Economic and monetary developments and prospects[1]

The inflation outlook has improved, but the economic contraction seems to be deepening

Inflation has decreased so far this year, even after allowing for various specific effects of government actions or a revision of the CPI base. Annualised underlying inflation over the past three months is estimated to be roughly 4%. Declining underlying inflation and the appreciation of the exchange rate of the króna have improved the inflation outlook, especially for next year. The forecast published in this issue of Monetary Bulletin indicates that inflation will move within the tolerance limits of the Central Bank's target in the third quarter of this year, and that the 2½% inflation target will be attained in the closing months of 2003. Over a two-year horizon, inflation should fall below the target given an unchanged monetary policy stance. At the same time, the contraction of domestic demand is intensifying, and a slack is emerging in the previously tight goods and labour markets. The current account deficit is on the verge of disappearing, which has contributed to the strengthening of the króna. The recent appreciation of the króna confirms the Bank's view that from a medium term perspective last year's depreciation was not warranted by economic fundamentals. The growth of credit system lending has slowed down and has come to a complete halt at deposit banks. Considerable growth is still taking place in broad money, however, which is partly attributable to a higher level of saving and need not be a cause for concern as long as the growth slows down in the near future. The monetary stance remains tight despite the latest interest rate cuts, but if inflation declines as forecast and given the expected contraction in domestic demand, further cuts in the Central Bank policy rate should be warranted in 2002.

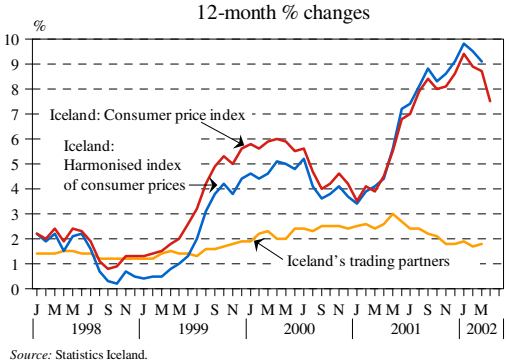
Inflation decreased in Q1

The twelve-month rate of inflation slowed considerably down during the first quarter of this year, after peaking in January. In April the CPI had risen by 7½% over the preceding 12 months, compared with 9.4% in January, which was the highest inflation recorded since October 1990. As domestic inflation increased last year, it was on a declining trend among main trading partner countries. So far this year inflation among trading partner countries has averaged around 1½-2%, running somewhat higher in Europe, at 2-2½% in EEA countries and around 2½% in the euro area.

Chart 1

CPI inflation 1998-2002

12-month % changes



Source: Statistics Iceland.

1. This article uses data available on April 30, 2002.

Last year's inflation was caused by several factors, including wage rises in excess of productivity growth, the depreciation of the króna from May 2000 to November 2001, and the underlying overheating of the economy and external imbalances. These factors have previously been discussed in the *Monetary Bulletin* 2002/1 in detail. The focus here will therefore be on the turnaround in the inflation outlook this year, its causes and permanence.

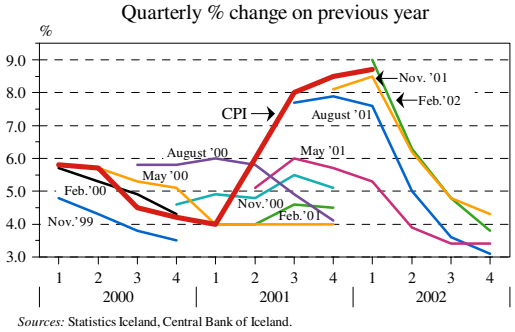
CPI rise in the last quarter was somewhat below the Central Bank forecast

In January, the Central Bank forecast a 9.0% rise in the CPI from Q1/2001 to Q1/2002. In the event, the index went up by 8.7%. The deviation is within statistical confidence limits, and can be more than explained by various government measures to reduce consumer prices. These include various healthcare costs, TV and radio licences, a temporary cut in petrol duty and the abolition of tariffs on vegetables. Although the precise impact of these government measures is difficult to evaluate, it is fair to assume that they left the CPI in April roughly ½% lower than otherwise. The index base was revised in April, after consumer surveys revealed changes in the weighting of a number of household consumption items which were distorting the index. This accumulated distortion in the index was therefore corrected at the same time. Changes in the weightings of various grocery stores and petrol outlets led to a 0.15% reduction in the CPI. The changes to the CPI base are discussed in more detail in Box 1. Without these specific effects, which led to a lower measured price level than would otherwise have been the case, the Central Bank's forecast for the following quarter would have fallen short of actual inflation for the fourth successive quarter.

Chart 2

CPI and Central Bank inflation forecasts 2000-2002

Quarterly % change on previous year



Sources: Statistics Iceland, Central Bank of Iceland.

Prices of non-public services rose most over the past 3 months

The CPI component making one of the greatest contributions to inflation over the past 12 months was non-public services. In April, their prices had risen by 9.7% over the preceding 12 months and by an annualised 7.6% over the previous 3 months. Non-public services weigh almost one-quarter of the CPI. Changes in their prices therefore exert a sizeable influence, explaining 0.3% of the 0.7% CPI increase over the past 3 months and 2.3% of the 7.5% rise over the past 12 months.

Prices of public services, on the other hand, went up by less than the index as a whole over the past 12 months, or 5.3%. In the past 3 months, public services prices went down by an annualised 3.8%. This was caused by government measures aimed at securing attainment of the benchmark price level for May which employers and unions had agreed upon.[2] In February, for example, increases in various public charges which had been announced in January were withdrawn.

Housing price deflation has halted for the time being

Last year, the housing component of the CPI rose by less than other components on average, and the 12-month rise in housing prices steadily slowed down. However, this slowdown has been losing momentum recently. Over the past three months the housing component of the index went up by annualised 7.4%, i.e. somewhat higher than its 12-month rise of 6%. Roughly two-thirds of the rise in the housing component over the past three months can be attributed to higher housing prices, and one-third to an increase in paid rent, which went up by 4.1% in April and resulted in an 0.08% rise in the CPI. The rise was caused by an adjustment of the index on the basis of better data.

Prices of housing in regional areas and larger properties in the Greater Reykjavík Area have recent-

2. For further discussion of the employers and unions' price level target, see Economic and monetary developments and prospects in *Monetary Bulletin* 2002/1, p. 12.

Box 1 Revised Consumer Price Index base in March 2002

In recent years the Consumer Price Index (CPI) base has been calculated from a household budget survey which was conducted in 1995 and had been in use since 1997. Since then, the base has been partially revised each year, if warranted. Components reviewed include telephone services, insurance and new motor vehicles, to cite a few examples. Other components, e.g. food, have not been revised in the same manner until now. Statistics Iceland (Statice) has conducted annual household budget surveys since 2000 and uses these to calculate the new CPI base. For the first time since 1997 the CPI base as a whole was reviewed. It is planned to continue the annual surveys and adjust the index annually.

The results of the household budget survey on which the current index is based are more precise than before. Most importantly, households participating in the survey now submit till slips from shops, which give more detailed information than has been produced by surveys hitherto. Some 75% of all entries in the household budget survey are now obtained by these means.

According to information from Statice, the CPI base is comprised of some 2,500 goods in 700 categories. Price measurements are much more extensive, however, or 15-16,000 per month. There are approximately 5,000 baskets in the base. Of these, roughly 4,500 are for groceries and 500 for other basic components. Changes have been made in the calculation of groceries in the index to match the more precise expenditure measurements. Instead of calculating four subindices by regions, the index is calculated for 13 grocery chains. A geometrical mean is calculated for each category of goods in each chain, and the average price change is calculated as the weighted geometrical mean for each category.

A special study was made of the major changes which have taken place recently in the purchasing pattern for groceries and petrol. In December 2001, considerable changes were made to the composition of retail stores included in the index sample. The review of the base has led to further changes in the weighting of the retail stores. The revision of the groceries component of the index, which was taken into account in April, led to an 0.1% reduction in the index, in addition to the 0.27% reduction made in December following the review of groceries goods retailing then. Petrol purchasing has also changed with a greater consumer preference for self-service stations. An adjustment for this change in weighting led to an 0.05% reduction in the CPI.

Other changes took place to the weightings of index components without causing any alteration to or impact on the CPI value. New motor vehicles and spare parts now weigh only 7.4% in the index, com-

Overview of the change in the CPI index base in March 2002

Percentage breakdown

Weights (%)		*Former base March 2001*	*New base March 2002*
(1)	Domestic agricultural products less vegetables	6.5	6.1
(2)	Vegetables	0.8	0.9
(3)	Other domestic food and beverages	6.4	6.2
(4)	Other domestic goods	4.6	3.9
(5)	Imported food and beverages	3.0	3.0
(6)	Cars and spare parts	10.4	7.4
(7)	Petrol	4.8	3.8
(8)	Other imported goods	13.7	18.7
(9)	Alcohol and tobacco	3.3	4.3
(10)	Housing	14.0	14.7
(11)	Public services	12.5	6.8
(12)	Other services	20.1	24.0
Total		*100.0*	*100.0*
(1-4)	Domestic goods	18.3	17.2
(1-2)	Agricultural products and vegetables	7.3	7.1
(3-4)	Domestic goods less agricultural products and vegetables	11.0	10.1
(5-9)	Imported goods, total	35.1	37.3
(5-8)	Imported goods excluding alcohol and tobacco	31.9	33.0

Source: Statistics Iceland.

pared with 10.4% in March last year on the former base. This is the direct consequence of a major contraction in car imports; new vehicle registrations in 2001 amounted to approximately 9,000 compared with their peak of 19,000 in 1999. The weighting of petrol in the index also decreases and is now 3.8% compared with 4.8% last year. Alcohol increases in weighting, however, due to greater sales of wine and beer.

ly risen most. The residential housing price index for the Greater Reykjavík Area, which is calculated by the Land Registry of Iceland, rose by less over the past 12 months than the CPI component for imputed housing rent, which reflects the cost of own housing in the CPI. Unlike the Land Registry index, which only covers the Greater Reykjavík Area, the imputed rent component extends to housing all over Iceland. Moreover, methods used for calculating imputed rent in the CPI and the Land Registry indices also differ. Housing price increases in regional areas have clearly exceeded increases in the capital area recently, which is in congruity with economic developments in the respective areas. According to Land Registry indices price increases of all residential accommodation (detached and multiresidential properties) in the Greater Reykjavík Area have recently exceeded those of multiresidential properties, which implies that prices of larger properties have risen by more than smaller ones. To some extent the surge in prices of larger housing, after a period of decline, may be explained by actions taken last autumn to lift the ceiling set for financing by the public Housing Financing Fund.

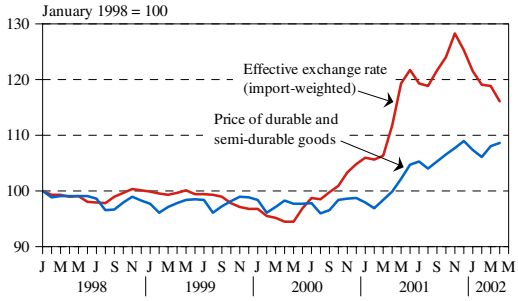
The Central Bank's tight monetary stance contributed to the strengthening of the króna and falling domestic demand, both of which brought down inflation

So far this year, three factors have contributed to the falling rate of inflation: the appreciation of the króna since the end of November; the slowdown in domestic demand, as discussed later; and measures taken by the Icelandic Federation of Labour (ASÍ) aimed at imposing restraint on retail and public sector price decisions. The Central Bank's tight monetary stance has made a major contribution to constraining domestic demand and strengthening the króna, the preconditions for a rapid decline in the inflation rate this year.

