repeated increases in the CBI's policy rate. Consequently, the external debt-to-GDP ratio rose rapidly over the last five years, from 63 percent in 1995 to 109 percent at end-2000 (Figure 4). With the recent adoption of a floating exchange rate, however, exchange rate risk drives effectively a wedge between the interest rate differential, which should normally slow down foreign borrowing and improve the overall effectiveness of monetary policy through the bank lending channel.



40. **Financial liberalization strengthens the interest rate channel of the transmission mechanism, as credit institutions, firms, and households tend to become increasingly leveraged due to increased access to foreign credit.** This usually leads to a medium-term increase in the interest rate sensitivity of domestic investment and consumption. This medium-term strengthening of the interest rate channel, however, has yet to occur in Iceland. Notwithstanding the widespread use of flexible interest rates and indexed loans for longer-term borrowing, lending of the credit system, including onlending of foreign funds, has remained brisk throughout the first quarter of 2001 (Figure 4).

41. **Liberalization of the capital account leads to a higher interest rate sensitivity of the exchange rate and thereby enhances the transmission of monetary policy changes through the exchange rate channel.** In this environment, a tightening of the monetary

policy stance would lead, ceteris paribus, to a rise in the trade-weighted nominal interest rate differential and put upward pressure on the exchange rate on account of increased capital inflows. In response to the appreciation, the value of the import price component of the domestic CPI would decline, and lower prices of imported goods would be eventually passed through to domestic goods.

42. **Given the sizable share of imported goods in Iceland's CPI and the openness of the capital account, the exchange rate channel is of particular relevance.** Recent evidence points to a weakening of the exchange rate channel, suggesting a smaller immediate price impact of exchange rate changes. Coupled with the empirical finding of unchanged long-term relationships between the exchange rate, prices, and wages, this implies an increase in the medium-term pass-through coefficient due mostly to increased competition in domestic markets and increased hedging of exchange rate risks. Consequently, the price effects of policy interest rate changes which are channeled through the exchange rate, occur with a longer time lag. Moreover, as the floating of the króna adds to exchange rate uncertainty, the responsiveness of capital flows to nominal interest rate changes is likely to decrease. Given its ongoing research on the transmission lags of monetary policy, however, the CBI is well aware of these changes.[16] Changes in the short-run relationship of exchange rate and prices are expected to result in a corresponding adjustment of the CBI's inflation projections.

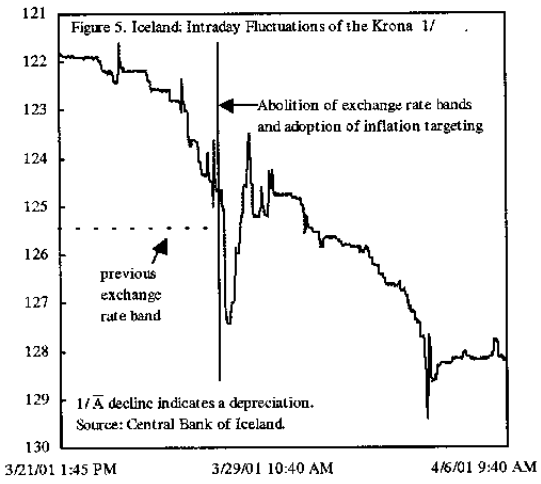
D. Announcement of the Target and Timing of the Regime Change

Formal announcement

43. **The formal announcement of inflation targets has varied across inflation targeting countries, leaving the authority to announce and determine the target to either the government or the monetary authority.** The different approaches may either reflect the government's concern that the central bank could announce an overly tight target or, by contrast, that the government is interested in a higher-than-optimal inflation rate due to its reliance on seigniorage and/or central bank credit. A joint announcement, issued by the government and the central bank, however, implies that both the government and the central bank recognize their responsibility for price stability. This ought to strengthen the credibility of the inflation target. Moreover, government endorsement of the target signals its commitment to ensure that fiscal policy is supportive achieving the inflation target. This approach has been widely applied by inflation targeters (New Zealand, South Africa, Canada, Czech Republic, and Norway). In Sweden, Spain, Poland, Australia and Chile, the central bank has been empowered to announce and determine the target, thus enhancing its

[16] In fact, the CBI has publicly stressed that the weakening of the exchange rate channel has resulted in increased forecasting uncertainty. The recent depreciation of the króna has led to a slight overprediction of inflation, whereas the trend appreciation that took place from early 1999 to mid-2000 induced an underprediction of inflation. See CBI (2001c).

accountability by signaling that the authority for monetary policy is vested solely with the central bank. Only a few countries (Brazil, the U.K., and Israel) have opted for government announcement of adopting inflation targeting, following consultations with the central bank.



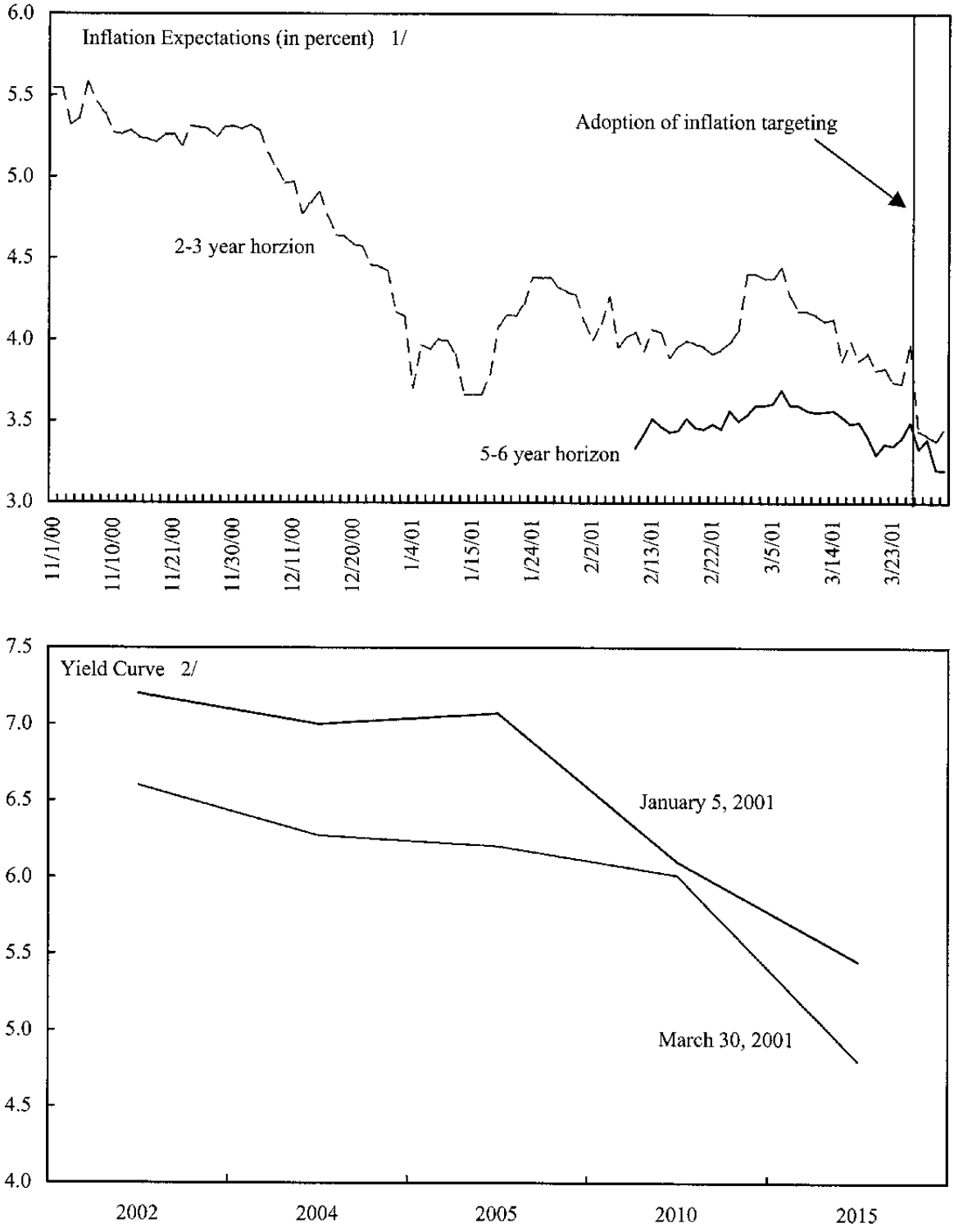
44. **Iceland chose a joint declaration of the Prime Minister and the Governor of the Central Bank, underscoring broad political support for the shift toward the new regime.** The simultaneous publication of draft changes to the legislative framework of the CBI further boosted the credibility of the new framework. Indeed, domestic financial markets reacted favorable to the announcement. While the intraday volatility of the exchange rate index increased significantly during the first hours of trading under the new regime, the market calmed down in the course of the following days (Figure 5).[17] Moreover, inflation expectations declined instantaneously given that the spread between indexed and unindexed treasury papers of similar maturity fell by more than half a percentage point on the day following the announcement (Figure 6).

