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MONETARY POLICY IN THE NORDIC COUNTRIES: EXPERIENCES SINCE 1992

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Foreword

Among the countries most affected by the European currency crisis of 1992–93 were the five Nordic countries. Some were forced to float their exchange rates and others experienced marked changes in their competitive position. The currency crisis also called for changes in the formulation and implementation of monetary policies in the Nordic countries and a search for alternative and credible nominal anchors.

Against this background, the BIS invited representatives of the five Nordic Central Banks to a one-day meeting on monetary policy in the Nordic area and the experiences since 1992. To stimulate the discussion, each of the Nordic banks were asked to produce a background paper focusing on the principal forces behind the developments in output and inflation since 1992, the role of macroeconomic policies, and the major considerations behind, or constraints on, the formulation and implementation of monetary policy. To broaden the discussion, representatives from five other central banks were also invited to act as "lead discussants" of the background papers.

As the participants felt that the issues discussed at the meeting were of interest to a broader audience, the five background papers are presented on the following pages, together with the discussants' comments and two contributions from the BIS staff. I hope they will be of value to analysts and policy-makers who may be considering similar questions in a different context.

Andrew Crockett
General Manager

Participants in the meeting

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Monetary policy in Denmark since 1992

Anders Møller Christensen and Jacob Topp

Background

As a point of departure it is worthwhile to put the environment for Danish monetary policy into a slightly longer perspective than indicated by the title.

In the 1970s and into the 1980s economic performance was clearly unsatisfactory. Unemployment was increasing rapidly, in particular if one abstracts from an early retirement scheme introduced in 1979, government deficits were approaching 10% of GDP, the current account of the balance of payments showed a chronical deficit of between 2 and 5% of GDP, inflation was running at double digit numbers, and living standards were rapidly deteriorating compared to most of our neighbours.

In retrospect, economic policy in those years was dominated by short-termism. Wages were set by agreement between the partners in the labour market in an environment of wage indexation. In principle, a fixed exchange rate policy was pursued, although the krone occasionally, in periods even frequently, was devaluated against the Deutsche mark in the snake and from 1979 onwards in the ERM. Keeping a high level of employment was considered a government responsibility respecting the fixed-exchange-rate and wage-setting behaviour. In practice this led to a growing share of the public sector in the economy, with taxes lagging somewhat behind expenditure. Government debt increased rapidly and interest payments even faster due to higher nominal as well as real interest rates. The increases in interest rates went well beyond the international trend of the period (Charts 1–4).

In 1982, a rather radical change in policies took place after a shift in government. It deserves to be mentioned that some of the initiatives in the preceding years pointed in the same direction, but were offset by other measures, thus leading to the aforementioned poor overall economic performance. It should also be mentioned that most parties in Parliament had government responsibilities before 1982.