Pressure put by ASÍ on providers of public services has left the CPI at least ½% lower than would otherwise have been the case, as reported elsewhere. It is more difficult to assess the extent of the effect on retailers, since this is hard to distinguish from other factors which have constrained inflation at the same time. Depressed demand for durables and semi-durables such as cars, household appliances and clothing limits retailers' scope for raising prices. Informal surveys suggest that competition at the retail level has increased for these goods. Under such conditions, businesses avoid raising prices for as long as possible, and tend to lower them if they have the opportunity to do so. These conditions may explain why recently the appreciation of the króna has been transmitted more quickly into prices of the above mentioned goods than during the period of appreciation in the second half of 1999 and first half of 2000. At that time businesses apparently tended to use the appreciation of the króna to boost their profits, rather than allowing consumers to benefit by lowering prices. Be that as it may, the publicity given to the ASÍ measures may have enhanced price awareness among the public and encouraged retailers to exert moderation in their pricing behaviour.[3]

Chart 3

Price of durable and semi-durable imported goods and the exchange rate 1998-2002



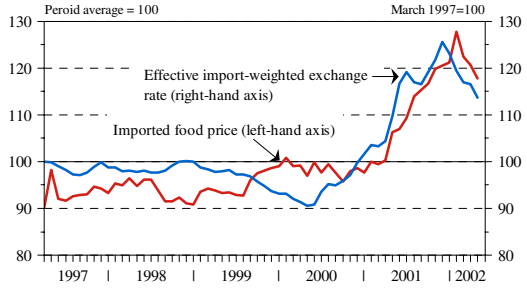
Sources: Statistics Iceland, Central Bank of Iceland.

3. However, it should be borne in mind that the counter-inflationary impact of such measures can only be temporary. In the long run, permanent success in the fight against inflation can only be achieved through monetary policy measures.

Prices of domestic food and beverages have come down somewhat in the past 3 months. It is difficult to assert the extent to which the decline reflects an underlying price decrease, since the correction to the index base affects this component and no detailed breakdown of the impact is available. Imported foods and beverages prices have declined more over the past 3 months, or by 3.9%. Clearly, in this case the appreciation of the króna has had a substantial impact, although it has probably not been transmitted in full.

Chart 4

Imported food prices and the effective import-weighted exhange rate of króna 1997-2002



Sources: EcoWin, Eurostat, Statistics Iceland and Central Bank of Iceland.

Underlying inflation in the past quarter was around 4%

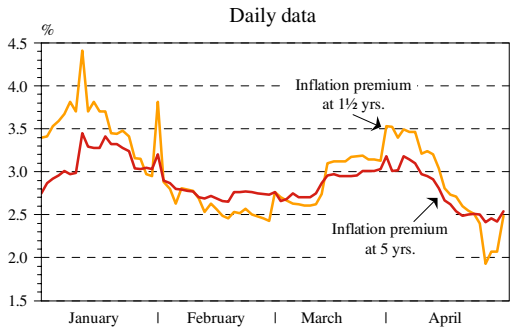
There has been some debate about the recent underlying rate of inflation, in light of price developments so far this year. Various special factors have influenced the CPI in recent months, as discussed above, making evaluation of underlying inflation exceptionally difficult. One way to assess the underlying short-term inflation rate is to purge short-term disturbance from the index and observe the annualised and seasonally adjusted rate of inflation over three-months. Such an exercise leads to the conclusion that underlying inflation over the past three months was near 4%. The twelve-month CPI rise, on the other hand, still reflects last year's high inflation rate, but will drop rapidly in the months to come, according to the current inflation forecast.

Considerable drop in the inflation premium on treasury bonds since early February

The inflation premium on treasury bonds has been highly susceptible to news on the CPI this year. This may be the result of the uncertainty surrounding wage settlements in the case the CPI exceeds the price level benchmark agreed on by employers and unions in May. In effect, the looming threat of a wage, exchange rate and price spiral was measurable during this period. Monthly changes in the CPI have swung above and below market participants' expectations from one time to the next, causing considerable fluctuations in the inflation premium on bonds each time a new CPI figure was released. The rise in the CPI in February was in line with expectations and the inflation premium on treasury bonds, with maturity of 1½ or 5 years, remained relatively stable in the range 2½-3%. On March 12, in the wake of a CPI release when the CPI rose far in excess of market participants' expectations, the inflation premium rose, especially on bonds with a lifetime of 1½ years. Until mid-April the inflation premium remained most of the time considerably higher, or 3¼% on average for bonds with a maturity of 1½ years. The lowering of the Central Bank policy rate by half a percentage point, announced after the closure of markets on March 26, caused a jump in the inflation premium on treasury bonds with a 1½-year maturity from 3.1% to 3½%, but had negligible impact on the premium on bonds with a maturity of around 5 years.

Chart 5

Inflation expectations January 3 - April 30 2002



Source: Central Bank of Iceland.

In April, the CPI rose less than expected by market participants. This led to a considerable drop in the inflation premium, which averaged 2½% over the period April 15-30 for shorter and longer bonds alike.

The Central Bank has surveyed public inflation expectations three times a year since 1997. Findings of these surveys suggest that it takes the public some time to realise that inflation is changing. For example, the public took several months to take stock of higher inflation in 1999 and 2001. The most recent survey was conducted in January this year. Public inflation expectations then measured 6.6%, which is much higher than the inflation premium on treasury bonds around that time, or forecasts by the Central Bank and market participants, although lower than the inflation rate for the previous 12 months.

Inflation forecast: Increased probability that the inflation target will be attained on time

Inflation prospects have improved considerably since the Central Bank published its last inflation forecast. The exchange rate of the króna has strengthened by 5% and the latest economic statistics give a more forthright indication than before that domestic demand is shrinking. Likewise, the outlook is that the CPI for May will be below the price level benchmark agreed on by employers and unions, which substantially dispels uncertainty concerning the future path of inflation. Twelve-month inflation is still running high but will come down rapidly in the near term, if developments will be in line with the current outlook.

In its last forecast, the Bank did not foresee its 2½% inflation target being attained before the end of 2003. In order for the target to be reached, some appreciation of the króna above the level assumed in the forecast was required, or macroeconomic pressures had to ease even further. Both have occurred. Hence, the current outlook is that inflation will be within the 4½% tolerance limit of the target in the third quarter of this year, and shortly afterwards move within the final 4% tolerance limit which goes into effect at the beginning of next year. The outlook is that the Central Bank's 2½% inflation target will be achieved in the final quarter of 2003. The joint declaration by the Government of Iceland and the Central Bank from March 27, 2001 stated that the target should be attained before the end of 2003.

Inflation outlook for the next two years has improved

Over this year, the outlook is for inflation of 2.8%, which is marginally less than was forecast in February. However, the discrepancy between the forecasts is larger for 2003. The current forecast is for a 2.3% rate of inflation, compared with 3% in the previous forecast. In fact, the forecast for 2003 is the same as last October. The higher inflation forecast in January reflected less favourable outlook for import prices and wage increases in accordance with an agreement between employers and unions from December 2001. Offsetting this was the appreciation of the króna in recent months and the decline in excess demand.

Over a one year horizon (to the first quarter of 2003) the Bank forecasts 3.2% inflation, but expects

Table 1 Inflation forecast of the Central Bank

Quarterly changes

	Percentage change from previous quarter (%)	*Annualised quarterly change (%)*	*Change on same quarter of previous year (%)*
2001:1	0.9	3.4	4.0
2001:2	3.5	14.5	6.0
2001:3	2.3	9.7	8.0
2001:4	1.6	6.6	8.5
2002:1	1.0	4.2	8.7
2002:2	0.4	1.8	5.5
2002:3	0.8	3.2	3.9
2002:4	1.0	4.2	3.3
2003:1	0.9	3.7	3.2
2003:2	0.8	3.4	3.6
2003:3	0.5	2.1	3.4
2003:4	0.3	1.3	2.6
2004:1	0.6	2.3	2.3
2004:2	0.6	2.6	2.1

Figures indicate changes between quarterly averages of the consumer price index. Shaded area indicates forecast.

Annual changes (%)

Year	*Year on year*	*Within year*
1999	3.4	5.8
2000	5.0	3.5
2001	6.7	9.4
2002	5.3	2.8
2003	3.2	2.3

Shaded area indicates forecast.

Table 2 Main assumptions of the inflation forecast

Percent changes between annual averages	*2002*	*2003*	*2004*
Contractual wages	4.0	3.6	2.9
Wage drift	1.6	0.2	0.6
Domestic productivity	0.3	1.0	1.6
Exchange rate of króna, based on an import-weighted basket of foreign currencies	-1.6	-0.8	0.0
Import prices in foreign currency terms	-1.1	1.9	1.5
Percent changes within year			
Contractual wages	4.2	3.3	2.9
Wage drift	0.5	0.0	1.0
Domestic productivity	0.5	1.5	1.5
Exchange rate of króna, based on an import-weighted basket of foreign currencies	-6.2	0.0	0.0
Import prices in foreign currency terms	0.1	2.3	1.4

the rate to come down to 2.3% two years ahead, which is below the Bank's inflation target. If the forecast turns out to be correct this will mark a major turnaround, as inflation until Q1/2002 was running at 8.7%.

The Bank's inflation forecast for this year and next, and for year-on-year averages, is similar to those of financial market analysts (see Box 3 on p. 12).

Assumptions behind the inflation forecast

Import prices. Several changes have been made since February to the assumptions behind the inflation forecast for 2002 and 2003 reflecting new data. Assumptions for 2004 are presented for the first time. Import price changes assumed in the forecast are based on IMF and OECD forecasts and on forward oil prices in the world market. A decrease of about 1% is foreseen between 2002 and 2003. In February, no change in import prices was expected. Next year import prices are expected rise faster as the world economic recovery gathers momentum. In the current forecast a rise of just under 2% is assumed, instead of just over 1½% in the previous forecast. In 2004, inflation in world trade prices is expected to stabilize at 1½%, which should correspond to steady state inflation in world trade prices as these prices can be expected to rise by rather less than consumer prices in general.

Wage developments. Recently, there has been a growing evidence of less tight conditions and perhaps an emerging slack in the labour market and the economy as a whole. This is reflected in lower wage drift in the past few months than in recent years. In addition, it now seems unlikely that escape clauses of current wage agreements will be invoked in May. Hence, wage drift is expected to decline to ½% in the course of this year and to disappear in 2003. The last forecast assumed wage drift of 1% for each respective year. Over 2004, wage drift is forecast at 1%,

Box 2 Oil prices

Since February, crude oil prices have risen sharply from the low that began last autumn. This increase can be attributed to the upturn, albeit slow, in the global economy and to political and military uncertainties, e.g. the Middle East conflict. Demand for oil products has increased and inventories declined at the same time as production by OPEC countries has gone down. These conditions led to a rise of almost 7 dollars per barrel of crude oil during the winter. No significant change is likely until peace prospects in the Middle East improve, because crude oil prices have been extremely sensitive to news reports, good and bad alike. Recorded prices show that forward crude oil prices will drop in the next few months and the forward price one year hence will be 11% lower than the spot price at the beginning of May. Judging from forward prices, oil prices should therefore show a downward trend in the fairly near future, perhaps to a similar level to the average in recent years. As a rule, prices of petrol and other oil products keep pace with swings in crude oil prices. Based on its forward price, petrol will average about 5% lower in the second half of this year than at present. In the long run, the importance of OPEC countries for global oil production will decline, and that of non-member countries will increase. This applies in particular to Russia and the Central Asian countries with oil resources. It is likely that the diminishing importance of OPEC will serve to calm the oil market.

which should correspond to a relative balance in the economy. Assumptions for productivity growth in 2002-2003 are unchanged from the last forecast.