Timing of the regime change

45. **Most inflation targeting countries have shifted to the new regime either after first achieving some progress in lowering inflation from initially high levels or following the occurrence of a one-time inflationary shock in an environment of otherwise relatively low and stable inflation.** Given the importance of there being a high probability of achieving the target, inflation targeting has usually been adopted at a time when expected inflation was trending downward from initially high levels (e.g., New Zealand, Israel), accompanied by a slowdown of economic activity. The implementation of an inflation targeting framework then has typically helped reduce inflation expectations by providing predictability to monetary policy. In some cases, the adoption of inflation targeting has followed a discrete event such as a collapse of an exchange rate regime (Brazil, Sweden, and the U.K.), whereas in Australia, Israel, and Chile it has evolved more gradually, following a continuum of changes to the existing monetary policy framework. The

[17] A large non-financial institution tested the central bank's commitment to the floating exchange rate of the króna on March 28. This explains to a large extent the abrupt but temporary depreciation of the króna during the first hours of trading. On April 4, intraday volatility rose again, most likely due to a sizable increase in domestic liquidity following a record-high repo auction of the CBI.

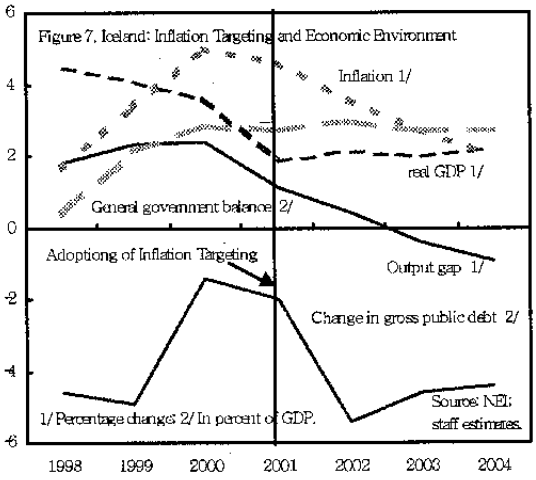
Figure 6. Iceland: Inflation Expectations and Yield Curve Developments



1/ Based on spread between non-indexed and inflation-indexed Treasury bonds.
2/ Based on inflation-indexed Treasury bonds.
Sources: Central Bank of Iceland, Islandsbanki-FBA.

latter two countries announced inflation targets in the context of a pegged exchange rate. Conflicts between the exchange rate regime and the inflation target were usually resolved in favor of the latter by gradual enlargement of the fluctuation bands of the pegs, together with judicious interventions to keep the peg within its bands.

46. **Iceland's regime change in many respects resembles the incremental approach chosen by Israel and Chile.** The shift followed a period of gradual widening of the fluctuation bands, which provided increased flexibility to monetary policy to resolve tensions between the exchange rate anchor and the pursuit of a low and stable inflation rate. Following its impressive disinflation during the first half of the 1990s, Iceland's regime change can be viewed as attempt to lock in lower inflation expectations. The economy is showing signs of slowing down, accompanied by falling inflation expectations.[18] Furthermore, general government finances are in reasonably good shape and, given that the stock of public sector debt is forecast to decline further, fiscal policy can in principle be expected to provide support to CBI in achieving a low and stable inflation rate (Figure 7). Against this background, Iceland's shift to an inflation targeting regime has been relatively well timed.[19]



47. **There was no formal advance notice to the public of the policy shift to inflation targeting.** However, the authorities carefully signaled a potential regime change to the interested public on several occasions. The CBI published several articles in various editions of its Quarterly Monetary Bulletin (Pétursson (2000b and 2000c)), discussing in an academic fashion the suitability of inflation targeting as well as recent trends with respect to independence, transparency and accountability in central banking. It was also publicly known that the Prime Minister had set up a committee to propose revisions to the current Central Bank Act. Finally, Fund staff and the OECD had publicly stressed that a shift to an inflation targeting would suit Iceland better in present circumstances.

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[18] The output gap is forecast to be closed by 2003.

[19] In retrospect, an earlier move to a floating exchange rate and adoption of inflation targeting may have been more advisable. This decision would have put a brake on excessive foreign borrowing and domestic onlending and thus slowed down the build-up of external imbalances. In any event, it would have avoided the need to exit the previous regime under pressure, following the large interventions that were necessary during 2000 and early 2001 to keep the effective exchange rate of the króna within its fluctuation bands.

E. Design of the Inflation Targeting Framework

48. **International experiences with inflation targeting regimes suggest that the initial success and viability of the framework benefits if several key institutional and operational criteria are implemented from the outset or soon thereafter.**[20] A reliable, clearly defined and broadly accepted inflation target is needed, including a target horizon that appropriately reflects the economic environment and other country-specific factors of relevance. The inflation forecasting capabilities of the central bank should be sufficiently developed to secure reliable inflation forecasts. Rules and provisions governing the transparency and accountability of the central bank should be set up and publicly disclosed. Judged on the basis of these prerequisites, Iceland's inflation targeting framework is well designed.

Inflation target

49. **The design of the inflation target varies among inflation targeters.** It is either defined as a point or a range, and the level (or central point) of the target is usually determined by country-specific factors. Also, the measure of the price index, in terms of which the target is specified, and the way the target is announced, differ among inflation targeting countries.

Definition of the target variable

50. **The choice of the appropriate price index for an inflation target entails a trade-off between credibility and controllability.** On the one hand, the target variable should be as transparent as possible, ensuring that the index is not prone to manipulation, and is well understood by the public, broad-based, accurate, and timely (Schaechter, Stone, and Zelmer (2000)). Many of the present inflation targeters have therefore chosen to measure inflation by monitoring changes in the overall consumer price index (CPI), often called headline inflation. On the other hand, the CPI usually includes certain volatile components that are beyond central bank control (administrative prices, indirect taxes, terms of trade), limiting the bank's capability to achieve its inflation target. Also, due to the inclusion of certain interest rate charges (e.g., mortgage interest rate payments) in the CPI, monetary tightening may induce a rise in the inflation measure, and vice versa. Some inflation targeters exclude volatile components and target core inflation to increase the controllability of the target variable. The

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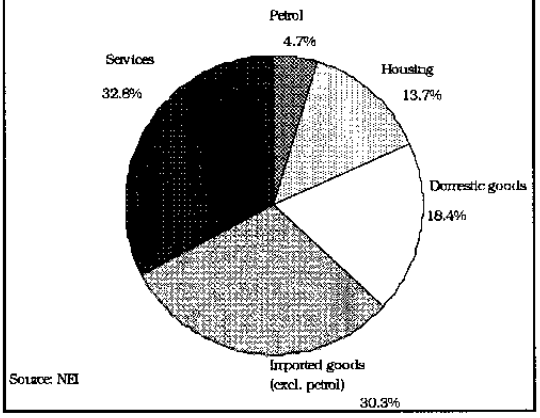
[20] This is not to say that inflation targeting could not be adopted without meeting certain conditions. In fact, some countries have adopted an inflation targeting framework rather abruptly, following a collapse of their exchange rate regime. However, a country that has implemented certain conditions from the outset of adopting an inflation target is likely to increase the confidence of domestic and foreign market participants that the central bank is capable of conducting monetary policy effectively and to achieve the newly adopted inflation target.

latter, however, makes the target less transparent. Australia and New Zealand switched therefore from targeting core inflation to headline CPI. In any event, to secure the credibility of the target variable, national statistical agencies are charged with the calculation of both headline and/or core CPI measures in all inflation targeting countries. Central banks of inflation targeting countries are then typically held accountable on the basis of rolling year-on-year inflation rates.

51. **The inflation target of the CBI is based on year-on-year changes in the CPI, as calculated by Statistics Iceland.** The CBI targets an inflation rate of 2 ½ percent based on headline CPI by no later than end-December 2003. An assessment of core inflation measures, to be compiled by Statistics Iceland over the medium term, will accompany the CBI's forecast of headline inflation in future. The overall CPI reported by Statistics Iceland is a Laspeyres index, which is based on the results of a household budget survey and came into effect in September 1997. It covers the entire country as well as all income groups and is not seasonally adjusted. Collected prices are final market prices, including all taxes, and CPI weights are revised on an annual basis. The inflation outcome is simultaneously released to all interested parties and the broad public on the 8th working day of every month, accessible through press releases and the agency's web site. Methodological revisions are disseminated in the monthly Statistical Bulletin at the time the change comes into effect. Re-basing of the CPI is described in detail in a special memorandum, published in Monthly Statistics, and is accessible through the web site of Statistics Iceland. The compilation of the Icelandic CPI is subject to regulations governing the compilation of price indices in the European Economic Area (EEA), and quality adjustments developed under the auspices of Eurostat are to be included in future revisions of the index.