Chart 1

Inflation rate

Percentage change in consumer prices

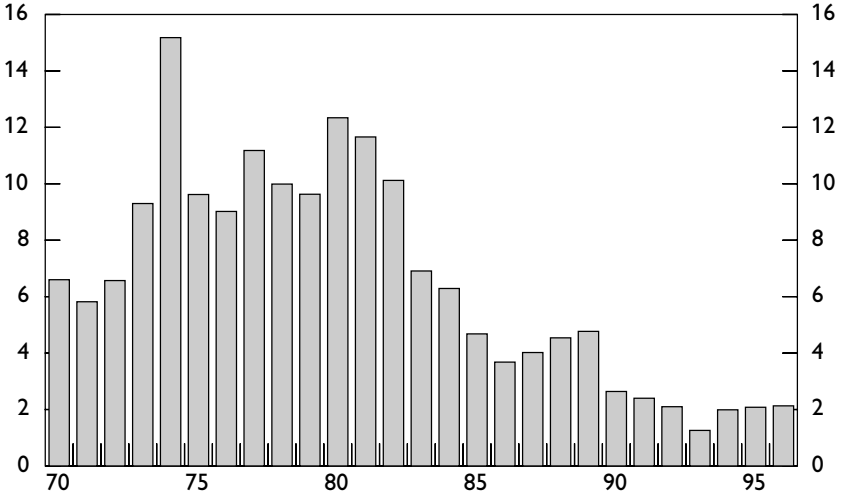


Chart 2

Current account

As a percentage of GDP

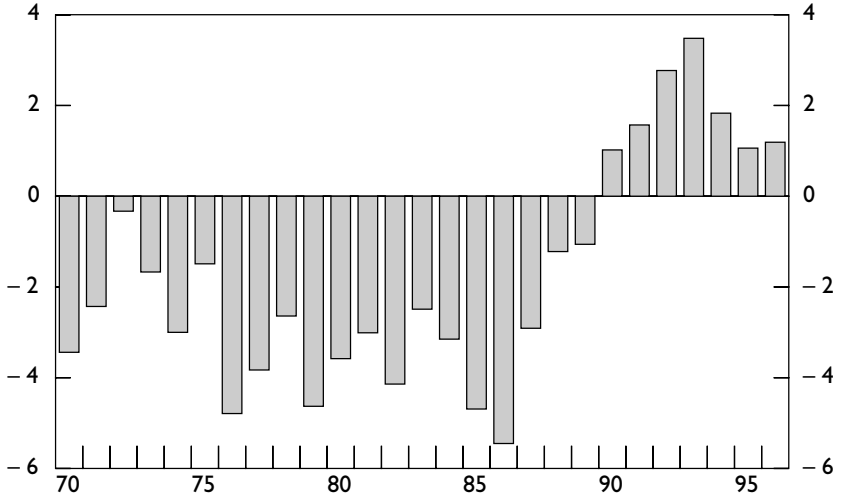


Chart 3

General government fiscal balance

As a percentage of GDP

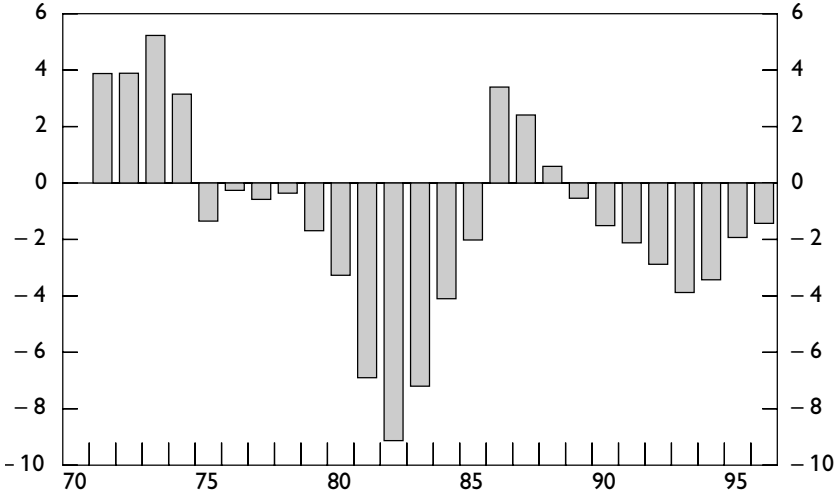
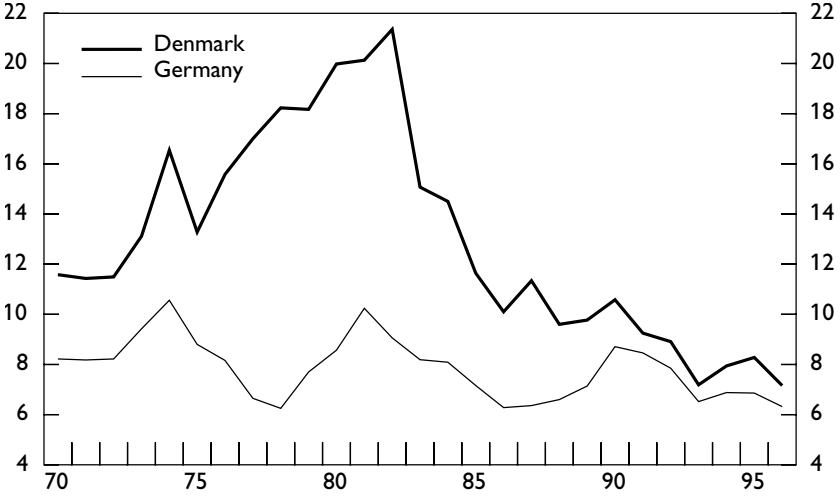


Chart 4

Long-term interest rates

In per cent



The measures taken in the fall of 1982 can be seen as falling in three broad categories:

- a commitment to a fixed exchange rate policy
- a law against wage indexation
- a significant tightening of fiscal policy.

Following the measures, long-term interest rates – dominating in Danish financial structures – fell rapidly as did inflation, leading to a sharp pick-up in domestic demand, declining unemployment, improving government finances, and an even bigger deficit on the current account than before.