Exchange rate developments. As in previous Central Bank inflation forecasts, the exchange rate is assumed to remain unchanged from the day of the forecast. When the forecast was made on April 23, the exchange rate index stood at 133.0 points, compared to 139.8 points assumed in the Bank's latest forecast. The difference is 5.1%, implying an annual average appreciation of 1½% between 2001 and 2002, and almost 1% between 2002 and 2003. In the February forecast a depreciation of 2½% was assumed between 2001 and 2002, and no change between 2002 and 2003. After the forecast was produced, the króna strengthened further. If the exchange rate remains at the same level as at the end of April for the remainder of the forecasting period, inflation will turn out somewhat lower than forecast here.

In recent months an anti-inflation campaign with active monitoring of price changes has been under way on the initiative of the labour movement, as mentioned above. As this may cause short-term disturbances to inflation as measured by the CPI, an attempt has been made to approach underlying inflation by eliminating, to some extent, this potentially misleading information from the forecast. Likewise, the forecast takes into account known price rises which will occur in the second half of the year, such as a rise in petrol duty. Finally, as in the February forecast but unlike earlier forecasts, housing prices are not assumed to fall over the forecasting period.

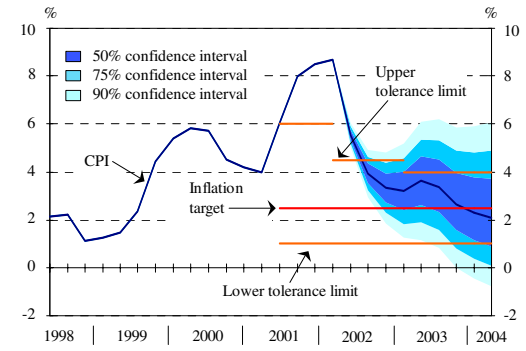
Uncertainties and risk factors

To underline the inherent uncertainties, the forecast is presented together with an assessment of its confidence interval in Chart 6. The entire coloured area shows the 90% confidence area; the two darkest ranges show the corresponding 75% confidence interval, and within the darkest range there is 50% probability of inflation remaining within the area. The uncertainty increases the longer the horizon of the forecast, as reflected in the widening of the confidence interval.

As discussed in earlier issues of the *Monetary Bulletin*, assessment of forecasting uncertainty is broadly based on historical forecasting errors.[4]

Chart 6

Central Bank inflation forecast



However, recent forecast errors have been greater than normal because of the high rate of inflation, which as a rule goes hand in hand with greater volatility of inflation. It can be argued that because it is evaluated on the basis of data from a relatively short period, uncertainty in long-term forecasts is in fact smaller than may be inferred from historical data. It can also be argued that uncertainty about the factors shaping the short-term inflation outlook have diminished recently. Thus the forecast uncertainty is assumed smaller in this forecast than historical forecasting errors would indicate.

Some uncertainty surrounds inflation developments after the price restraint campaign discussed above has ended. There is a definite risk that inflation will bounce back due to accumulated need for price increases in some sectors. If so, the decline of inflation in recent months could give a misleading impression about the sustainability of the trend. However, favourable exchange rate developments have probably already diminished the accumulated need for raising prices. Furthermore, as pointed out above, the scope for raising prices has been limited due to shrinking demand and increasing competition. Segments of the retail sector which suffered losses

4. The Bank has only a short experience of forecasting over a two-year horizon. The range from one to two years is therefore based on a simple projection. Just as forecasts for individual values are subject to uncertainty, so is the estimated uncertainty of forecasts. The estimated forecast uncertainty should therefore be interpreted with caution. The aim is to highlight the inherent uncertainty of forecasting rather than to provide a precise assessment of the probability distribution of forecast inflation.

Box 3 Survey of analysts' assessment of the economic outlook

For the first time, the Central Bank has surveyed the views of financial market analysts about the economic outlook. The survey was sent to six companies that publish their economic analyses: Búnadarbanki, Economic Consulting and Forecasting, Íslandsbanki, Kaupthing Bank, Landsbanki and SPRON (Reykjavík and Environs Savings Bank). The aim is to conduct a similar survey on a regular basis in connection with the publication of *Monetary Bulletin*.

The accompanying table shows the survey results. Firstly, the table shows the analysts' evaluation of inflation prospects for this year and next year. Their forecasts correspond closely to the new Central Bank forecast. However, some financial market experts apparently think the Bank's 2½% inflation target will not be attained before the end of 2003.

The survey also reveals that financial market analysts expect output growth this year and next year to be broadly in line with the recent National Economic Institute forecast. They also seem optimistic that the recent strengthening of the króna will be long-lived. On average, the exchange rate is not expected to strengthen further over the next two years. However, their assessment differed substantially, with some analysts expecting the króna to weaken over the next two years, and others foreseeing further strengthening.

Analysts also expect the Central Bank to continue cutting interest rates this year, and that the policy rate will be around 8% at the end of the year. However, they do not seem to expect interest rates to come down much next year and forecast an average policy rate of 7.7% at the end of 2003, which is somewhat more than the 5½-6½% interest rate which would probably be consistent with a neutral monetary policy stance, cf. the discussion in Box 5. Some analysts even expected the Bank's policy rate to rise again next year after coming down this year.

Overview of forecasts by financial market analysts

	Average	*Highest*	*Lowest*	*Average*	*Highest*	*Lowest*
		2002			*2003*	
Inflation (within year)	2.7	3.3	2.2	2.7	3.0	2.1
Inflation (year on year)	5.4	6.0	5.0	3.0	3.7	2.5
Economic growth	-0.4	0.1	-1.0	2.0	2.6	0.8
	One year forward			*Two years forward*		
The effective exchange rate index of foreign currencies vis-à-vis króna (Dec. 31 1991=100)	133.3	138.0	126.0	132.5	138.0	123.8
Central Bank policy interest rate	8.0	8.5	7.6	7.7	9.5	6.1
Nominal long-term interest rate	7.9	8.4	7.5	7.9	8.8	7.2
Real long-term interest rate	5.1	5.2	4.8	5.0	5.5	4.5
ICEX-15 share price index (12-month change)	7.7	18.0	-15.0	19.4	36.1	12.6
Housing prices (12-month change)	1.8	5.0	-2.0	0.7	9.0	-4.0

The table shows percentage changes, except for interest rates (percentage points) and the exchange rate index for foreign currencies (index points). Participants in the survey were the research departments of Búnadarbanki, Economic Consulting and Forecasting, Íslandsbanki, Kaupthing, Landsbanki and SPRON (Reykjavík and Environs Savings Bank). Source: Central Bank of Iceland.

Analysts also expect long-term interest rates to fall over the next two years. Long-term nominal rates will be down below 8% at the end of this year and will remain there throughout next year. Long-term real interest rates will also fall and be around 5% by the end of this year, where they will remain throughout 2003,

according to the analysts' forecasts. The inflation premium on indexed treasury bonds will therefore be just under 3% at the end of this year and next year, which could be consistent with the Bank's 2½% inflation target, after taking into account the risk premium on non-indexed treasury bonds.

Finally, the survey findings indicate that analysts are fairly optimistic about asset price developments over the next two years. On average, the forecast twelve-month rise in equity prices is almost 8% until the end of 2002 and almost 20% until the end of next year. Nonetheless, the survey clearly reveals quite different views regarding the equity market outlook, especially for this year. In general, analysts expect ongoing rises in housing prices over the next two years, but their views on real estate price developments are rather diverging.

last year when retail prices of imported goods lagged behind rising cost of foreign currency will therefore probably not be in a position to recoup their losses. Thus the likelihood of a wave of price rises during the second half of the year seems relatively small. The marked contraction which took place in private consumption during the final quarter of last year, and signs that it will continue this year, point in the same direction. Growing debt service burden of households could even cause private consumption to contract more than assumed in the main forecast. Direct intervention or the application of moral suasion to restrain price increases is as a rule more likely to postpone inflation than eradicate it. Nonetheless, it can be argued that by helping to meet the price level target in the wage agreement, this pressure has helped to dispel uncertainty about wage and price developments in the near future and thereby contributed to less inflation in the long run.

Another uncertainty concerns the effect of changes made to government tariffs and public sector service charges with the aim of influencing the CPI in May. There is much to suggest that the recent cut in petrol duty will be taken back during the year and various service charges are likely to increase as usually in the beginning of next year.

Over the medium term, there are conflicting factors at work, two of which could yield some upward pressures on the price level and one likely to put downward pressure on prices. Firstly, higher inflation in the rest of the world and rising commodity and oil prices in wake of a global recovery could be transmitted into domestic prices. Secondly, the strong position of the export sector, especially fisheries, which are highly competitive at the current exchange rate, could lead to pressure on wages if it remains. If the recent appreciation of the króna is sustained, this risk will diminish. By contrast, a deeper than forecast recession, and higher than forecast unemployment this year are also conceivable. The labour market tends to weaken for some time after recovery has begun. This year's recession could therefore lead to a continuing rise in unemployment stretching into next year. Such a development could have an effect on the housing market. The combination of intense competition, low or negative wage drift, and falling housing prices could lead to lower inflation than projected here.

On balance, the Central Bank considers the balance of risk for inflation one year ahead to be roughly equal. This assumption is based on the above risk factors and the fact that models incorporating the underlying discrepancies in the long-run relationship between prices and marginal costs indicate that it will take longer to bring inflation down than conventional cost-push models suggest. However, the Bank considers the upside risk for inflation two years ahead to by slightly greater than the downward risk. This reflects both the risk factors mentioned above for 2003 and historical experience which indicates substantial inflation inertia as it approaches the zero bound. This assessment is reflected in the chart whereby a larger part of the probability distribution for next year lies above the main forecast than below it.

Clear signs of a substantial fall in labour demand

In recent months increasing evidence has emerged of a substantial easing of pressure in the labour market. Demand for labour has fallen substantially. Rising unemployment indicates that excess demand for labour has fallen. A decline in the number of vacancies and work permits issued so far this year suggest the same. Registered unemployment increased by

0.1% in March to measure 2.7%. Seasonally adjusted unemployment was 2.3% in March, up by 0.2% from the preceding month. In March last year the seasonally adjusted figure was 1.2%, being exceptionally low during winter 2000-2001. Seasonally adjusted unemployment is at its highest figure since November 1998. A Statistics Iceland labour market survey conducted in April revealed a similar increase in unemployment from the previous year. Unemployment turned out to be 3.2%, having increased by 1.1% since the survey made a year before.

A watershed has been reached in the division of unemployment between the Greater Reykjavík Area and the regions. Registered unemployment has increased more in the Greater Reykjavík Area than in regional areas over the past 12 months. This is consistent with indications revealed in a National Economic Institute survey in January, in which employers in and around the capital wanted to reduce staffing for the first time since 1997, by 0.9% of the labour force there, while regional employers wanted to take on 1.2% extra staff. As is common when unemployment begins to climb, it has risen faster in the younger age groups, e.g. 16-24 years, than the older ones. The share of the youngest age group in total unemployment grew from 22% in March 2001 to 29% in March this year.