52. **The price index chosen by the authorities fully meets the requirements attached to an adequate inflation target.** However, headline CPI compiled by Statistics Iceland includes several components that are beyond the control of the central bank. Given the sizable share of imported goods in the CPI (Figure 8), terms of trade shocks are likely to have a significant price level impact. Tax changes are also transmitted into the price index. By contrast, mortgage interest charges, which are of particular importance in Iceland given that more than 80 percent of Iceland's households are owner-occupants, are excluded from the Icelandic definition of the CPI. Moreover, the CBI has indicated that Statistics Iceland will be asked to report measures of core inflation in addition to headline inflation, which would allow for an in-depth assessment of underlying inflation. In this regard, indirect taxes such as valued-added taxes and property taxes could usefully be

Figure 8. Iceland: Selected CPI Weights in 2000



Source: NEI

excluded so that changes in fiscal policy do not induce unwarranted price changes.[21]

Horizon of the target

53. **The target horizon refers to the period over which the central bank intends to achieve its inflation target.** The horizon is determined by the inflation rate, prevailing at the time of the adoption of the initial inflation target regime, and by the transmission of monetary policy changes to offset deviations from short-term shocks. In countries where inflation was already near the targeted long-term level (e.g., the UK, Sweden), a longer-term or even indefinite target horizon was chosen. By contrast, in countries where the initial inflation rate exceeded the inflation target, a transition period of about 2 years was provided to achieve the inflation target and to better reflect the lagged impact of policy interest rate changes on inflation. New Zealand adopted inflation targeting in April 1990, following substantial progress in disinflation, which made the achievement of initial targets more likely (Bernanke et al. (1999)). The first monetary policy statement stipulated that a 3 to 5 percent target range for inflation by end-1990, followed by a narrowed range of 1½ to 3½ percent by end-1991. The final target range of 0 to 2 percent was to be reached from December 1992 onward. In Canada, inflation targeting was adopted in February 1991, after progress in reducing inflation had become evident. The likelihood of initial success was increased by the fact that the horizon for the first midpoint target of 3 percent was to be achieved by end-December 1992, i.e. 22 months from target adoption. A second and third target of 2½ percent and 2 percent, respectively, were to be reached within successive eighteen months periods. Sweden and Finland allowed for a two-year transition period to gather experience with the floating exchange rate regime and to allow for time lags of monetary policy.

54. **The design of Iceland's target horizon resembles in part the approach taken by New Zealand and Canada, and reflects the authorities' recognition that the present year-on-year inflation rate of about 4½ percent exceeds its long-run rate.** The CBI is set to achieve its inflation target of 2½ percent no later than by end-2003 (Figure 9). The target matches Iceland's average annual inflation rate over the last seven years and—while slightly higher than similar objectives for Sweden, Canada and the euro area—corresponds roughly to targets in the United Kingdom and Australia.[22] During the transition to the long-run target, the disinflation path is pre-specified by a gradual narrowing of the annual target range, from

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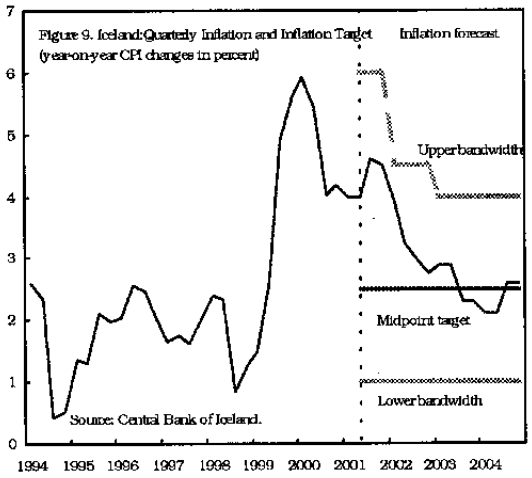
[21] Some countries (e.g., Canada, Australia) have also excluded energy and food prices from core inflation measures. Given Iceland's relatively limited dependence on energy imports (Figure), and in view of the fact that energy prices are thought to be mean-reverting over a horizon of two to three years (Debelle (1997)), this may be of limited importance in the case of Iceland.

[22] During these years Iceland experienced a sustained economic boom, characterized by brisk average real GDP growth of about 4.1 percent, exceeding estimated average potential growth by almost 1½ percent.

1 to 6 percent in 2001 to 1 to 4½ percent in the following year. Dissemination of the timetable is meant to assist the disinflation process by guiding inflation expectations during the transition period. The target horizon also allows the CBI to develop further understanding of how the economy operates under the newly adopted exchange rate regime. While the formal framework does not yet explicitly define the relevant checkpoints of the inflation target, it is likely that inflation performance will be checked against year-on-year changes in headline CPI on a rolling monthly or quarterly basis. This would facilitate the monitoring of inflation outcomes relative to the target and strengthening the accountability of the central bank.



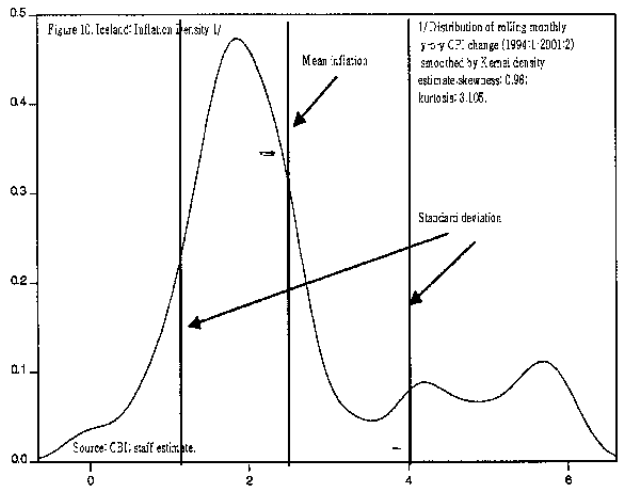
Point target versus target range

55. **Reflecting a tradeoff between transparency and flexibility, an inflation target can be defined as point target or as a target range.** On the one hand, a target range, specified by horizontal fluctuation bands, allows for greater discretion in monetary policy in reacting to short-term shocks and reduces the likelihood of target breaches. On the other hand, a permanent target range lowers the credibility of the central bank's commitment to achieve a certain inflation rate and mitigates the transparency of the target. In practice, policy makers tend to be more concerned about keeping inflation within the upper portion of the target range, rather than targeting the midpoint of the range. A point target provides better guidance for inflation expectations, being more easily understood by the public and allowing for a clear-cut assessment of the inflation performance of the central bank. Frequent target breaches, however, are more likely to occur and can undermine the credibility of the framework. In sum, an inflation targeting central bank is more accountable if the target is a point target or a narrow band. If a temporarily wider but gradually declining band is chosen for a transition period, the accountability of the central bank shifts more to the medium term. At present, only Finland, the UK, and Spain follow a point target, whereas New Zealand, Brazil, and South Africa apply a wide target range of more than 2 percentage points. The vast majority of industrialized countries, however, adopted a narrow target range of 2 percent or less. Only Brazil, Sweden, and Norway focus on a midpoint target with a fluctuation range, i.e. they apply a combination of both approaches.[23]

[23] In Norway, for instance, which adopted an inflation targeting regime shortly after Iceland at end-March 2001, the Bank of Norway allows for a narrow symmetric band of ±1 percent around a midpoint inflation target of 2½ percent.

56. **Iceland's framework combines the transparency and accountability of a midpoint target with the flexibility provided by a range.** Inflation is intended to range within a symmetric band of ± 1½ percent around the midpoint target of 2½ percent inflation by no later than end-2003. During the transition period, the CBI will apply an asymmetric band, providing for a significantly larger upper target range. Inflation is allowed to exceed the midpoint target by 3½ percent and 2 percent in 2001 and 2002, respectively. The lower bandwidth, however, remains at 1½ percent throughout the transition. The design of the target range reflects the authorities' expectation that inflationary pressures, though on a declining path, will continue throughout 2002, mostly on account of the previous overheating of the economy, and the pass-through of the recent depreciation of the exchange rate index of the króna on domestic prices. The gradual narrowing of the upper target range is intended to guide inflation expectations through the transition period.

57. **The design of Iceland's target keeps a reasonable balance between transparency and flexibility of the framework.** Given the Central Bank's well-established forecasting capabilities (see below), and in view of the fact that the floating of the exchange rate provides more leeway to monetary policy to respond to short-term economic shocks, the decision to keep inflation within a symmetric band of ±1½ percent from 2004 onward appears to be manageable. Evidence of forward-looking price and wage formation as well as broad support for the new regime from labor unions, employers federations, and political parties should facilitate keeping inflation within the narrowly targeted range. Stylized facts of Iceland's inflation performance over the last seven years also suggest that the chosen bandwidth may be appropriate (Figure 10). Following the successful transition to a low inflation environment, the standard deviation of rolling monthly year-on-year CPI changes was roughly 1½ percentage points. If this historical pattern were to persist, the long-run bandwidth of 3 percentage points would be suitable.[24].



[24] The positive skewness of the inflation density function (Figure 10) implies that year-on-year monthly inflation rates were more likely to exceed the average long-run inflation rate rather than to fall short of it. This statistical finding is a result of the sustained overheating in 1999 and 2000, and it points to the risk of potential breaches of the inflation target. Given, however, that inflation targeting allows for an increased discretion of monetary policy, the CBI should be better suited to contain inflationary pressures in future, i.e. the skewness of the density function is expected to decline in the future.