It might deserve mentioning that the declared exchange-rate policy came to an immediate test as Sweden, our second most important trading partner, devalued its currency with as much as 16% within days after the Danish announcement. The Danish government stuck to its target and did not devalue the krone and, combined with the other measures, credibility increased rapidly. As witnessed by the comparative developments in GDP per capita (PPP) in Denmark and Sweden in the following years (and basically by any statistics) the decision made by the Danish authorities seems to have been wise. It should be underlined as well, that the strong activity in the mid-80s needs to be seen against a depressed point of departure and all the policy measures mentioned. In the academic literature there seems to be a tendency to attribute the decline in interest rates and thus the expansion of private demand to the fiscal discipline alone. The Danish experience has been seen as a documentation of the possibility that a fiscal tightening can prove to be expansionary even in the short run. However, the exchange rate policy and the wage policy are at least of equal importance for the increased confidence. Besides, fiscal tightening was to a certain extent "hot air" as a tax on the interest income of pension-funds was a big revenue maker that did not have any immediate impact on consumers' disposable income after payments to pension schemes. However, from a structural point of view, the tax on pension funds was important since it seems to have raised total savings of households that cared about their future living standards as the previous "free lunch" was removed.

The rapid deterioration of the current account forced the government to introduce additional fiscal measures and in late 1986 the housing market and private consumption started to decline. The structural factor seems to have been a tax reform starting in 1987 lowering the tax on

capital income – positive or negative – and thus the value of the full deductibility of interest payments, but temporary measures were taken into use as well.

The following years saw stagnant or declining domestic demand but, in technical terms, a recession did not take place due to a rather strong export performance. The current account turned into surplus after more than 25 consecutive years with deficits, the government deficit increased somewhat while unemployment reached unprecedented levels. The losses in the financial sector were significant, but manageable compared to those of the other Nordic countries and Danish financial institutions were well capitalised at the outset.

Development in the 1990s

(i) What were the principal forces behind developments in demand components, aggregate output and employment, and what was the role of macroeconomic policies in this respect? Is there any evidence of changes in the behaviour of households and firms? To what extent did financial institutions and developments in financial markets and asset prices affect overall demand?

Developments in early 1992 were dominated by domestic demand being stagnant for the sixth year in a row while export performance was rather healthy due to German unification and a good level of competitiveness. The impact of the tax reform of 1987 became increasingly visible, in particular in the housing market. In nominal terms housing prices in early 1992 were almost 20% below the peak in late 1986.

The impact of the depressed housing market was an increase in the household savings ratio as productivity, real wages and real disposable income increased steadily at a pace of around 2% per annum. It is a matter of definition whether this points to a change in savings behaviour as policies have changed the incentives.

In late 1992, Parliament passed a relatively expansionary fiscal bill for 1993 and in early 1993 a major change in government took place due to factors totally outside economics. The incoming government accepted the broad outline of the policy in the previous decade (in particular the exchange rate policy) but wanted to kick-start the economy via a

temporarily more expansionary fiscal policy and used an additional tax reform as the main vehicle for this purpose. Marginal tax rates were lowered, including the tax rate on capital income, the tax base was broadened, in particular via new pay-roll taxes, and environmental taxes were increased. The temporary nature of the stimulus was underlined by a timetable for future tightening, although only partially specified in detail.

Furthermore, there was a so-called conversion wave in Denmark from the summer of 1993 into early 1994 leading to lower interest payments for many households due to the decline in the international level of interest rates. During the conversion wave mortgage credit loans for DKr 300 billion were converted. The conversions as such did not lead to a credit expansion but stimulated borrowing from the mortgage credit institutions, particularly non-business lending. The development was supported by the liberalisation of lending regulations and the amendment of the taxation regulations for loans financed by issuing mortgage credit bonds below par in the summer of 1993. The drop in interest rates meant that new mortgage credit loans carried lower interest rate burdens than the old ones. Thereby the conversion wave generally raised households disposable income at the expense of the large institutional investors that were the primary holders of the bonds. Besides, the decline in interest rates led to higher house prices and thus increased household wealth. This contributed significantly to the upswing.