Supply of available job positions has dropped sharply since October 2001. The number of vacancies at the end of this March was only one-third of that a year before. Some 6% fewer work permits have been issued so far this year compared with the same period last year. Although their overall number has not fallen much, a fundamental change has taken place in the type of permits issued. The number of newly issued work permits dropped from 418 in the first 3 months of 2001 to 140 this year. However, the number of extended temporary work permits increased by 56%, from 248 to 443. This increase is explained by the large number of work permits that were issued over the past two years and are being renewed in part.

Labour market participation has fallen and working hours are fewer

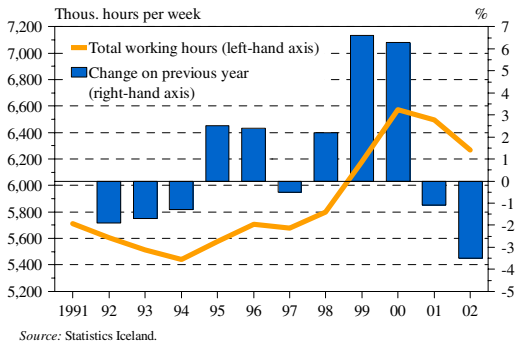
According to Statistics Iceland's survey in April, labour market participation decreased for the first time since the last upswing began. In April it measured just under 84%, or 1% less than at the same time last year. The decrease in labour market participation is confined to males in the Greater Reykjavík Area and the youngest age group. Between April 2001 and 2002, labour market participation by 16-24 year-olds dropped by 8%. Participation by other age groups either remained unchanged or increased.

The number of weekly working hours has been falling over the past two years, after peaking at more than 44 hours in April 2000. According to the labour market survey, the working week in April this year was approximately 1½ hours shorter than in April 2000, the same as in April 1998, but shorter than the average over the period 1995-1998.

Both labour market participation and average working hours grew in step with the economic upswing, resulting in a sizeable increase in total working hours to begin with. The largest increase was in 1999 and 2000, after which volume has fallen. The contraction in working hours since 2000 corresponds to a reduction of 7,500 man-years, which can be seen in the context that some 4,000 people were registered unemployed in March. Thus the reversal in the labour market has been considerably greater than unemployment figures suggest.

Chart 7

Hours worked in April 1991-2002



Source: Statistics Iceland.

Changes in supply of student labour played a major part in meeting excess demand for labour when it peaked. Over the period from 1997 to 2000, their labour market participation increased from 52% to 67% and their working week from 20 hours to almost 26. In 2001, students' labour market participation remained unchanged but their working week

decreased by 2 hours. The change in students' total working hours in 2000 when their participation and average working hours peaked explains almost 93% of the change in total working hours. The contraction in student labour supply in 2001 was also the first sign that pressure in the labour market was easing.

This trend invites the question whether significant slack has already emerged in the labour market. The fact that seasonally adjusted unemployment is still near the lower limit of estimated natural unemployment, which could be 2½-3½%,[5] does not suggest this incontrovertibly. As shown above, there are various indications that measured unemployment is not necessarily always the best criterion of labour market tightness, at least not in the short run. Other indicators suggest that excess demand has almost completely vanished and that some slack may even have emerged. These include indications of a halt in wage drift and even negative wage drift in some sectors. In this context it should be borne in mind that international evidence suggests that restoring lasting price stability after inflation has been unleashed, as it has in the recent past, may require a temporary slack in the labour market.

No wage drift measured between Q4/2001 and Q1/2002

Data on recent quarterly changes in wages also suggest that demand for labour has diminished. Wage drift decreased sharply in the second part of last year and has apparently more or less come to a halt, judging by figures for the first quarter of this year. The wage index for the entire labour market went up by 9.5% between Q1/2001 and Q1/2002. Public sector and bank employees' wages rose by 14.1% and wages in the non-financial private sector by 6.4%.

Wage drift decreased in the first quarter of 2002 to 2.7%, compared with 3.4% in Q4/2001. No wage drift was measured between Q4/2001 and Q1/2002 and there are signs of negative wage drift among some groups. The wage indices maintained by Statistics Iceland (Statice) and the Institute of Labour Market Research have been moving closer to each other. The Institute of Labour Market Research index showed more wage drift at the peak of the upswing than the corresponding Statice index, but it has also come down at a faster pace.

Real wages in the labour market as a whole, according to Statice, were only just over ½% higher during the first quarter of this year than a year ago. Despite wage drift, wages in the private sector excluding financial institutions did not entirely keep pace with price developments and in the first quarter they were 2.1% less than a year before in real terms. Real wages in the non-financial private sector shrank by 4.6% at the same time, but wages of public sector and bank employees rose by 5% in real terms.

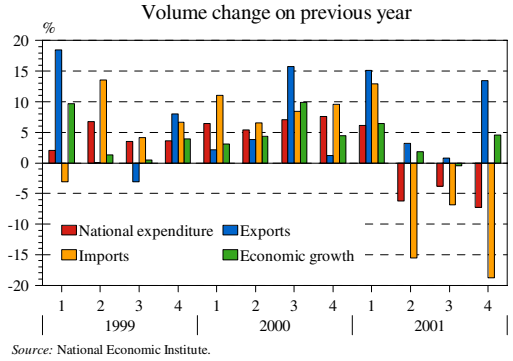
Sharp contraction in national expenditure but GDP continues to grow

Recent national accounts statistics gives rather conflicting signals about the current position of the economy in the business cycle. GDP in the fourth quarter of last year, for example, was 4½% higher than four quarters earlier, according to initial estimates by the National Economic Institute (NEI). Thus the economy might appear to be on a firm upswing. This is not the case, however, since national expenditure contracted by 7.3% over the same period. Revised figures for national expenditure for the first three quarters of last year also show a greater decrease than before, although that stems largely from the fact that GDP growth in 2000 is at present estimated to have been considerably higher than according to earlier NEI estimates. It should also be underlined that quarterly aggregates are highly volatile and revisions to annual figures have an effect on all quarterly figures,

Chart 8

Quarterly economic growth 1999-2001

Volume change on previous year



Source: National Economic Institute.

5. See box 1 in Economic and monetary developments and prospects, *Monetary Bulletin* 2001/4, p. 6.

making interpretation quite difficult. The diverging path of national expenditure on the one hand and GDP on the other is caused by the interaction of domestic demand and external trade. At the same time as contracting domestic demand has been reflected in an even sharper contraction in imports, the terms of trade improved and exports underwent robust growth. The surge in exports towards the end of last year can probably to some extent be attributed to the response of exporters to the weakening of the króna and favourable prices in foreign markets, but in part this upswing was probably caused by temporary factors, unrelated to the improved competitive position. As discussed in earlier issues of *Monetary Bulletin*, a characteristic of the current business cycle is that it appears to be less closely related to swings in external conditions than earlier cycles have been.

The economy grew faster in 2000 and 2001 than initially forecast

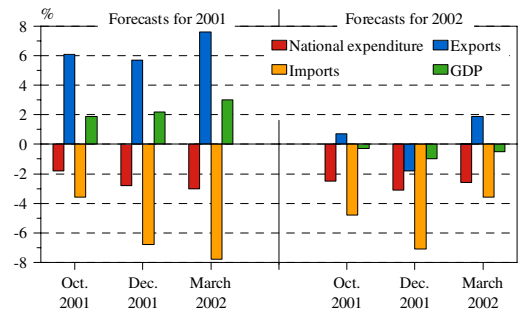
Monetary policy decisions are based on the information available at the time of decision and an assessment of the economic outlook derived from this information. It is interesting to note to what extent current knowledge of economic conditions in the past differs from what was known when monetary decisions were made. According to currently available information, GDP growth in 2000 and 2001, for example, was greatly underestimated, especially in 2000. According to the latest NEI estimate, growth was 5½%, or almost 3 percentage points higher than in its first forecast and almost 2½ percentage points higher than projected in March 2001. Growth in 2001 is estimated to have reached 3%, i.e. twice the figure suggested by the first forecasts. The accumulated discrepancy from the first forecast to the latest estimates for 2000 and 2001 is therefore 4.2%. The outlook for 2002 is still uncertain, but in its forecast published this March the NEI expected economic growth to be marginally below its first forecast.

Monetary policy decisions are not derived mechanically on the basis of a single forecast or a few indicators. So it cannot be taken for granted that incorrect decisions were made on the basis of this information. No judgement will be passed here. Nonetheless, the effect of incomplete information on decisions on both monetary and fiscal policy, is certainly worth considering. A problem faced by macroeconomic forecasters all over the world is how difficult it is to predict the peaks and troughs of the business cycle. Models are generally incapable of producing such events, or at least unable to time them correctly. This is worth bearing in mind now that the economy is clearly cooling down. In the next section an attempt is made to weigh up and evaluate the factors influencing economic developments in the current year and following year, and monetary policy decisions need to take into account.

Chart 9

Economic growth forecast revisions

Forecasts conducted in October 2001, December 2001 and March 2002



Source: National Economic Institute.

Outlook for contraction in GDP this year and private consumption could remain depressed for a protracted period

Although last year's growth projections have been revised upwards, it is clear that economic activity has slowed significantly. The NEI forecast published in March suggests a ½% contraction in GDP and a contraction of 2.6% in national expenditure this year. Export growth is expected to be fairly slow and imports to continue contracting, although at a slower pace than last year. Terms of trade developments are expected to be favourable. The current account deficit is forecast to shrink to 2% of GDP, which is a major turnaround from two years ago, as discussed below.

According to the forecast, private consumption will shrink for the second year in a row. This is the first time since 1992-1993 that this has happened for two consecutive years. The NEI estimates that real disposable income per capita increased by 2½% last year and will increase by almost 2% in 2002. The drop in private consumption is explained by the

Table 3 The National Economic Institute forecast in March 2002

Volume changes between years %	*1999*	*Preliminary 2000*	*2001*	*Forecast 2002*
Private consumption.....	7.2	4.2	-2.8	-1.0
Public consumption.....	4.4	3.7	3.0	2.8
Gross fixed investment ...	-3.7	14.8	-6.0	-13.0
Final domestic demand ...	4.2	6.4	-2.5	-2.9
Stock changes.....	-0.2	0.3	-0.6	0.3
National expenditure.....	4.0	6.6	-3.0	-2.6
Exports of goods and services.....	4.8	6.0	7.6	1.9
Imports of goods and services.....	5.5	8.8	-7.8	-3.6
Gross domestic product ..	3.6	5.5	3.0	-0.5
Current account balance as % of GDP	-6.9	-10.1	-4.4	-2.0

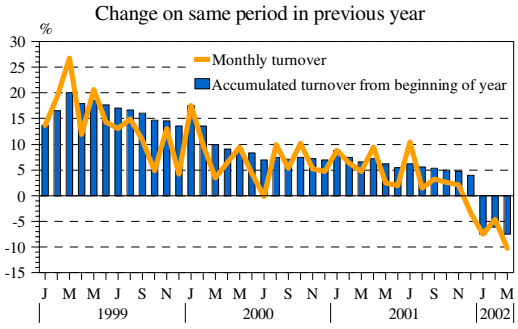
Source: National Economic Institute.

greater debt service burden of households, or less willingness or ability on their part to compensate for this with further borrowing (see more detailed discussion in the article on financial stability on p. 37). This development is not unexpected and the probability of a considerably sharper adjustment of domestic demand than medium term scenarios have suggested have been discussed in earlier issues of *Monetary Bulletin*. On average, real wages this year will probably remain broadly unchanged from last year, or marginally lower, and will decline somewhat in the course of the year. Judging from recent developments of domestic demand, unemployment can be expected to increase somewhat in excess of what has been assumed in the NEI forecast, and working hours will most likely decline further. The higher debt service burden, however, will leave households with less disposable funds than last year. A drop in real disposable income cannot be ruled out during the year, causing private consumption to shrink by even more. On the whole, there seems to be a fairly large likelihood that private consumption will fall short of the NEI forecast. The heavy debt service burden increases the probability of a fairly persistent slump in private consumption, if the economy does not gain from significant positive shocks.