58. **A wide, asymmetric, and gradually declining target range during the transition period to the long-run inflation objective should allow the Central Bank sufficient flexibility to cope with inflationary pressures and to provide guidance for inflation expectations.** The upper inflation ceiling of 6 percent for 2001 equals the seven-year peak of year-on-year monthly inflation that was reached in April 2000 when inflation culminated on account of overheating pressures in the Icelandic economy. It allows for appropriate flexibility to keep short-term inflation within the targeted range and echoes the authorities' expectation that the recent depreciation of the króna will eventually be passed-through to domestic prices and effect a temporary rise in inflation. The 2002 bandwidth, allowing for an upper inflation ceiling of 4½ percent, exceeds inflation expectations by considerable margin and is consistent with the inverse shape of the yield curve of Icelandic bonds (see Figure 5). It not only reasonably reflects the expected slowdown in domestic and global economic activity but also provides sufficient flexibility in the event of a longer lag in the pass-through of the recent or potential future depreciation of the króna.

Inflation forecast

59. **The degree of forward-lookingness of an inflation targeting framework is mainly determined by the length of the transmission lag.** In view of the time lags inherent in the transmission of monetary policy changes, an inflation targeting regime is essentially a forward-looking monetary policy framework. Pre-emptive innovations in the operational target are thus needed to ensure that actual inflation is in line with expected inflation. Any deviation of projected inflation from the inflation target forms the basis of the central bank's monetary policy decisions, ensuring that lags in the transmission of monetary policy decisions are recognized in the setting of the operational target. As a consequence, the official inflation forecast is of utmost importance in an inflation targeting regime, taking on the role of a feedback variable for monetary policy (Haldane (1997)).[25] The forecast is typically based on the latest available economic data, leading indicators of economic activity, model-based estimation results, judgment, and the integration of global economic developments and political events (Schaechter, Stone, Zelmer (2000)).

60. **Industrialized countries tend to follow an eclectic approach to inflation forecasting.** In the UK, for instance, detailed sectoral inflation models based on multivariate time series models complement information gained from a medium-term structural macro-model (Haldane (1997)). The medium-term forecast (two-year horizon) is supplemented by short-term inflation projections (three-month horizon) based on Kalman filter techniques. Multivariate time series models are applied to decompose the contribution of real and monetary variables to inflation dynamics. Information variables such as inflation

[25] Svensson (1996) argues that the official inflation forecast becomes the intermediate target of monetary policy, turning inflation targeting, in effect, into inflation-forecast targeting.

expectations, inferred from the yield curve or various private surveys, have also been incorporated in short- and medium-term inflation projections.

61. **In an open economy exchange rate changes have a significant impact on the controllability of inflation by the central bank.** Policy interest rate changes are transmitted through domestic demand and induced exchange rate changes, with the latter exerting a more immediate impact on domestic prices. This may result in difficulties tracking the transition path of inflation following an exchange rate shock. Moreover, while exchange rate shocks can have various sources, only domestic monetary shocks exert persistent inflationary pressures. Overseas monetary shocks and/or real exchange rate shocks typically have no long-lasting implications for domestic monetary conditions and usually need not to be accommodated by monetary policy under an inflation targeting regime. This requires, however, that central banks decompose the various sources of nominal exchange rate changes in order to appropriately assess their inflationary potential, which makes short-run inflation forecasts in open economies particularly problematic.

62. **Given the forecasting uncertainty induced by exchange rate changes in open economies, monetary policy should feed back from a medium term inflation forecast, accompanied by the reporting of probability distributions for short-term inflation projections.** The experiences of open economies with inflation targeting confirm that the inflation-control problem is predominantly of short-term nature, calling for a feedback of monetary policy from a medium-term inflation forecast. New Zealand, for instance, in view of its openness and limited export diversification, adopted a monetary conditions index (MCI) as its operational target of monetary policy. The MCI, however, allowed exchange rate changes to result in automatic interest rate adjustments, with little proof of the need for such changes. Coupled with a relatively narrow target range and a one-year target horizon, this resulted in wide temporary swings of interest and exchange rates, making it increasingly difficult to keep inflation within the predetermined target range. New Zealand eventually adopted a short-term interest rate as its operational instrument, and widened the forecast horizon of its official inflation forecast to two years. Norway, Sweden, and the UK account for uncertainty in their inflation projections by disclosing probability distributions for future inflation in their inflation reports (distribution forecast targeting). While Norway and Sweden publish symmetric confidence intervals around their inflation projections, the UK reports asymmetric confidence bands to take into account unbalanced risks to the inflation forecast. In each of these countries, the inflation forecast is conditional on assumptions about the expected path of the exchange rate, which are published in the central banks' inflation reports.[26]

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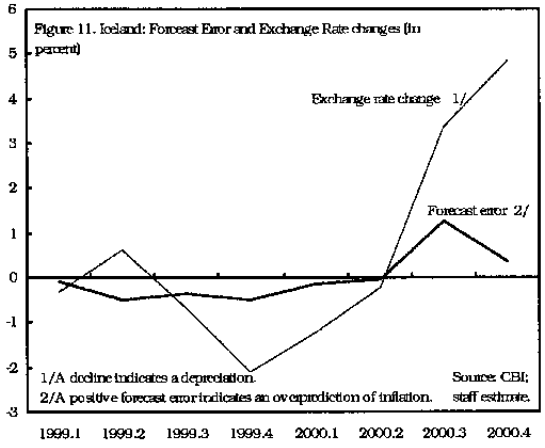
[26] Canada, New Zealand, and the UK treat the exchange rate endogenous, whereas most inflation targeters base their forecasts on an unchanged exchange rate over the forecast horizon.

63. **The CBI employs several models to analyze the relationship between exchange rate, wages, and price changes.** The relationship between changes in exchange rates, prices, and wages is at the heart of Iceland's inflation outlook. Earlier models, based on the main assumption that changes in inflation could be explained by wage and price inertia and exchange rate changes, captured inflation reasonably well prior to 1990. However, given the marked slowdown in price, wage, and exchange rate dynamics in the early 1990s, achieved by the abolition of backward-looking wage indexation and implementation of an exchange rate anchor, the goodness of fit of traditional model specifications has deteriorated, notwithstanding the inclusion of error correction terms and productivity proxies (CBI (2001c)). Estimations of these models, based on a relatively small sample range covering the last decade, indicate that—while the long-term relationship between exchange rates, wages, and prices has remained basically unchanged—the short-run impact of exchange rate changes has weakened.[27] This has led to a slight underprediction of inflation during the trend appreciation of the króna in 1999 and the first half of 2000, followed by a small overprediction due to the depreciation of the króna (Figure 11).



64. **A newly developed dynamic wage-price model, based on a generalized version of Phillips curves, takes into account changes in unit labor costs and import prices to reflect the openness and size of Iceland's economy**. It also captures wage and price inertia and allows for an estimation of the inflationary impact of excess demand on goods and labor markets. Estimation results indicate that the real wage responsiveness to changes in unemployment is relatively large and in line with results obtained for other Nordic countries. Demand pressures in goods markets, however, exert a somewhat smaller and more delayed impact on prices than found elsewhere, given that a one percentage point change in the output gap is estimated to induce a price change of about 0.3 percent after 12 months (Pétursson (2000d)). Finally, estimation results of forward-looking error correction models suggest that domestic price formation is based on rational expectations, with an expected increase in wages or import prices by 10 percent inducing an immediate price increase by 0.5 percent and 0.6 percent, respectively.

65. **The inflation forecast capabilities of the CBI are well developed.** Inflation projections are based on a thorough analysis of latest available short-term and main economic indicators, global economic trends, model-based estimations, and other

[27] Estimation results of several model specifications indicate that the long-run elasticities of wages and import prices range between 0.45-0.6 and 0.4-0.52, respectively.

information variables, and are disseminated through the Bank's Quarterly Monetary Bulletin. The main underlying assumptions are discussed in detail, particularly expected changes in contractual wages, wage drift, taxes, productivity, and import prices. While model specifications and estimation results of quantitative models are not explicitly reported, on occasion the CBI refers to its underlying models in a more general fashion. Based on the assumption of an unchanged nominal effective exchange rate of the króna, the inflation outlook covers a two-year horizon and provides rolling quarterly estimates of year-on-year inflation.

66. **The CBI's inflation projections are reliable, particularly with respect to forecasts one year ahead.** The quality and reliability of the projections is discussed on the basis of the forecast bias and the root mean square error (RMSE), including a comparison with private sector inflation forecasts. All in all, the mean square error of inflation forecasts one year ahead is fairly small and compares favorably with the forecast performance of other inflation targeting central banks (Table 2; Figure 11). However, standard errors for dynamic forecasts with a two-year horizon reported in internal research papers are slightly higher than the findings reported elsewhere. A decomposition of shocks into real, monetary, domestic or foreign sources, has yet not been publicly provided. Ongoing research is conducted to further improve the forecasting framework, particularly with regard to medium-term forecasts, which are of special importance in a small open economy like Iceland.

Table 2 . Iceland: Comparison of quarterly inflation forecasts

	RMSE	Average error
Central Bank of Iceland		
1995:1 - 2000:4	0.42%	0.06%
1997:1 - 2000:4	0.47%	0.04%
1999:1 - 2000:4	0.54%	0.00%
Gjaldeyrismál		
1995:1 - 2000:4	0.45%	0.26%
1997:1 - 2000:4	0.45%	0.27%
1999:1 - 2000:4	0.39%	0.12%
Íslandsbanki FBA[1)]		
1991:1 - 2000:4	0.67%	0.03%

[1)] FBA forecasts used before June 2000; Source: Central Bank of Iceland.