Broadly speaking, things turned out well (Charts 5–8). Domestic demand started to pick up, the current account deteriorated, but remained in surplus, the government deficit started to increase but only temporarily and in 1996 Denmark became the third EU country not having an excessive budget deficit. Unemployment declined rapidly, although to a large extent due to measures reducing the labour force (leave schemes, early-retirement schemes). However, employment outside the government sector also increased. By now, Danish unemployment is among the lowest in Europe, in particular if the harmonised Eurostat definitions are used (6% in 1996 against 10% in Sweden and 15.7% in Finland), and youth unemployment has basically disappeared, in sharp contrast to most other EU member states. The measures used against youth unemployment are difficult to fit into textbook presentations of macroeconomic policies. However, the main content is that for persons below the age of 26 it is impossible to receive unemployment benefits or welfare payments for more than a short period. If unemployed in that age

group cannot find a job themselves they are obliged either to accept a job that shall be offered by the municipalities or to start an education.

House prices started to pick-up in 1993, in retrospect at a 10% per annum rate and thus at a rate way beyond the general level of inflation. The pick-up in house prices came about primarily because of the upswing and the general drop in long term interest rates, which also brought along the conversions wave. Recently this has led to much higher residential construction and a fear of overheating in the construction sector. Since 1993 the stock market has been strong, abstracting from developments in 1994.

The breakdown of the narrow band in the ERM in 1993 and the preceding story of the ERM also influenced developments, maybe less in Denmark than in most other European countries. Looking at the level of business investment in Europe compared to GDP it seems justified to blame investment for the slowdown in 1995, as it did not reach normal levels relatively to GDP, and next to blame the unstable exchange-rate environment for the low levels of investment. In theory, unstable exchange rates increase uncertainty and thereby decrease the level of investment. In practice, the level of business investment in Europe has been low in recent years, in particular in countries with strongly depreciated currencies, such as Italy and Sweden. In practice, it seems to have been the case that in appreciating countries enterprises have reacted to the deteriorating competitiveness by lowering investment while enterprises in the depreciating countries have taken a wait-and-see attitude as they were uncertain as to whether the improved competitiveness was of a permanent nature or not. The importance of a nominal stable environment for the level of business investment rarely enters analysis of potential benefits from the single European currency even if the benefits go far beyond the lower costs of handling several currencies.

(ii) What were the major sources (external as well as internal) of price and wage inflation (or disinflation)? Did policies or changes in policy targets influence expectations of inflation?

Since 1992, Danish inflation has been stable around a level below 2% per annum. CPI inflation bottomed out at 1.3% in 1993 but increases since then have only been minor (2.1% inflation in both 1995 and 1996). Incidentally, inflation has consistently turned out to be lower than expected