Recent indicators, such as on turnover, point to somewhat intensified contraction in private consumption. For example, credit card turnover has been falling at an accelerating rate since the end of 2001. By March, turnover was down by 10% in real terms over the 12-month period.

Chart 10

Credit card and debit card turnover[1] 1999-2002



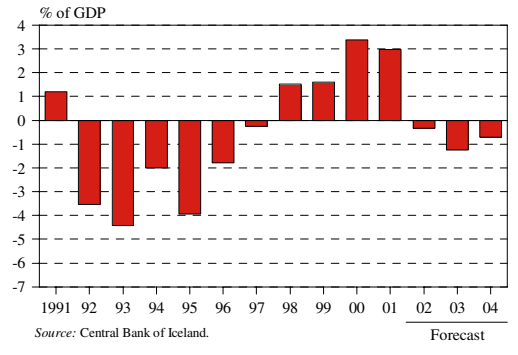
1. Domestic turnover is deflated using the CPI. Turnover in other currencies is deflated by the effective exchange rate of króna. *Source*: Central Bank of Iceland.

The output gap will turn negative this year

The Central Bank expects that the positive output gap will disappear and be slightly negative this year, reaching just over 1% next year, but starting to diminish again in 2004. Revision of the historical output gap indicate that it was fractionally less over the period 1999-2001 than previously estimated, even though the latest NEI estimates indicate higher rate of growth during that period than previously thought. This can be explained by the fact that the

Chart 11

The output gap 1991-2004



Source: Central Bank of Iceland.

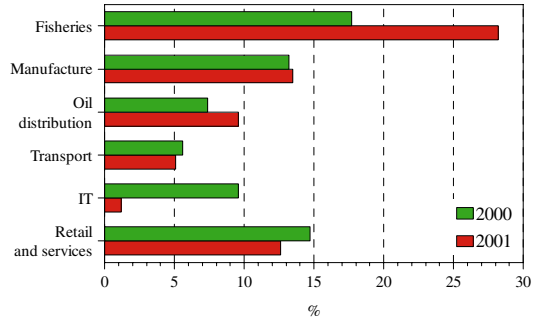
NEI has reviewed its methods for evaluating capital formation and the capital stock. The capital stock is now estimated to be lower than before which, assuming unchanged labour utilisation and output growth, leads to a higher estimate of marginal productivity of labour and potential output, thereby reducing the estimated output gap, other things being equal.

Development of imbalances does not pose an immediate threat, but could kindle inflation later

A positive or negative output gap often has varying effects on individual sectors. This can prove crucial for monetary policy decisions, because sometimes the conditions in one sector can affect other sectors, even though conditions there are different. One example, wage formation in the fisheries sector has intermittently affected other sectors, despite different conditions there. There is some risk of such a scenario following last year's depreciation of the króna. Gross profits in fisheries and most other export companies surged. Seamen's wages rise as profitability improves, since they are partially linked to marine product prices. Given the conditions now prevailing in the Icelandic economy, however, it is unlikely that this trend will spread to other sectors in the near future. But this could change once recovery gathers strength and the external conditions of fisheries remain favourable. The appreciation of the króna recently, however, has reduced the risk of imbalances leading to intersectoral contagion, and the risk would diminish even further if the króna appreciates further before wage agreements expire next year.

Chart 12

The contribution margin[1] 2000-2001



1. Operating profit before depreciation. *Source:* Central Bank of Iceland.

Be that as it may, the upswing in fisheries, which is largely a regional industry, has to some degree erased earlier imbalances resulting from diverging development in the capital area on one hand, and the regions on the other hand. Regional housing prices, for example, have rallied slightly recently while falling, in real terms at least, in the Greater Reykjavík Area. Labour market pressure has probably eased most in those sectors where it was running highest. This applies, for example, to the construction industry and various services in the Greater Reykjavík Area, as shown by turnover figures and the NEI labour market surveys. These sectors have to some extent come to rely on imported labour in recent years. In general, it seems fair to conclude that there are far fewer bottlenecks in the economy that could lead to wage pressures.

The current account deficit has been rapidly shrinking and should be easily funded by the private sector

The interaction of declining national income and an upswing in exports has caused the current account to shrink faster than was generally expected. As has been pointed out in *Monetary Bulletin* before a current account deficit on the scale experienced in Iceland in recent years is unsustainable and will inevitably lead to an adjustment of the exchange rate, domestic demand or both. The adjustment of national expenditure is already underway and this was not unexpected. It entailed a 7.8% contraction in imports last year, and during the first three months of 2002 merchandise imports were down almost 20% from the same period in the previous year, measured at a constant exchange rate. The fact that the Easter-holiday period fell during the first quarter this year probably explains some of this decrease, but even after taking this into account the contraction in imports seems to have intensified.

The rapid growth in exports in recent months has been quite unexpected. The NEI traces it to causes including lower inventories of marine products, since exports have been considerably greater than catch figures would suggest.[6] If this is the case, the upswing may be to some extent temporary. Nonetheless, the discrepancy could also be partly the result of

6. See the National Economic Institute's publication *The Icelandic Economy* – developments 2001 and outlook for 2002, March 2002, p. 24.

greater value added from production. The quota position looks good, even though larger share of the cod quota has been used during the current fishing year than has often been the case at similar periods in the past. The price outlook appears fairly good on the whole, although some decreases have taken place in the past few weeks. Prices in foreign currency have generally been on the increase since 1999. A recent reduction in prices of frozen-at-sea and salted products, however, suggests that buyers' price tolerance was being strained. In the past few months exports have been very robust while imports have continued to contract. There was a surplus on the merchandise account over the past 12 months on average and the period from October 2001 to February 2002 showed a continuous surplus, amounting to 16½ b.kr. in total. There was a deficit in March, which was more than accounted for by the delivery of a new aircraft. In March the NEI forecast that the surplus on the merchandise account in 2002 would be 6.6 b.kr. Over the first three months it amounted to 5.6 b.kr., and would have been twice as large without the aircraft transaction. Thus it seems reasonably likely that the current account deficit will be lower than forecast by the NEI, and it cannot be ruled out that it will disappear completely, for example if private consumption drops by more than forecast. On the same assumptions for the development of wages, prices and the real exchange rate as made in the Central Bank's inflation forecast, if export grow faster to the tune of 4% and private consumption decreases by 2½%, the deficit would amount to ½% of GDP this year, and should by and large disappear if the contraction in national expenditure fully offsets the contribution to GDP growth of the increase in exports.

It is uncertain whether exports will go on growing as vigorously as in recent months. But even if export growth turns sluggish this year, in line with

Box 4 Global economic recovery has begun but its sustainability is uncertain

The global economic outlook has improved significantly since the publication of *Monetary Bulletin* in February. During the final quarter of last year output grew in the US, while a contraction had been widely expected beforehand. Robust growth was recorded in the first quarter of this year, or 5.8% on an annualised basis according to initial estimates. Industrial production is also beginning to grow again after the sharpest contraction for decades. What contributed most to growth in the first-quarter was the end of stock adjustment that took place last year, increased public expenditure and the continued growth in private consumption. In recent weeks, however, signs of weaknesses have appeared which could suggest that the improvement is not on a particularly firm footing. The inventory adjustment is temporary in character, the same probably applies to the increase in public expenditure, and ongoing private consumption growth may depend on continuing low interest rates, since unemployment has probably not peaked yet. Likewise, a convincing improvement in corporate profits is still lacking. There are also lingering doubts concerning the sustainability of long-term growth due to the lack of any significant reduction in the current account deficit during the preceding recession. According to recent data the deficit appears to be on the rise once more.

In Europe the slow down was less pronounced, and recovery seems to be taking correspondingly longer to get off the mark, especially in Germany. Growth in the euro zone is clearly recovering, however, although the rise in oil prices, if it continues, could slow this down. The euro zone's strength lies in better overall balance and higher corporate profits. The UK economy to some extent displays similar characteristics to the USA. A large contraction has taken place in industrial production, private consumption is strong and the Sterling exchange rate is high. Unlike the USA, however, unemployment has not increased to any extent in the UK and in fact has not been lower for decades.

In Japan the decline in industrial production and increase in unemployment have come to a halt, for the time being at least. However, there seems to be no sign that deflation in Japan is coming to an end and the problems of its financial system remain unsolved. Whether the Japanese economy can avoid a major crisis is still very much an open question.

the assumption in the recent national economic forecast, and the current account deficit turns out to be about 2% of GDP, such an adjustment is still sufficient to support the exchange rate in the near future. The last *Monetary Bulletin* included a detailed discussion of how the current account deficit is funded. The basic balance, which is defined as the sum of the current account deficit, net direct foreign investment and net portfolio investment abroad, was compared with planned foreign borrowing by credit institutions and other parties. It was found that the estimated deficit on the basic balance for 2002, amounting to 5.7% of GDP, could easily be funded by the private sector, without intervention by the Central Bank or the Treasury. A review of these findings suggests that the funding requirement will be around half that assumed then, and it cannot be ruled out that the need for funding will vanish completely this year.

Export company profitability improved substantially last year, but worsened somewhat among home market companies

Turnover of companies (excl. finance and insurance sector) listed on the Iceland Stock Exchange increased by 25% between 2000 and 2001, but by 9% in real terms, deflated by CPI on home-market revenues and after adjusting for the impact of exchange rate changes on export revenues. Overall corporate profitability improved during the year. EBITDA increased from 9.2% of sales in 2000 to 11% last year, and profit after tax from -0.6% to 1.3%. Return on capital increased as a result, from 8.9% to 10.5%, and return on equity from -2% to 4.2%. The equity ratio dropped slightly, however. Working capital provided by operating activities soared, rising 55% between the years, and its ratio to turnover went up to 7.3% in 2001.

Book value of financial expense increased very sharply between the years due to large exchange rate losses, from 3.5% of turnover in 2000 to 4.8% last year. In light of last year's exceptional exchange rate conditions, this high level of financial expenses does not give a realistic picture of the long-term position of businesses. EBITDA and working capital from operations present a better picture of their performance in this respect.

There was no sizeable difference in profitability between export companies and those in domestic sectors. EBITDA for export companies was 11.4% but for domestic market companies 10.3%. Exporters clearly improved their position, while that of domestic market companies weakened. At export companies, profit before tax switched from being negative in 2000 to 1.3% last year, while profit decreased among domestic market companies. The overall improvement in profitability is therefore derived solely from export companies and the profitability of companies in the domestic market deteriorated somewhat last year. Profitability improved most among fisheries companies, where EBITDA reached a record level, at more than 28% of turnover. On average, EBITDA has been in the range 15-18% for the past 6 years. It is interesting to note that fisheries companies swung around from a loss to 2.6% profit after tax, as a ratio of turnover. EBITDA of oil companies rose from 7.4% in 2000 to 9.6% last year.