67. **Finally, the scope and quality of input data have been improved.** The National Economic Institute (NEI) has recently stated to disseminate quarterly national accounts. Statistics Iceland is also expected to compile measures of core inflation measures, which will then be integrated into the forecasting framework of the CBI. There is, however, a need for improved coordination between official institutions with respect to inflation forecasting. The credibility of the new framework would be enhanced, if the government publicly declared that government institutions such as the NEI and the Economics Department of the Ministry of Finance were to begin basing their economic forecasts (the NEI's forecasts are publicly available) on the inflation projections of the CBI, rather than relying on their own projections, which have differed substantially in the past.

Transparency and public accountability

68. **In view of the length of the transmission lag between monetary policy changes and inflation, an inflation targeting regime benefits from a transparent conduct of monetary policy and intensive communication thereof with the broad public.** In practice, this has led to an immediate release of press statements following monetary policy decisions and an increased frequency of public speeches and lectures on topics of relevance to monetary policy. Almost all inflation targeters have issued comprehensive inflation reports, elaborating in detail on the path of monetary policy in the context of inflation prospects and economic developments. Some central banks (e.g., the U.K., Sweden) have also begun publishing the meeting schedule of the decision-making body (executive board, monetary policy committee) of the central bank, accompanied by the lagged release of meeting minutes. To increase the accountability of the central bank, provisions governing the central bank's response in case of target breaches have been published. In this regard, most central banks are required to explain the reasons for the deviation from the target publicly and to indicate as to when monetary policy aims to get back on track. The government of New Zealand is even empowered to dismiss the governor of the central bank, if a target is breached.[28] Finally, some inflation targeters (e.g., Chile, Poland, Sweden) have allowed for external experts—in some instances with executive responsibilities—to increase their public accountability.

69. **Rules governing the transparency and accountability of Iceland's inflation targeting regime, while sufficiently embedded in the new framework, could be further improved over the medium term.** Monetary policy decisions are taken in the context of discretionary meetings of the Board of Governors, based on the votes of the three governors. While the voting records are not published and no minutes of the meetings are kept, draft legislation provides that monetary policy decisions of the Board of Governors shall be presented to the public, accompanied by an explanation of the underlying rationale. Furthermore, the joint declaration of the government and CBI on the adoption of inflation targeting provides rules on how the CBI has to respond to breaches of the inflation target. It is stated that the CBI needs to bring inflation as soon as possible back inside the target range of ±1½ percentage points. Moreover, the CBI is required to submit a report to the government explaining the reasons for the deviation from the target. The report, which is to be published, will also have to draw on the Bank's intended policy response and an assessment of how long it may take to meet the inflation target again. This provision also holds for potential target breaches that would occur during the transition period until end-2003.

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[28] At the same time, however, escape clauses have been established, which define explicit circumstances (e.g., natural disasters, major oil price shock) allowing for a breach of the target and increasing the discretion of monetary policy.

70. **The joint declaration requires that the CBI publish its inflation forecast, based on a two-year forecast horizon, in the Bank's Quarterly Monetary Bulletin.** It is also stated that the inflation outlook needs to be supplemented by a discussion of uncertainties pertaining to the forecast and an assessment of the current economic situation and outlook. The transparency of the framework could, however, be further strengthened if the CBI were to issue a separate quarterly inflation report as a supplement to the Quarterly Monetary Bulletin, rather than integrating the inflation projections and the discussion thereof into the latter. The issuance of a separate inflation report would clearly communicate to the public that the authorities' inflation target and the Bank's inflation projections are at the heart of the new monetary policy framework.[29] Finally, reports of the Governor to the government and committees of Parliament on the Bank's policy and economic trends and developments will ensure public accountability. However, there are as yet no explicit provisions as to the frequency of these reports.

F. Conclusions

71. **Iceland's new monetary policy framework has been introduced against a backdrop of a sound legal environment.** Draft legislation allows for full instrument independence of the CBI, including provision of a clear mandate for price stability as the primary policy objective. Despite the shallowness of domestic financial markets, the CBI has a profound understanding of the transmission lags of monetary policy, facilitating inflation projections and the timing of monetary policy decisions. All in all, the legal framework should be conducive to the achievement of price stability and contribute to the viability of the inflation targeting regime (Table 3).

72. **Draft legislation allows for full instrument independence of the CBI, including provision of a clear mandate for price stability as the primary policy objective.** Despite the shallowness of domestic financial markets, the CBI has a profound understanding of the transmission lags of monetary policy, facilitating the timing of the monetary policy decisions as well as the inflation projections.

73. **The institutional and operational framework of the inflation targeting regime is well defined.** Most of the key modalities adopted by other successful inflation targeters have either been incorporated from the outset or are in the process of being implemented (Table 3). The inflation target is appropriately designed, allowing for a sufficiently long transition period to achieve the long-run inflation objective. The Bank's inflation forecast performance for projections one-year ahead matches those of experienced inflation targeters, medium-term forecasts are being further strengthened, and measures of core inflation, to be compiled by Statistics Iceland, will be integrated into the CBI's inflation assessment in future. Finally, rules governing the accountability of the CBI are reasonably defined.

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[29] Inflation reports published by the Bank of England, the Swedish Riksbank, or the Bank of Norway could serve as example.

Table 3. Iceland: Synopsis of Iceland's Inflation Targeting Framework

Institutional framework	
Central bank legislation	Draft legislation grants full instrument independence to the CBI and provides a clear mandate for price stability as primary objective of monetary policy. While central bank financing of the government deficit is prohibited, the draft bill calls for a regular exchange of information between the government and the CBI on economic development and public finances.
Design of the inflation target	
Target variable	Consumer price index, excluding mortgage interest payments. Core inflation measures are yet to be developed by Statistics Iceland and to be integrated into the inflation forecasting framework by the CBI.
Target horizon	Annual target horizon.
Target range/point target	Midpoint target of 2 ½ percent from 2004 onward, embedded in a symmetric target range of ± 1 ½ percent. In view of present uncertainties with respect to the inflation outlook, the framework provides for an asymmetric target range with a larger but gradually declining upper target range for a transition period of 20 months. During 2001, the upper bandwidth is expanded to 3 ½ percent, followed by an upper range of 2 percent in 2002.
Target announcement	Inflation target was announced jointly by the government and the CBI. It is yet not clear, whether future targets will be announced jointly or only by the CBI upon agreement with the government.
Accountability/Transparency	
Target breaches	Deviations of more than ± 1 ½ percent must be explained by the CBI in a special report to the government. This report has to be published. Corrective actions need to be taken to bring inflation back inside the target range as soon as possible. It is not yet decided whether there will be monthly or quarterly checkpoints of the Bank's inflation performance.
Policy decisions	Immediate press release of policy decisions, including the explanation of underlying reasons of policy changes. Meetings of the Board of Governors, the CBI's decision-making body, are discretionary, and no minutes of the meetings are prepared.
Communication vehicle	Quarterly monetary bulletin, which includes a detailed assessment of the Bank's inflation projections and the inflation outcome. The report is available on the CBI's web site. No separate inflation report is issued. Internal research papers are disseminated through the Internet.
Operational framework	
Policy transmission	While the interest rate channel is strong due to financial indexation and shallow financial markets, the bank lending channel is weakened by shortcomings in liquidity arrangements and unconstrained access to international capital. The exchange rate pass-through appears to have lengthened.
Operational target	Interest rate on 14-day repurchase agreements. The CBI provides liquidity through fixed-price repo auctions on a weekly basis.
Inflation forecasting	Based on quantitative economic models, economic indicator variables, discussions with market participants, and qualitative judgment.

74. **However, there is room for further improvement over the medium term.** Shortcomings in existing liquidity arrangements and the operational target of monetary policy need to be addressed to improve the robustness of domestic money and capital markets and secure the long-run effectiveness of the regime. Uncertainties surrounding short-term inflation projections could usefully be illustrated by reporting probability distributions, and empirical research on the sources of exchange rate shocks could be strengthened. Also, the transparency of the monetary policy decision-making process needs to be further enhanced, as the checkpoints of the inflation forecast performance of the CBI are not yet clearly defined, and the transparency of the decision-making process of monetary policy is limited. Finally, the communication of the inflation outlook could be improved over the medium term by issuance of a separate quarterly inflation report along the lines of the reports of other inflation targeters.

75. **All in all, the design of the regime is well thought out, including a coherent institutional and operational framework.** The stage has thus been set for the regime change to be successful.