Chart 5

GDP

1980 = 100

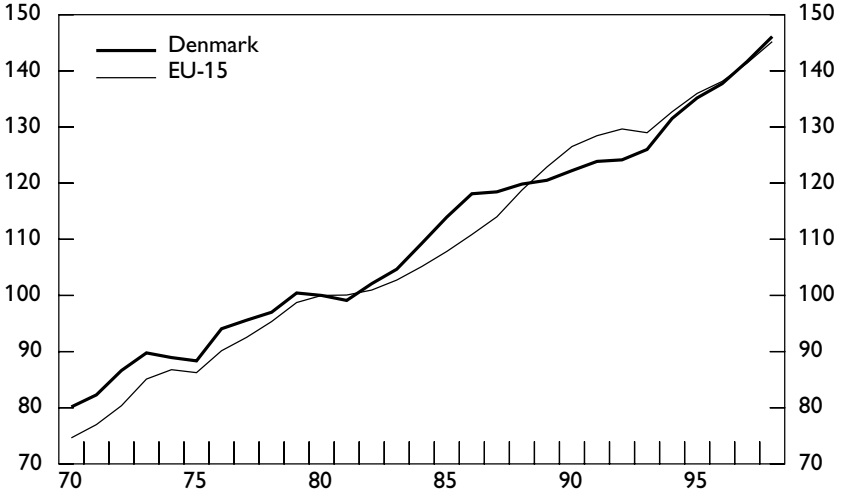


Chart 6

Total employment

As a percentage of the 15 to 64-year-old population

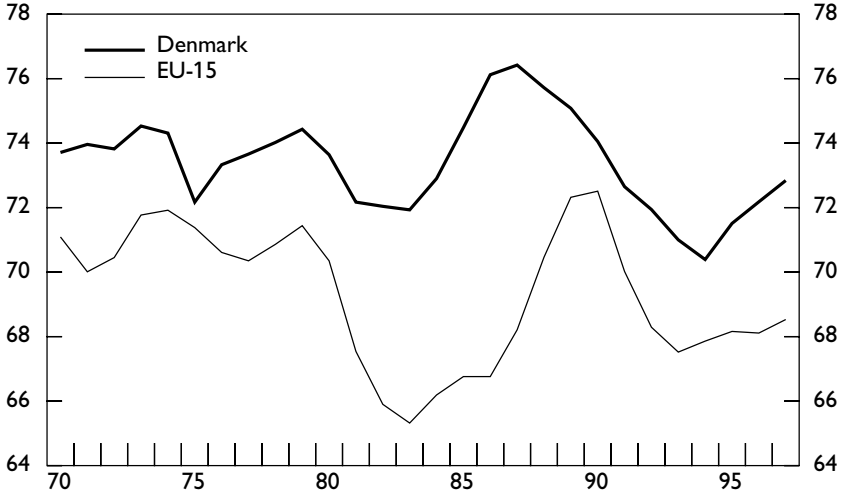


Chart 7

Unemployment rate

As a percentage of the labour force

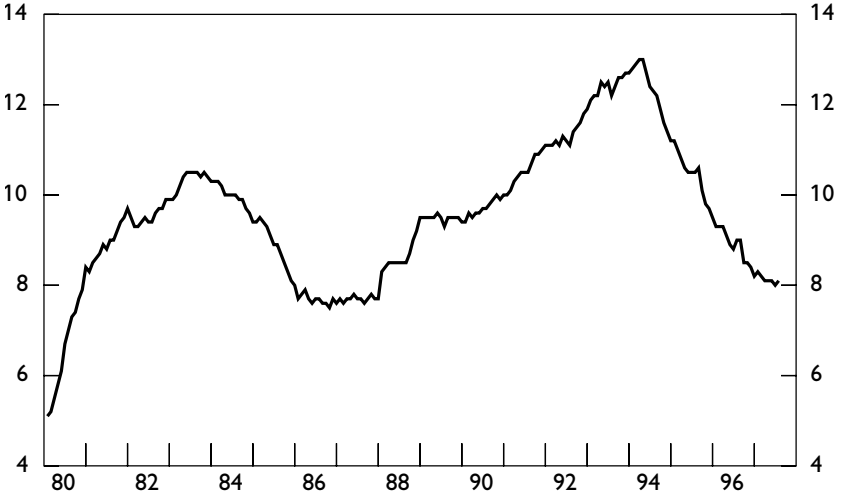
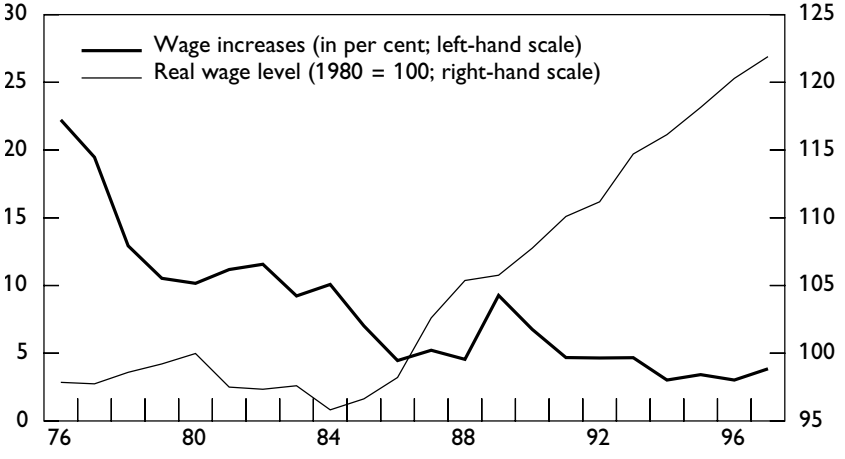


Chart 8

Nominal wage increases and the level of real wages



Note: Nominal wage increases are lagged two years.

by the majority of forecasters. This will be the case also in 1997 when CPI inflation will be of same magnitude as in the previous years.

The transition to a seemingly stable low inflation environment can to some extent be attributed to the exchange rate policy since 1982 – with unchanged parities against the strongest currencies in the ERM since early 1987. The exchange rate policy gives the partners in the labour market a stable nominal environment for their negotiations which, to a greater extent than before, are carried out at the plant level. Taking the rapidly declining – and by now low – unemployment into consideration it is obvious, however, that other elements have also played a role. Among economic policy measures, a band between an increased emphasis on preventing bottlenecks via education and the impact of the tax reforms seems to be of importance. From an econometric point of view no structural breaks in wage formation have been detected yet.