Table 4 Company profits 2000-2001

Profit before depreciation and financial items (EBITDA) and profit after tax as percent of turnover

	EBITDA/turnover		*Profit after tax/turnover*		*Equity/total assets*		*Net profit/turnover*	
%	*2000*	*2001*	*2000*	*2001*	*2000*	*2001*	*2000*	*2001*
Fisheries	17.7	28.2	-8.6	2.6	28.0	27.8	10.3	20.4
Manufacture and production	13.2	13.5	2.7	6.0	38.1	36.8	9.5	11.3
Oil distribution	7.4	9.6	0.8	2.5	36.4	37.7	5.2	6.1
Seafood exporters	2.1	3.3	-0.9	0.9	15.9	16.6	0.8	1.7
Transportation	9.6	5.1	-0.8	-3.7	28.1	22.9	4.2	4.3
Software	9.6	1.2	5.4	-7.6	34.8	27.8	4.2	-2.4
Services, retail, construction	9.2	12.6	10.8	2.1	39.6	38.3	13.3	9.4
Total	9.2	11.0	-0.6	1.3	31.1	30.5	5.9	7.3

Profitability of the six listed IT companies was poor last year. Their EBITDA was close to zero, with a considerable loss after tax.

Exchange rate developments this year confirms the Central Bank's assessment of last year's depreciation

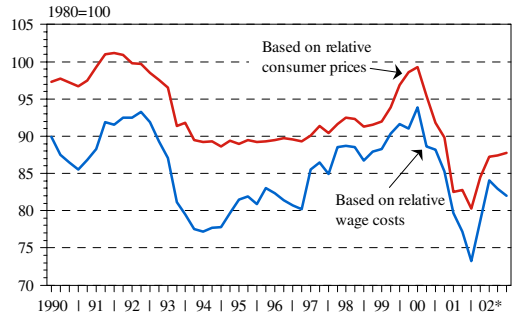
Last year the Central Bank persistently claimed that the weakening of the króna after it was floated at the end of March 2001 and until the end of November was largely unwarranted by economic fundamentals in the long run. Admittedly the depreciation could be explained by imbalances in the foreign exchange market which stemmed from the current account deficit and other currency outflows, with the swing intensified by expectations and lack of confidence. Nonetheless, the depreciation was considerably in excess of what was needed to achieve external and internal balance in the economy. The real exchange rate in the fourth quarter was almost 15% below the 10-year average and there were various other arguments in favour of it appreciating in the medium term. The question was above all whether this would happen through an appreciating nominal exchange rate or through higher inflation.[7]

In this context it should also be borne in mind that the decrease in the current account deficit is not solely explained by the lower exchange rate. A contraction in national expenditure is also involved. While partly brought about by the depreciation of the króna it is also the result of the Central Bank's tight monetary stance and the inevitable reversal of household and corporate expenditure that had reached such high levels by means of relentless and unsustainable accumulation of debt and hence was bound to come down regardless of any exchange rate adjustment. The real exchange rate was already relatively low in the first quarter of 2001 and there were no indications that the exchange rate was an obstacle to export growth in sectors not subject to supply constraints. Nevertheless the depreciation of the króna since then has further stimulated exports, thereby reducing the current account deficit. The lower exchange rate also played a part in reducing imports, both by yielding lower real revenues than otherwise and also by making imports relatively more expensive.

The real exchange rate reached a historical low in Q4/2001, measured against either relative prices or wages. The real exchange rate in the second quarter of this year is expected to be about 8½% higher than then, based on relative prices, and almost 15% higher based on relative unit wage cost. It will then be approaching the level of the first quarter of last year, before the largest depreciation occurred. Measured against relative prices, the monthly real exchange rate was similar in April 2002 to April 2001. During the second quarter of this year, the real exchange rate in terms of relative consumer prices and unit labour costs will be 7% and 2% respectively below a 10-year average.

Chart 13

Quarterly real effective exchange rate of króna
1990-2002



* Forecast for 2002:2-4. *Source:* Central Bank of Iceland.

The swift decline in the current account deficit prompts a number of questions. Firstly, it can be asked whether this is due more to a contraction in investment, following a pronounced upswing, or to growing national saving. Secondly, it is interesting to see whether export growth or a decline in imports plays a larger part in this turnaround. Thirdly, it is important to appreciate the role played by exchange rate changes in the adjustment process, because if they have a decisive effect and if the exchange rate goes on strengthening, the reduction in the deficit could arguably be short-lived. Table 5 shows that

7. In the *Monetary Bulletin* published in November it was stated that it was impossible to make a short-term forecast for the level of the exchange rate (p. 1-2) but the Bank's view reiterated that "the real exchange rate of the króna is now much lower than the expected long-term equilibrium exchange rate, and will therefore increase in the near future. However, it is uncertain when this will take place and to what extent it will come about through a higher nominal exchange rate of the króna or higher inflation than among trading partner countries."

changes in the ratio of investment in GDP and in national saving played a fairly similar part in both the formation of the current account deficit and the contraction in it. The drop in national saving, however, contributed more to the formation of the deficit, while increased saving will play less part in its contraction, if the NEI forecast for 2002 turns out to hold, as Table 5 shows.

Table 5 Impact of changes in the investment ratio and the saving ratio on the current account

Share in total change in the current account (%)	*1997-2000*	*2000-2002*
Change in investment ratio	45.6	61.4
Change in national saving ratio	54.4	38.6
Total	*100.0*	*100.0*
Change in current account (% of GDP)	-8.4	8.1

From 1997 to 2000, the current account deficit was largely due to increased imports. However, if it shrinks as forecast between 2000 and 2002, it will be largely due to a rise in exports, which rose by 7.6% last year, compared to a 3% rise in GDP. Falling imports nonetheless account for almost two-fifths of the contraction, primarily due to declining private consumption.

Table 6 Contribution of exports, imports and factor income to changes in the current account

Share in total change in the current account	*1997-2000*	*2000-2002*
Exports	16.3	68.6
Imports	70.7	38.5
Factor income account	8.0	-12.0
Other contributing factors	5.0	4.9
Total	*100.0*	*100.0*
Change in current account (% of GDP)	-8.4	8.1

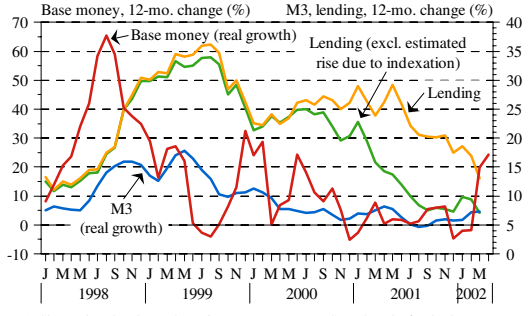
The extent to which the changes in imports and exports entail a response to changes in the exchange rate is unclear. In the fisheries sector, the quota system limits the responses, and insofar as fisheries companies may have reacted by selling from inventories, this would not be permanent growth. The case may be different regarding export of services, e.g. tourism. Of all the export sectors, the growth in services has had the strongest impact on bringing down the current account deficit. It is difficult to distinguish between the contribution to the fall in imports of the exchange rate, real incomes and certain degree of saturation, after the preceding wave of investment and durable goods consumption. Because a considerable share of imports of consumer goods consists of consumer durables, consumption of which always contracts more than other goods during a downswing, it can be assumed that a sizeable decline in imports would have taken place anyway without the lower exchange rate, even though the depreciation speeded up the adjustment, not least because a large depreciation of the exchange rate is accompanied by a drop in real wages and affects expectations.

Growth of broad money is still in excess of equilibrium growth

Despite a noticeable contraction in domestic demand, broad money (M3) has hitherto been growing faster than is compatible with stability and low inflation in the long run. Over the twelve months until the end of March, M3 increased by 15.3%, or by 7.3% in real terms relative to the rise in the CPI over the same period. For the first three months of this year, M3 grew at roughly the same rate as in the same period the year before, or at an annualised rate of 22%. In real terms the rate of growth is higher than last year, even though prices rose faster during the first quarter of 2001 than at the same period this year. A strong

Chart 14

Real growth of M3 and base money[1] and nominal bank lending growth January 1998 - April 2002



1. Changes based on 3-month moving averages. *Source:* Central Bank of Iceland.

correlation exists between the long-term growth of broad money and the growth of nominal GDP, which may be regarded as the sum of output growth and inflation. On first impression the strong growth in M3 could be seen as a cause for concern, signalling either that the output gap is hardly closing, contrary to what most other indicators suggest, or that more inflation is in store than recent forecasts indicate. Thus the 5-6% growth of M3 in real terms for most part of last year suggested that the economy grew not as slowly as had widely been thought around the middle of the year, and according to latest estimates it grew by 3%. However, changes in the money stock over a short period need to be interpreted with caution. The recent large increase in broad money could be consistent with less demand and a narrowing output gap, if it represents greater saving initially channelled through bank deposits, which constitute the bulk of M3. Supporting this interpretation is the fact that, measured either over the past twelve months or so far this year, growth in deposits with deposit banks has largely been in indexed and other tied savings. Further support for this interpretation is shown by the fact that base money, which is the best yardstick of Central Bank liquidity supply, decreased in real terms until it suddenly leapt in March. This has in fact been cancelled out in April, although this does not show up in the moving average series in Chart 13. Coupled with relatively high money market interest rates, this does not suggest that the rise in broad money can be traced to an excessive growth of money supply on the part of the Central Bank. Growth in broad money should therefore decelerate in the next few months as income growth and inflation slow down. Amortisation of corporate foreign debt and greater household saving outside the banking system, in the form of debt repayment or increased investment in securities, should also have the same effect. It could therefore be a warning sign of higher growth in nominal GDP in the near future, or a lower level of household and corporate saving, if this does not occur.

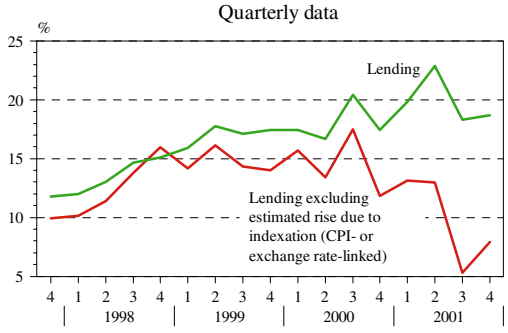
Deposit banks' credit expansion has stopped

Alongside the depreciation of the króna and higher inflation in recent months, the deposit banks' loan stock has risen irrespective of whether they were granting new loans, as the nominal value of indexed or foreign currency denominated loans changes in pace with the relevant currencies or indices. Correcting for these factors, the 12-month growth in lending by deposit banks fell steadily last year and by the end of 2001 it was less than 7½%. This trend has continued in 2002. Recently, however, the króna has strengthened and the CPI has shown little increase so far this year. In nominal, annualised terms, lending by deposit banks dropped by 4% in the first quarter,

Chart 15

Credit system lending 1997:1 - 2001:4

Quarterly data



Source: Central Bank of Iceland.

but adjusting for currency and price level changes the credit expansion was close to 2½% in annualised terms. The credit expansion at deposit banks has therefore come to an almost complete halt.

Looking at the credit system as a whole, it is still not clear whether the same can be said. Other credit institutions, for example, took up the slack that formed in the deposit banks' lending growth last year. For example, pension funds' loans to members increased by almost 28% over the twelve months until the end of February, which corresponds to 17% growth in real terms.[8] The rate of increase seems to have slowed down somewhat in recent months, however, to an annualised rate 12% above inflation. Lending by the Housing Financing Fund has also increased heftily, by 19% last year, or more than 9½% in real terms. Overall, lending by the credit system rose by 18½% last year, and by almost 8% excluding exchange rate and inflation adjustments. In contrast to the deposit banks, these figures imply

8. Part of this increase is probably because loans on less favourable terms have been converted.

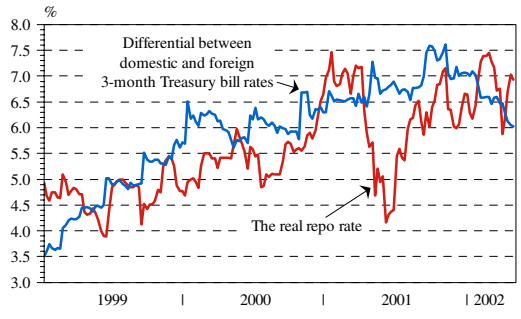
that lending by the credit system has increased somewhat since autumn. At the end of September the twelve-month rise was 17½%, or almost 5½% excluding exchange rate and inflation adjustments. This is admittedly a lower rate of lending growth than was seen in 1998-2000, but still higher than can be expected when excess demand and the positive output gap have disappeared.