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Table A1. Iceland: GDP and Expenditure Components 1/

	2000 In billions of kronur at current prices	1995	1996	1997	1998	1999 Prel.	2000 Prov.
		Percentage change at constant prices 2/					
Private consumption	401.0	2.2	5.4	5.5	10.0	6.9	4.0
Public consumption	158.3	1.8	1.2	2.5	3.4	5.1	3.7
Gross fixed investment	157.2	-1.1	25.7	9.6	26.6	-0.8	9.0
Final domestic demand	716.5	1.5	8.0	5.7	12.1	4.8	5.1
Change in Stocks 3/	2.1	0.7	-0.7	0.0	0.1	-0.1	0.3
Total domestic demand	718.6	2.2	7.2	5.7	12.3	4.6	5.4
Exports of goods and services	229.4	-2.1	9.9	5.7	2.2	4.4	5.1
Imports of goods and services	278.6	4.0	16.7	8.5	23.3	5.7	9.3
Gross domestic product	669.4	0.1	5.2	4.8	4.5	4.1	3.6
Net factor income 3/	-19.0	0.3	0.5	0.0	...	...	...
Gross national product	650.4	0.4	5.7	4.8	4.6	4.1	2.9

Source: National Economic Institute.

1/ Volume changes in 1995 to 1998 are based on 1990 prices, but the provisional figures for 1999 and 2000 are on previous year's prices.
2/ Percentage figures indicate contribution to GDP growth; i.e. changes in aggregates expressed as a percentage of GDP of the previous year, at fixed prices.
3/ Net transfers from abroad other than factor income.
4/ GNP adjusted for changes in terms of trade.

Table A2. Iceland: Unemployment, Wages, and Prices

	1994	1995	1996	1997	1998	1999 1/	2000 1/
				(In percent)			
Unemployment	4.8	5.0	4.3	3.9	2.8	1.9	1.3
Participation rate	75.4	75.7	76.4	76.6	77.1	77.2	77.7
Vacancies 2/	--	0.1	0.1	0.6	0.5	0.5	0.7
				(percentage change)			
Nominal wages and incomes							
Wage index	0.1	5.7	6.4	5.4	9.4	6.8	6.6
Disposable income per capita	1.6	5.2	6.4	6.0	9.3	6.2	7.2
Prices							
Consumer price index	1.5	1.7	2.3	1.8	1.7	3.4	5.0
Building cost index	2.6	3.2	4.9	4.4	2.7	2.3	3.2
Real wages and incomes 3/							
Wage index	-1.3	3.8	4.1	3.5	7.6	3.4	1.6
Disposable income per capita	0.1	3.5	4.0	4.1	7.4	2.6	2.0

Source: National Economic Institute; Central Bank of Iceland.

1/ Official estimates.
2/ At September of each year; in percent of labor force.
3/ Deflated by the consumer price index.

Table A3. Iceland: Gross Domestic Product by Sectors

	In percent of total (2000) 1/	1995	1996	1997	1998 1/	1999 1/	2000 1/
		(Percentage change at constant prices)					
Agriculture and fishing	8.0	-1.2	7.5	-0.8	-5.6	-0.5	-0.3
Agriculture	1.8	-2.8	3.9	2.0	3.9	3.6	1.7
Fishing	6.1	-0.8	8.5	-1.6	-8.0	-1.6	-0.9
Manufacturing	16.9	2.4	8.6	2.1	4.1	4.9	2.4
Fish Processing	4.0	-3.2	8.8	-1.6	-5.3	-1.2	-3.0
Other manufacturing	12.9	4.9	8.5	3.6	7.9	7.2	4.4
Electricity and water supply	4.9	3.0	1.0	3.0	11.0	12.0	5.8
Construction	8.9	-4.7	14.1	18.2	11.9	6.5	10.0
Commerce	14.1	4.2	6.0	6.5	12.4	7.0	4.1
Transport, storage and communication	8.9	3.3	15.8	10.0	7.5	5.0	12.0
Finance, insurance, real estate and business services	19.8	1.5	3.0	1.0	3.3	3.9	3.2
Other private services	5.3	3.5	6.0	6.0	11.0	7.0	4.0
Government Services	14.3	1.3	1.0	2.2	3.4	4.8	3.5
Other producers	3.7	8.1	1.0	2.2	3.4	4.9	3.5
Less: Imputed bank service charges	-4.9	1.5	3.0	1.0	4.0	4.0	3.0
Gross domestic factor income	100	1.5	6.4	4.3	5.5	5.1	4.4

Source: National Economic Institute.

1/ Official estimate.

Table A4. Iceland: Gross Fixed Capital Formation 1/

	2000 In billions of kronur at current prices 2/	1995	1996	1997	1998	1999	2000 2/
		Percentage change at constant prices					
Gross fixed capital formation	157.2	-1.1	25.7	9.6	26.6	-0.8	9.0
Business sector	111.8	8.7	46.1	17.3	38.0	-2.5	11.3
Agriculture	3.7	-16.1	63.1	9.2	15.9	-2.5	7.4
Fisheries 3/	4.5	-55.3	216.8	-65.6	173.2	-50.9	86.0
Manufacturing							
Fish processing	4.5	27.7	43.5	-11.6	22.6	-15.8	-1.9
Aluminum smelter and Ferrosilicon	5.8	29.1	1124.8	75.3	-4.5	-54.6	13.6
Other manufacturing	11.1	10.2	31.6	13.0	21.5	-3.4	5.3
Energy and water supply							
Electrical power generation, and distribution	8.0	10.8	73.6	125.0	81.6	-11.4	-39.9
Geothermal heating	2.0	11.1	10.6	-20.9	98.9	5.6	-16.8
Water supply	0.8	14.8	-10.4	31.4	11.9	-1.2	-4.3
Construction	4.8	35.9	45.6	23.7	34.5	-20.7	36.5
Commercial and office buildings	14.0	5.1	18.3	43.9	1.5	60.7	11.7
Transport equipment	24.5	48.9	21.3	10.7	100.4	-4.8	37.9
Post, telephone, radio and television	7.0	-10.4	-0.9	2.3	64.2	31.9	9.8
Computers and office equipments	21.1	14.8	17.1	6.6	21.9	24.5	17.6
Residential housing	23.4	-8.7	7.1	-9.7	1.1	0.3	1.4
Public sector	22.0	-12.4	-3.7	6.6	8.3	7.2	5.3
Roads and bridges	4.8	-13.7	-10.0	0.8	1.2	10.6	15.1
Streets and sewers	4.6	-26.6	4.8	22.9	-0.6	10.7	2.4
Public buildings	12.6	-6.3	-3.7	3.4	14.5	4.9	3.0

Source: National Economic Institute.

1/ Volume changes are based on 1990 prices.
2/ Official estimates.
3/ Including aquaculture.

Table A5. Iceland: Fish Catch and Marine Production

	1995	1996	1997	1998	1999 1/	2000 1/
	(In thousands of metric tons)					
Fish catch	1609	2059	2199	1679	1732	1976
Cod	203	1179	209	243	261	236
Other demersal species	308	298	268	257	253	255
Herring	110	100	71	77	94	100
Capelin	716	1179	1319	750	704	892
Crustaceans	267	266	325	343	416	489
Others	5	12	7	9	4	3.6
	(Percentage change at constant prices) 2/					
Value of catch	-0.6	8.1	-1.3	-7.9	-1.6	-0.9
Excluding capelin	-1.7	0.0	-5.1	-1.3	-1.2	-5.8

Source: The National Economic Institute.

1/ Official estimates.
2/ Catch values deflated by average price of export production.

Table A6. Iceland: Selected Short-term Interest Rates

	Central Bank interest rates			Money market yields			
				Treasury bills			Interbank
	Repo rate	Discount rate	Current account	3-month	6-month	12-month	Overnight loans
1995	6.9		2.6	7.3	7.6	7.9	7.0
1996	6.6		2.4	7.1	7.3	7.8	8.3
1997	6.9		2.7	7.2	7.4	7.6	7.4
1998	7.3	8.5	3.0	7.6	7.6	7.6	9.4
1999	8.4	9.4	3.8	8.6	8.0	7.9	9.2
2000	10.5	11.5	6.0	11.1	11.3	11.2	12.4
2000 January	9.8	10.8	5.3	10.5	10.5	10.8	11.2
February	10.1	11.1	5.6	10.7	10.8	11.0	20.9
March	10.1	11.1	5.6	10.8	...	11.0	10.9
April	10.1	11.1	5.6	10.7	11.0	11.1	11.5
May	10.1	11.1	5.6	10.7	11.1	11.2	11.5
June	10.6	11.6	6.1	11.2	11.2	11.2	11.9
July	10.6	11.6	6.1	11.4	11.4	11.2	11.7
August	10.6	11.6	6.1	11.3	11.4	11.4	10.5
September	10.6	11.6	6.1	11.3	11.4	11.4	11.0
October	10.6	11.6	6.1	11.3	11.4	11.4	11.0
November	11.4	12.4	6.9	11.8	11.8	11.8	12.8
December	11.4	12.4	6.9	11.8	11.8	...	13.5
2001 January	11.4	12.4	6.9	11.6	11.6	...	12.5
February	11.4	12.4	6.9	11.5	11.5	...	12.9
March	10.9	12.4	6.9	11.1	11.0	...	...

Source: Central Bank of Iceland.