Monetary policy continues to be tight despite policy rate cuts in March and April

The Central Bank announced a cut in its policy rate, by half a percentage point to 9.6%, on March 26. At that time, the inflation premium on treasury bonds with a maturity of approximately 1½ years was 3.1%, and had in fact been rather lower for most of February and until mid-March. In terms of the inflation premium, the real policy rate stood at just under 6½% after the cut, or at a similar rate as when the inflation forecast for the last *Monetary Bulletin* was being completed. The fall in the inflation premium in February and part of March pushed the policy rate in real terms past 7% for a while. The premium dropped sharply after mid-April following an encouraging CPI measurement and the strengthening of the króna. On April 23 the premium dipped below 2½%, sending the policy rate in real terms back above 7% once more. The Central Bank then announced a reduction in its policy rate of 0.3 percentage points on April 30, bringing the interest rate down to 9.3% from May 7. Nonetheless, based on the inflation premium at the end of April, the policy rate in real terms was then still just above 7%.

Chart 16

Weekly short-term interest rate and the differential between domestic and foreign rates 1999-2002



Source: Central Bank of Iceland.

The inflation premium on treasury bonds is not an incontrovertible measure of inflation expectations and thereby of the policy rate in real terms. The premium fluctuates more over a short time than the long-term inflation outlook can be expected to change. An alternative measure of the policy rate in real terms, and thereby of the monetary policy stance, is to use inflation forecasts. The forecast presented above suggests inflation of 3.2% one year ahead. If this holds true, the policy rate in real terms at the beginning of May was 5.9%, compared to 6.1% at the beginning of February. Assuming that the neutral real interest rate is hardly above 4%, the monetary policy stance is still rather tight by this criterion, and the policy rate is still some way from being neutral (see Box 5 on the Taylor Rule).

Regardless of whether it is measured against the inflation premium on treasury bonds or the inflation forecast, the monetary stance has eased relatively little despite the cuts in Central Bank interest rates in March and April. Reinforcing this conclusion is the fact that the exchange rate of the króna on which the current inflation forecast is based is 5.1% higher than in the February forecast and 2.8% higher than when the Bank announced the cut at the end of March. This strengthening of the exchange rate has taken place despite a drop of one percentage point in the nominal interest rate differential with abroad since the beginning of the year. Countering this is the recent reduction in money market interest rates over and above the Central Bank's cut, which has a similar effect to easing the monetary stance. The rise in share prices, whereby the ICEX Main List stood 7.1% higher at the end of April than at the end of January, compounds this effect. Indexed interest rates have still not come down despite the poorer growth outlook. In fact, interest rates on 25-year housing bonds and 15-year government bonds was somewhat higher at the end of April than at the end of January, or 6% for housing bonds as against 5.8% in January, and 5.4% on government bonds as against 5.2%. On the whole, financial conditions should therefore not stimulate private consumption or investment.

The inflation forecast and analysis of the economic situation and outlook presented here support the conclusion that further reductions in the policy rate lie ahead in the next few months. The crucial points are that the forecast assumes inflation will be

well inside the tolerance limit before the end of this year, that the Central Bank's inflation target will be attained next year, and that all things being equal inflation will fall below the target over the next two years. Contributing to this development is a growing evidence of emerging slack in the economy. The signs of a contraction are indeed sufficiently strong to warrant an even lower policy rate than at present, if it were not for the past surge of inflation, which calls for a cautious approach to easing monetary restraint. The task of monetary policy in the immediate future will be to ensure that the inflation target is attained without causing deeper recession than necessary. The timing and scope of further interest rate cuts, however, will depend as ever on the future course of events. In the immediate weeks, it will be crucial to have uncertainties concerning wage contracts dispelled.

Box 5 Central bank policy decisions using Taylor rules

Ever since John Taylor (1993) demonstrated that the Federal Funds rate (the Federal Reserve interest rate instrument) movements over the period 1987-1992 could largely be explained by movements in inflation and the output gap, "Taylor rules" have become increasingly popular in theoretical and general discussion of monetary policy. One of the most common forms of the Taylor rule states that deviations of the central bank policy rate from an equilibrium interest rate, which reflects a neutral policy stance, are a positive function of deviations of inflation from the inflation target of the central bank and deviations of output from potential output. This equilibrium interest rate, on the other hand, is composed of the equilibrium real interest rate and the inflation target.

Formally, this simple Taylor rule may be expressed as follows:

$$i_t = (r^* + \pi^*) + \beta(\pi_t - \pi^*) + \gamma x_t$$

where i_t is the central bank policy rate, π^* is the central bank's inflation target, π_t is actual inflation and x_t is the output gap, i.e. output produced in excess of the production capacity of the economy. r^* is what is usually called the neutral, or equilibrium, real interest rate, i.e. the level of real interest that reflects internal and external balance in the economy. This is determined, among other things, by real factors such as the productivity of capital, the level of saving and the steady state growth rate of the economy. According to this simple rule, the central bank policy rate is determined by four factors. The first two are the equilibrium real interest rate and the inflation target. Together, these provide a benchmark recommendation for the central bank's nominal policy rate. The third factor adjusts this benchmark for the degree to which inflation deviates from the target. If inflation exceeds the target, the rule recommends raising the policy rate above the benchmark and lowering the policy rate below the target if inflation is below the target. Finally, the benchmark is adjusted for the degree to which actual output deviates from potential output. If there is a positive output gap, the factors of production are overutilised with a greater risk of inflation. The rule recommends raising the policy rate above the benchmark in this case. The opposite applies when the output gap is negative. When inflation is equal to the inflation target and output equal to potential, the central bank's equilibrium nominal policy rate, according to the rule, is the sum of the equilibrium real rate and the inflation target. This interest rate can be considered neutral in the context of the rule.

In order to be able to use the Taylor rule, the equilibrium real rate must be quantified, along with the response parameters for the inflation and output gaps. In his article from 1993, Taylor found that such a rule, where $r^* = \pi^* = 2\%$, $\beta = 1½$ and $\gamma = ½$, produced an amazingly accurate description of the Federal Reserve's interest rate decisions over the period 1987-1992. It seemed incredibly that such a complex process as US monetary policy decisions could be described with such a simple rule. Other research has followed, showing that this same rule also seems describes the behaviour of other central banks (e.g. the Bank of

England after it adopted inflation targeting, Nelson (2001), and the central banks of Japan, Germany, France and Italy, Clarida, Galí and Gertler (1998)). Since this rule has been able to describe periods when monetary policy decisions have been considered successful, there has been growing support for the view that Taylor's rule, or some variations of the simple rule, provides a good rule recommendation for monetary policy decisions.

The choice of suitable parameters for the Taylor rule probably depend on time and place. Thus it can be argued that an economy like Iceland, which can probably grow faster in steady state than the larger and more developed US economy, would require a higher real interest rates in order to maintain economic equilibrium. The equilibrium real rate will therefore be higher than, for example, in the USA. The response parameters could also be different. It is, however, necessary that $\beta > 1$, in order for the rule to return a rate of inflation that is compatible with the inflation target. The reason is that β reflects the response of the nominal policy rate to an increase in inflation. If $\beta < 1$, the rise in the policy rate would never manage to offset the rise in inflation, so that the real policy rate would fall instead of rising. The Central Bank will therefore never manage to squeeze the excess demand that caused inflation to rise out of the economy, so that the inflation target will never be attained. In such a case the Taylor rule would be unstable and would not provide a nominal anchor for monetary policy.

Despite its many advantages, the Taylor rule also has various flaws which make it difficult to apply it directly as a guide for actual policy decisions. Firstly, it is really too simple to reflect all the information that central banks consider in their interest rate decisions. Central banks are likely to want to take advantage of other data which are not clearly reflected in the Taylor rule, for example concerning exchange rate developments, other asset price developments, and the development of money supply and lending. Secondly, it is unclear what the response parameters for the Taylor rule should be at any given time and there is considerable uncertainty about the actual value of the equilibrium real interest rate. Similarly, it is unclear what measures of inflation and output gap should be used in the rule, and what the timing of these variables should be. Inflation can be measured in many ways: e.g. using past 12-month changes or quarterly year-on-year changes, and likewise many price indices could be considered: consumer prices, some measures of core inflation and the implicit GDP price index. It is not clear either whether the contemporary value of inflation over a previous period, lagged inflation or forecast inflation should be used, and if the latter is used, how far into the future such a forecast should project. The same kind of questions arise regarding the output gap, which moreover is not measured but needs to be estimated using statistical methods. Major uncertainties accompany such an evaluation, reflected in frequent revisions of historical data on the output gap. Finally, it can be mentioned that the Taylor rule in its most simple form does not take into account the tendency of central banks to smooth movements in interest rates, which appears to be rooted in part in their role of safeguarding financial stability and promoting active financial markets, as well as reflecting their wish to implement interest rate changes in many small steps rather than one large one, due to uncertainty concerning the effects of policy changes on inflation and the output gap.

Due to these difficulties, central banks generally do not use the Taylor rule directly in their monetary decisions. However, the rule can prove useful in other ways. For example, central banks can use it as one of many internal tools in the interest rate decision-making process. The rule can be used as the starting point for the decision process, and as a benchmark to assess actual interest rate decisions which are based on all relevant information available in order to understand why actual policy decisions do not conform to the recommendations of the rule. By doing so, a central bank could strengthen its interest rate decision process even further. In addition, central banks can use the rule in their forecasting models and to assess the effects of different economic shocks on the economy, and of the policy responses that would follow. An example of the latter is the way the Central Bank has used the rule in assessing the likely monetary policy responses to the Reydarál aluminium project (see Appendix 1 on p. 28). Finally, central banks can use the Taylor rule as a convenient communication tool for focusing the discussion on monetary policy decisions and to educate the

general public and government about key issues on monetary policy, and to improve their understanding on the interest rate decision-making process.

To conclude, a few examples will be given to show how the Taylor rule can be applied. As a rough estimate, the equilibrium real interest rate in Iceland could lie between 3 and 4%, which is somewhat higher than is generally assumed for large industrial countries. Given the 2½% inflation target of the Bank, the neutral nominal policy rate lies between 5½ and 6½%. These numbers should give some indication as to where the Central Bank policy rate could head towards once the inflation and output gaps disappear.

Another example concerns the policy rate last year. At the time inflation exceeded 9% for a short period and the Bank's estimate for the output gap was 3%. Inserting these numbers into the Taylor rule produces a policy rate of around 17%, compared to the peak in the policy rate of 11.4% from November 2000 to the end of March 2001. Even using inflation over the year 2001, which was somewhat lower, gives a policy rate between 13 and 14%. Although these findings must be taken with some reservation, partly because they do not take into account the tendency of central banks to smooth movements in interest rates, they nonetheless underline that it is easier to claim that the Bank's policy rate was too low rather than too high last year, despite the widespread view to the contrary.

The final example presented here concerns the current situation. According to the newest forecasts, the output gap will be slightly negative this year. Underlying inflation in recent months is probably around 4%. The Bank's inflation forecast for one year ahead is just over 3%. Inserting these numbers into the Taylor rule produces gives a policy rate between 7 and 8½%. This gives some indication as to where the Central Bank policy rate could head in the months to come, when uncertainty concerning the labour market agreement have been dispelled and inflation decreases according to the Bank's forecast. It should be underlined that these calculations are only for demonstration. Actual monetary policy decisions and their timing are always based on a much more complex evaluation of the state of the economy, as discussed above.

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Appendix 1 The monetary policy response to the Noral Project

In February this year a question was put in parliament to the Prime Minister concerning possible Central Bank countermeasures to offset the impact of the Noral Project (to build an aluminium smelter and hydropower production facilities) on domestic demand and inflation (parliamentary document no. 726 – matter no. 455). The Bank's reply states that its policy interest rate would need to be raised somewhat initially and during the first half of the construction phase in order to dampen the demand pressure and inflation which would inevitably accompany such a shock to the Icelandic economy.

Despite the indefinite postponement of this project, the main ideas behind this answer deserves to be explained, as it reflects important factors that underpin monetary policy decisions at any time and will therefore reflect the Bank's response to other shocks which have as extensive an impact as the Noral Project was expected to have.

As the Bank stated in its reply, it did not have the opportunity to make an independent evaluation of the economic impact of the project within the assigned deadline, and it also lacked access to all the necessary data for making an independent assessment of the macroeconomic effects of the project. For these reasons, major parts of the Bank's reply are based on the National Economic Institute's (NEI) earlier studies of the project's impact on the domestic economy. It is important to bear in mind that the Central Bank took the NEI's findings as given and did not make an independent evaluation of them.

The Bank's calculations were therefore more or less based on the assessment by the NEI of the project's impact on inflation and the output gap, assuming unchanged fiscal and monetary policy stance. The Bank's task was then to evaluate the likely responses of monetary policy to the impact of the project on the domestic economy. The inflation and output gap developments calculated by the Central Bank are therefore not the same as those in the NEI's calculations. The main reason is that the NEI does not assume any monetary policy response, while the Bank's calculations allow for interest rate changes to affect output gap and inflation developments. However, as in the NEI model, no responses of fiscal policy are assumed. In the Bank's calcultions, monetary policy therefore always bears the brunt of responding to the shocks casued by the project. Had a fiscal policy response been allowed for, e.g. a cut in government expenditure for the duration of the construction phase, the monetary policy would not need to be as tight as shown here.

The evaluation of the monetary policy response to the impact of the Noral Project on the domestic economy used the Taylor rule, which is a simple description of the response by central bank policy rate to inflation and output gap developments (see discussion in Box 5 on p. 23). This rule states that a central bank will raise its policy rate above a certain equilibrium interest rate if inflation exceeds the Bank's inflation target and if there is a positive output gap, since the latter leads to greater inflation pressures in the future. The rule has been considered to provide a good description of interest rate decisions of leading central banks at a time of successful monetary policy implementation, and it is invariably used for estimating monetary policy response to different types of economic shocks.

Evaluation of the extent to which the Central Bank of Iceland's policy rate deviates from the equilibrium policy rate was based on the NEI assessment and the economy's responses to the Bank's interest rate changes, using the findings of a multivariant time series analysis of the impact of the Bank's policy rate on demand and inflation, as discussed in Thórarinn G. Pétursson's article in *Monetary Bulletin* 2001/4.[1] Those calculations assume that monetary policy first begins to exert an effect on demand and inflation after approximately one year, and that the effect gradually fades out and has more or less disappeared after 4-5 years.

In evaluating the Taylor rule, eight different variations of the rule were calculated for the Central

1. Thórarinn G. Pétursson, "The transmission mechanism of monetary policy", *Monetary Bulletin*, 2001/4, pp. 62-77. An Okun's law relationship with a parameter of 0.3 is used to produce a value for the effect of interest rate changes on GDP instead of employment.

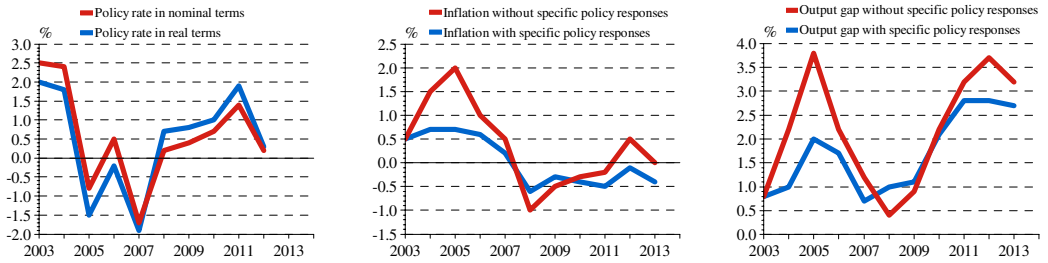
Bank's policy rates, based on different assumptions concerning the effects of the construction phase on output gap developments and the formation of the Taylor rule. Some estimates assumed that the construction phase would raise the output gap one for one, while others allowed for a temporary increase in potential output, e.g. due to temporary import of labour. In that case, the output gap was only assumed to rise by a half. Policy responses were either calculated using contemporary values of inflation and the output gap or a one year ahead forecast of these variables.[2] The calculations also allow for interest rate smoothing by the Bank, as suggested by theory and empirical results (see the discussion in Box 5).

Based on the average of different formulations of the Taylor rule using one year ahead values of inflation and the output gap, the Central Bank's policy rate would have needed to be about 2½ percentage points higher than in the baseline case over the period 2003-4. In real terms the Bank's policy rate would therefore be 2 percentage points higher than in the baseline case over this period. Because the baseline assumes a considerable economic downturn in 2007-8, the Bank would begin to ease its monetary policy stance after 2005 and over the period 2005-7 its policy rate would be on average roughly ½-1 percentage point lower than in the baseline case, which makes 1-1½ percentage points lower in real terms. In 2008, the monetary policy stance would gradually tighten again and over the period 2008-12 the Bank's interest rate would be on average about ½-1 percentage points higher than in the baseline, giving a 1-1½ percentage points higher policy rate in real terms.

As a result, the Bank would manage to bring down inflation and the output gap compared with the NEI results. Inflation would always remain within the ±1½% tolerance limit of the Central Bank's inflation target, while the NEI results suggested that inflation would temporarily exceed it. The Central Bank's response would also dampen inflation and output gap fluctuations considerably compared to the NEI results. The standard deviation of inflation in that case was around 1% over the period 2003-2013, but only ½% after taking the monetary policy

Deviation in Central Bank policy rates, inflation and output gap from the baseline case for 2003-2013

With and without specific monetary policy responses to the impact of the Noral Project



responses into account. The standard deviation of the output gap in the NEI calculations is around 1.2%, but 0.8% after allowing for the monetary policy responses.

The chart shows the development of the Central Bank's policy rate in nominal and real terms compared to the baseline case, the deviation in inflation and output gap from the baseline according to the NEI's calculations, where no specific monetary policy responses are assumed, and the calculations de-

2. It should be noted that these are not true forecasts, as the calculations assume that the Bank has perfect knowledge concerning the future developments of inflation and the output gap. The results suggest that by responding to future variables instead of considering contemporary ones, the Bank will be more successful in smoothing movements in inflation and the output gap. In reality, the Bank does not possess such information, so it is unclear which type of policy response will give better results. Research seems to give conflicting results, but in general the Taylor rule is defined on the basis of contemporary aggregates, which are usually considered to be good for forecasting their future developments. See further the discussion in Box 5 on pp. 25-27.

scribed here, which take into account possible monetary policy responses.

It needs to be borne in mind that these calculations only meant to give an idea about the the possible monetary policy responses to a shock on the scale of the Noral Project. In reality, the Central Bank needs to look at far more data than is reflected in the simple Taylor rule which is used to calculate the policy responses reported here. Nonetheless, these findings suggest that projects such as Noral would entail considerable pressure on monetary policy, especially if they were not followed by fiscal policy measures to reduce demand pressures which inevitably accompany a project on such a scale. For the first years, monetary policy is tackling a conventional demand-driven expansion, i.e. where inflation and the output gap increase. The policy response is also conventional: the monetary policy stance is tightened and interest rates are raised while excess demand is eliminated from the economy. Given the lags in the transmission mechanism, however, the Central Bank clearly needs to begin to tighten its monetary policy stance somewhat before the actual construction phase begins, in particular if this has an effect on public expectations, which could cause an increase expenditure because of the project before actual work on it commences. According to the NEI's assessment, inflation pressures decrease considerably around the middle of the period, but increase again in the second half. Once again the monetary policy response is conventional. The stance is eased when the slack begins, then tightened when pressures build up anew. Due to lags, the Bank needs to be prepared to ease its monetary stance some time before the slack is formed, and to tighten it again before new pressures are formed. This is easy to incorporate into simulations such as these, where the Bank has full knowledge of the timing and magnitude of the business cycle. In reality this would obviously be much more difficult to deal with and there is a risk that it would put monetary policy under great strain.

It should be reiterated that these results are subject to great uncertainty. The effect of the project would depend to a very large extent on the state of the economy at the time when the construction phase begins, and on other external effects experienced by the economy for its duration. If sizeable pressures exist in the domestic goods and labour markets when the construction phase commences, the effect on domestic price and wage developments could be much stronger than shown here.

Similarly, great uncertainty surrounds the basline case on which the NEI findings are based. The major turnaround envisaged in its results for the middle of the period, with a considerable fall in inflation even though a positive output gap is still present, cannot be considered particularly credible. The fact that the results reported here by and large build upon this assessment inevitably affects the calculations shown here.

There is likewise much uncertainty about the impact of interest rate decisions on inflation and the output gap, and the timing of these effects. The less the effects of monetary policy actions, or the longer they take to be transmitted, the more that interest rates clearly need to be altered. Furthermore, it should be mentioned that the calculations do not assume any fiscal policy countermeasures. If such measures are taken, monetary policy is likely to come under less strain than described here.

One of the greatest uncertainty, however, concerns the effect that construction work on the project and the subsequent monetary policy measures would have on the exchange rate of the króna. The NEI calculations assume an unchanged exchange rate, which must be considered highly unlikely although admittedly it is extremely difficult to assess what the effect would actually be, to say nothing of timing it with any degree of certainty. For example, the exchange rate of the króna could rise substantially early on during the construction phase, then depreciate afterwards. These exchange rate swings would probably have a considerable effect on the real exchange rate and the competitive position of the export sector and import-competing industries. In turn, this would probably have a sizeable impact on the NEI's calculations, and on the calculations shown here.

Finally, it should be pointed out that the NEI calculations and those shown here do not assume that the project will have any special impact on public expectations. Taking such effects into account, it is conceivable that the project, and thereby the monetary policy response to it, will have a somewhat different impact from that assumed here. One example could be that expectations of a positive income shock could serve to increase demand in the economy by

more than the equivalent of the direct impact of the construction phase, and this effect could be felt before the actual construction work begins. The monetary policy stance could therefore need to be even tighter than stated here. It is important to bear in mind the enormous scale of this construction project, and the difficulty of evaluating its effects using models based on historical data, since there is little in the way of precedents. Nobel Prize winner Robert Lucas, for example, has pointed out the limitations of conventional macroeconomic models for assessing the impact of economic shocks which are likely to have a major impact on public expectations.