Table A7. Iceland: Selected Long-term and Deposit Money Banks' Interest Rates

	Secondary market for indexed bonds 1/		Deposit money banks' interest rates 2/			
	Government bonds' real yields	Housing bonds' real yields	Discount rate on commercial bills	Average rate on non-indexed secured loans	Average real rate on securities	Average rate on general credit
	5-year 3/	25-year 4/				
1993	4.9	5.4	13.9	14.3	9.1	15.0
1994	5.1	5.8	11.2	10.6	7.9	11.2
1995	5.9	5.8	11.7	11.5	8.7	12.0
1996	5.8	5.8	12.4	12.4	8.9	12.9
1997	5.3	5.3	12.9	12.9	9.0	13.5
1998	4.7	4.7	12.9	12.8	8.8	13.5
1999	4.7	4.6	14.0	13.6	8.6	14.2
2000	6.0	5.8	17.1	16.8	9.6	17.5
2000 January	5.3	5.1	16.1	15.8	8.9	15.9
February	5.1	5.1	16.4	16.1	9.0	16.7
March	5.3	5.7	16.4	16.2	9.0	17.0
April	5.5	5.8	16.4	16.2	9.0	17.1
May	6.4	6.1	16.5	16.2	9.1	17.1
June	6.0	5.9	17.1	16.8	9.8	17.1
July	6.2	6.2	17.3	17.0	9.8	17.8
August	6.2	5.7	17.4	17.1	9.9	18.0
September	6.2	6.0	17.4	17.1	9.9	18.1
October	6.3	6.1	17.4	17.1	10.0	18.1
November	6.6	6.2	18.2	18.0	10.2	18.1
December	7.1	6.3	18.2	18.0	10.2	19.1
2001 January	6.7	6.2	18.2	18.0	10.2	19.1
February	6.2	5.9	18.2	18.1	10.2	19.1

Sources: Central Bank of Iceland; and IMF, International Financial Statistics.

1/ End of period figures.
2/ Annual average or end of month figures.
3/ Central Bank's bids on the Icelandic Stock Exchange.
4/ Market makers' bids on the Icelandic Stock Exchange.

Table A8 . Iceland: Credit System 1/

	31/12 1998	31/12 1999	31/03 2000	30/06 2000	30/09 2000	31/12 2000
			(In billions of kronur)			
Assets	1,166.4	1,367.4	1,394.8	1,472.1	1,578.8	1,618.4
Loans and domestic securities	1,166.4	1,367.4	1,394.8	1,472.1	1,578.8	1,618.4
Banking system 2/	388.9	473.5	498.0	638.8	670.7	691.1
Industrial credit funds 2/	121.7	146.2	148.7	67.2	75.5	88.0
Housing credit funds	232.6	264.8	278.4	280.6	292.8	302.5
Pension funds	344.4	406.2	421.4	420.5	424.6	430.5
Insurance companies	34.4	37.9	38.3	42.7	48.0	44.4
Leasing companies	27.3	33.7	35.1	38.8	41.7	43.5
Mutual funds	69.2	85.8	85.5	79.8	78.6	73.8
Foreign credit	398.0	505.4	525.6	596.7	654.6	703.3
Public lending funds	259.2	264.9	266.1	279.7	280.4	263.6
Total of above	1,875.6	2,218.4	2,297.2	2,444.9	2,566.9	2,640.7
Less inter-institutional lending	-709.2	-851.0	-902.5	-972.8	-988.1	-1,022.3
Liabilities	1,166.4	1,367.4	1,394.8	1,472.1	1,578.8	1,618.4
Domestic liabilities	873.8	1,049.6	1,069.9	1,087.6	1,147.2	1,139.9
Notes and deposits	208.0	243.2	252.8	265.8	265.8	270.1
Bonds and bills of exchange	111.4	135.5	132.3	157.7	160.4	149.0
Insurance funds	32.2	35.1	35.8	36.4	40.2	39.3
Pension funds	398.2	507.3	543.4	548.9	561.9	563.6
Capital of financial institutions	109.8	106.6	132.5	119.8	129.0	126.6
Other, net	14.2	22.0	-26.9	-41.0	-10.1	-8.6
Foreign credit, net	292.6	317.8	324.8	384.6	431.6	478.4
Credit by sector:						
Central government (Treasury)	154.6	133.7	118.8	111.1	131.8	124.9
Municipalities	54.8	61.8	61.3	65.2	67.5	70.3
Industries	514.4	661.4	675.2	735.4	793.3	813.3
Households	442.6	510.6	539.5	560.4	586.2	610.0
Total loans	1,166.4	1,367.4	1,394.8	1,472.1	1,578.8	1,618.4
Memorandum items:						
			Percentage change (year-on-year)			
Credit and marketable securities, total		17.4	16.8	17.0	21.1	18.4
Banking system		21.3	22.8	46.6	50.6	46.0
Housing funds		14.7	17.3	13.2	13.3	-39.8
Pension funds		17.1	19.5	15.7	13.4	6.0
Domestic liabilities of credit institutions		18.4	20.0	16.5	20.1	8.6
Loans of credit system to industries		26.2	25.7	26.2	31.4	23.0
Loans of credit system to households		16.0	20.3	18.8	18.4	19.5

Source: Central Bank of Iceland.

1/ Includes the banking system, investment credit funds, penion funds, state lending funds, insurance companies, leasing companies, mutual funds, and foreign sector.

2/ Effective June 30, 2000, due to the FBA-Islandsbanki merger, figures for FBA investment bank, previously tallied in the category of industrial credit funds, are now tallied in the category "banking system".

Table A9. Iceland: Monetary Survey

	1995	1996	1997	1998	1999	2000
	(In billions of kronur; end of period)					
Net foreign assets	21.4	38.9	31.9	-65.5	-97.4	-185.2
Total credit by use	239.8	258.5	298.6	381.0	465.9	669.9
Government	36.1	28.7	35.1	21.2	19.6	5.4
Municipalities	8.0	7.9	8.2	7.9	10.8	15.7
Non-bank financial institutions	10.6	14.4	18.9	38.3	49.4	74.5
Enterprises	122.9	138.8	157.4	207.2	257.1	402.3
Households	62.2	68.7	78.9	106.4	129.0	172.0
Money and quasi money (M3)	171.7	183.4	199.3	229.6	268.7	298.1
Money and general savings deposits (M2)	111.1	113.4	116.7	131.2	136.6	131.7
Money supply (M1)	38.3	41.6	48.4	58.2	69.6	72.3
Foreign borrowing	29.3	44.9	58.5	90.2	146.6	224.6

Source: Central Bank of Iceland.

Table A10. Iceland: Foreign Reserves of the Central Bank

	1995	1996	1997	1998	1999	2000	2001 February
	(In millions of dollars, end of period)						
Foreign assets	398.0	540.5	461.0	506.9	513.3	407.7	403.9
Gross foreign reserves	310.7	456.5	386.3	427.3	494.6	405.2	401.4
Gold	2.6	2.7	2.6	2.8	17.0	16.4	13.4
SDRs	...	...	...	0.0	0.0	0.0	0.2
Reserve position in IMF	15.6	15.1	14.2	14.7	25.5	24.2	24.0
Deposits and securities	292.5	438.7	369.5	409.8	452.1	364.6	363.9
Other foreign assets	87.3	84.0	74.7	79.5	18.7	2.5	2.5
Short-term liabilities	176.5	75.5	75.1	130.9	67.7	186.6	242.0
Net foreign assets	221.5	465.0	385.9	376.0	445.6	221.1	161.9

Source: Central Bank of Iceland.

Table A11. Iceland: Accounts of the Central Bank

	1995	1996	1997	1998	1999	2000
	(In millions of kronur)					
Net liquid foreign assets	19,259	36,025	33,171	30,993	31,027	18,676
Net claims						
Government	12,299	3,680	6,413	-8,171	-11,577	-12,096
Other financial institutions	3,380	3,443	3,474	7,770	9,671	13,074
Deposit money banks	5,353	1,878	6,494	19,600	29,513	38,978
Main liabilities						
Base money 1/	15,430	19,067	19,667	20,562	36,157	32,355
Deposit money banks	10,261	13,592	13,916	14,239	33,620	25,204
Notes, coin in circulation	5,169	5,475	5,751	6,323	2,537	7,151
Other financial institutions	1,733	2,623	4,486	4,128	2,278	1,498

Source: Central Bank of Iceland.

1/ Base money = deposit money banks + notes and coins in circulation.

Table A12. Iceland: Central Government Finances, 1995-2001 1/

	1995	1996	1997	1998	1999	2000		2001
						Budget	Estimate	Budget
				(In billions of kronur)				
Revenue	114.4	127.7	131.9	180.8	222.6	209.9	224.2	253.1
Tax revenue	106.0	119.5	122.9	161.2	187.8	189.2	205.5	217.1
Other revenue	8.4	8.2	9.0	17.1	18.8	16.4	18.7	36.0
Expenditure	123.3	139.7	130.7	189.6	199.0	193.2	201.4	219.1
Operating expenditure	52.1	56.2	53.4	84.2	84.1	84.1	86.8	92.2
Transfer payments	47.7	49.7	51.5	71.7	77.9	77.6	80.0	88.5
Interest payments	12.4	23.8	16.0	16.0	15.3	13.4	14.6	16.2
Capital expenditure	11.1	10.0	9.8	17.7	21.7	18.0	20.0	22.2
Revenue balance	-8.9	-12.0	1.2	-8.8	23.6	16.7	22.8	34.0
Net financial balance	-18.6	-12.7	-0.6	16.8	26.9	21.0	24.3	38.8
Memorandum items:								
				(In percent of GDP)				
Revenue	25.3	26.4	25.1	31.3	35.7	31.4	33.5	35.6
Expenditure	27.3	28.9	24.9	32.8	31.9	28.9	30.1	30.9
Revenue balance	-2.0	-2.5	0.2	-1.5	3.8	2.5	3.4	4.8
Net financial balance	-4.1	-2.6	-0.1	2.9	4.3	3.1	3.6	5.5

Source: Ministry of Finance of Iceland.
1/ From 1999 onward on accrual basis.

Table A13. Iceland: General Government Finances

	1995	1996	1997	1998	1999	2000	2001
			(In percent of GDP)				
Total revenue	38.6	39.3	39.4	40.5	43.2	43.8	43.9
Direct taxes	15.1	15.8	16.4	17.1	18.6	19.2	19.5
Indirect taxes	18.4	18.7	18.3	18.9	20.0	19.8	19.8
Interest income	1.5	1.4	1.2	1.3	1.3	1.4	1.6
Other current income	1.2	1.1	1.2	1.0	1.2	1.2	0.8
Capital revenue	2.4	2.3	2.3	2.3	2.2	2.2	2.2
Total expenditure	41.6	40.9	39.4	40.1	41.1	41.0	41.2
Public consumption	21.9	21.8	21.5	22.1	23.0	23.6	24.3
Interest expenditure	4.4	4.0	3.7	3.7	3.3	2.9	3.1
Subsidies	1.9	1.9	1.8	1.6	1.5	1.4	1.5
Current transfers	8.0	7.7	7.4	6.9	7.2	7.9	6.7
Capital expenditure	5.3	5.5	5.1	5.7	6.0	5.2	5.5
Financial balance	-3.0	-1.6	0.0	0.5	2.2	2.8	2.7
Gross debt	59.3	56.7	53.2	48.6	43.6	42.2	40.2
Domestic	30.1	28.5	27.7	26.5	23.1	19.3	19.7
Foreign	29.2	28.2	25.6	22.0	20.5	22.9	20.5
Net debt	39.7	39.6	37.5	31.3	24.1	22.8	22.2
Memorandum items:							
Structural balance							
Level	0.6	0.3	-0.4	-0.5	0.4	0.9	1.2
Change	2.4	-0.3	-0.7	-0.1	0.9	0.4	0.3
Structural primary balance							
Level	3.3	2.9	2.1	1.9	2.5	2.5	2.8
Change	2.7	-0.5	-0.8	-0.2	0.5	0.0	0.4

Source: Ministry of Finance.

Table A14 . Iceland: Balance of Payments

	1995	1996	1997	1998	1999	2000 1/
	(In millions of dollars 2/)					
Current account	53	-119	-126	-564	-604	-877
Balance on goods and services	256	46	46	-371	-407	-626
Income balance and transfers	-198	-165	-171	-193	-197	-251
Trade balance	207	18	4	-353	-310	-488
Merchandise exports, fob	1803	1890	1854	1925	2007	1887
Marine products	1297	1392	1323	1402	1353	1353
Other goods	506	498	531	523	654	654
Merchandise imports, fob	-1597	-1871	-1851	-2278	-2317	-2375
Investment goods	-539	-696	-717	-958	-978	-978
Other goods	-1058	-1176	-1134	-1320	-1339	-1339
Services balance	49	28	42	-18	-97	-138
Exports of services	690	769	844	946	930	1031
Transport	268	338	364	438	414	509
Travel	186	176	174	206	223	229
Other	236	255	306	302	293	293
Imports of services	-641	-741	-802	-965	-1027	-1169
Transport	-207	-250	-253	-321	-355	-416
Travel	-281	-308	-324	-395	-436	-472
Other	-153	-183	-225	-248	-236	-281
Income balance	-198	-158	-168	-179	-187	-241
Receipts	92	116	104	120	119	148
Compensation of employees	50	64	58	67	68	63
Investment income	42	52	45	53	51	85
Expenditures	-280	-274	-272	-299	-306	-389
Compensation of employees	-6	-5	-6	-4	-5	-11
Investment income	-274	-269	-266	-295	-302	-378
Current transfers, net	-5	-7	-3	-14	-10	-10
Capital and financial account	-10	151	239	641	836	841
Capital transfers, net	-4	0	0	-5	-1	-3
Financial account	-5	151	239	646	837	844
Financial account, excl. reserves	-2	304	194	678	911	776
Direct investment, net	-35	19	94	76	-41	-195
Abroad	-26	-63	-51	-71	-106	-323
In Iceland	-9	82	145	147	66	128
Portfolio investment, net	154	109	-244	-237	590	443
Assets	81	-65	-204	-304	-390	-626
Equity Securities	..	..	-181	-253	-371	-635
Debt Securities	..	..	-23	-51	-19	10
Liabilities	235	174	-40	66	980	1069
Equity Securities	..	..	-1	14	56	-101
Debt Securities	..	..	-39	53	924	1170
Other capital, net	-121	176	344	839	361	528
Assets	23	-30	-164	4	-175	-88
Liabilities	-144	206	507	835	536	616
Reserve assets (- = increase)	-4	-153	45	-32	-74	68
Net errors and omissions	-43	-32	-113	-77	-232	36
Memorandum items:						
	(In months of imports of goods and services; end of period)					
Gross foreign reserves of the Central Bank	1.7	2.1	1.8	1.6	1.8	1.5
Net foreign reserves of the Central Bank	1.2	2.1	1.8	1.3	1.6	0.9
Exchange Rate: ISK/US$ (aop)	64.7	66.5	70.8	71.0	72.2	78.6

Sources: Central Bank of Iceland; IMF, International Financial Statistics.

1/ Preliminary figures.
2/ Based on official data. Converted into US$ at current exchange rates (aop).

Table A15 . Iceland: International Investment Position

	1995	1996	1997	1998	1999	2000
	(In millions of dollars 1/)					
Foreign assets	1009	1306	1600	2196	3352	3681
Direct investment abroad	180	241	275	339	434	564
Equity capital	91	99	129	140	210	431
Other capital	89	142	146	199	224	133
Portfolio assets	278	345	564	1046	1918	2206
Equity capital	103	183	399	829	1718	2127
Debt securities	177	162	165	215	200	78
Bonds and notes	92	72	82	130	173	43
Money-market instruments	3	9	8	7	12	36
Financial derivatives	81	81	76	78	17	0
Other investment, assets	235	259	375	384	506	507
Reserves	315	462	386	427	495	405
Foreign liabilities	4478	4719	5008	6344	7607	9035
Direct investment abroad	129	198	332	457	531	503
Equity capital	114	115	199	343	366	374
Other capital	15	84	133	114	164	129
Portfolio assets	2201	2286	2113	2274	3143	4109
Equity capital	0	1	0	14	66	19
Debt securities	2201	2286	2113	2261	3077	4090
Bonds and notes	1830	1944	1846	1998	2511	3542
Money-market instruments	298	267	193	188	550	548
Financial derivatives	74	73	74	74	17	0
Other investment, assets	2146	2234	2563	3612	3934	4423
Long-term loans	1712	1665	1832	2848	3173	3399
Short-term debt	434	568	731	765	760	1024
Net international investment position	-3469	-3413	-3408	-4149	-4256	-5355
Memorandum items:						
			(In percent of GDP)			
Net international investment position	-50.1	-47.0	-46.8	-49.8	-49.2	-67.6
Gross external debt	63.0	63.4	66.0	71.9	83.2	109.1
Net equity position	1.2	2.3	4.5	7.3	17.3	27.3

Source: Central Bank of Iceland.
1/ Based on official data. Converted into US$ at end-of-period exchange rate.

Table A16 . Iceland: Merchandise Imports - Broad Economic Categories and Import Growth Contribution

	1995	1996	1997	1998	1999	2000
	(Share of broad economic categories in total imports in percent)					
Food and beverages	10.3	9.3	9.0	9.1	9.6	8.3
Industrial supplies	28.7	27.2	26.2	26.2	24.1	24.0
Fuels and lubricants	7.1	7.7	7.5	5.1	5.3	9.1
Capital goods (except for transport)	20.6	22.0	24.3	25.4	24.0	23.1
Transport equipment	12.2	14.3	13.6	15.7	17.2	16.6
Consumer goods	20.9	19.3	19.3	18.4	19.7	18.8
Other	0.2	0.3	0.2	0.2	0.1	0.1
Total	100	100	100	100	100	100
	(Growth contribution by category in percent)					
Food and beverages	...	4.6	2.2	9.6	24.0	-2.6
Industrial supplies	...	19.6	8.9	25.8	-35.8	23.1
Fuels and lubricants	...	10.8	3.6	-5.5	13.7	42.0
Capital goods (except for transport)	...	28.9	67.4	30.3	-14.8	15.1
Transport equipment	...	24.6	0.8	24.9	58.9	11.7
Consumer goods	...	10.9	19.3	14.6	55.4	10.9
Other	...	0.6	-2.1	0.3	-1.5	-0.1

Sources: Statistics Iceland; staff estimates.