In the period under review, households' inflation expectations have been roughly unchanged. However, an attempt to quantify expectations points to expectations of inflation being consistently slightly higher than the outcome – as have been the case with almost all forecasts.

(iii) What were the major considerations in the formulation and implementation of monetary policy and were there particular constraints? Were there changes in operating procedures and, if so, to what extent were they induced by changes in the objectives of monetary policy (both final and intermediate) and by developments in financial markets and institutions ?

The central framework for the conduct of monetary policy in Denmark is the membership of the ERM and the government's commitment to exchange rate stability. Since 1982, the government has not used exchange rate adjustments in the ERM as a policy option. The exchange rate policy has gradually been defined as stability against other core currencies.

Before the widening of the band in the ERM in August 1993 the monetary policy objective was simply to keep the krone within the narrow band. The existence of the narrow band in reality made announcement of a more specific strategy superfluous. After the widening of the bands there was a need for clarification of the Danish exchange rate policy in the new environment. Reasons for changing the central parities against the core currencies were not seen, but for a period it had to be accepted

that exchange rates would fluctuate more than before. Summing up, the strategy of monetary policy as such was not changed, while measures had to adapt to the new situation.[1]

Accordingly, the unhappy decision to widen the fluctuation bands in 1993 to some extent required changes in policy reactions. Prior to August 1993 a movement close to intervention limits would normally trigger a stabilising speculation by the private sector but, in itself, did not trigger any response from the Nationalbank. Only if the krone came very close to the intervention margin were changes in official rates considered but official rates could, of course, also be changed for other reasons than exchange rate movements. Moreover, intramarginal interventions were not seen as part of the tool set. Radical measures had to be taken during the repeated speculative attacks before the breakdown and official rates were promptly raised significantly. When things calmed down short-term interest rates were normally lowered slowly and stepwise.

Since August 1993 it has become even more important to keep the exchange rate stable, because the Nationalbank now stands alone in the defence of the krone. However, it has been chosen not to announce or demonstrate the quite narrow bands in which the krone can vary (against the Deutsche mark) since this would imply a willingness to defend the announced limits "at all costs". The choice might best be described as a policy of "revealed preferences". The policy implicitly defines an exchange rate policy or strategy of maintaining a value of the krone close to the central parity against the core countries of the ERM and a policy of not changing the parities. This is not because the central parities are viewed as equilibrium rates per se but the central parities are the only reasonable and probably also the only credible benchmark values in the system with a ±15% fluctuation margin. In practice, the Deutsche mark, as the undisputed anchor of the ERM, is the most important benchmark to measure the exchange rate stability against. Germany is also Denmark's largest trading partner.

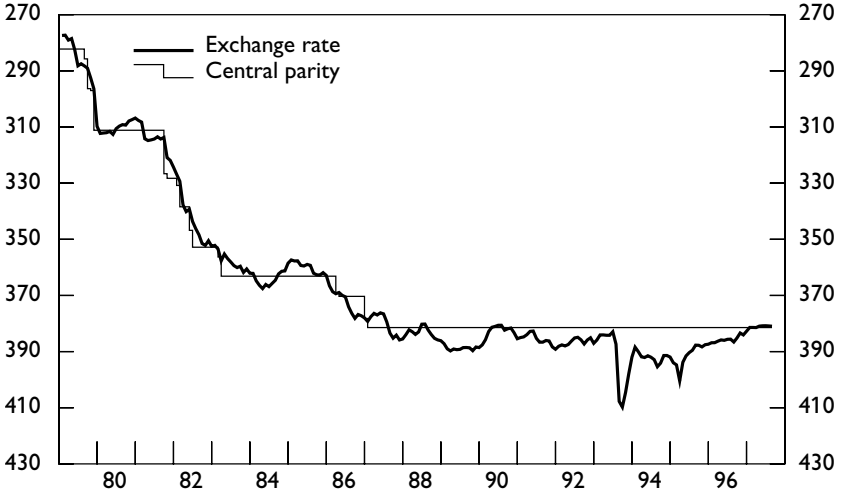
The breakdown of ERM did not change the hard currency option; but, at first, there was uncertainty about the proper way to react in the new environment. The problem was not the economic fundamentals but the new situation: The Nationalbank stood alone in the defence of the krone in an environment where speculative attacks were highly probable. In the

[1] See the statements from the Danish Prime Minister and the Nationalbank, reproduced in the Annex at the end of this paper.

Chart 9

Krone exchange rate vis-à-vis the Deutsche mark

Krone per 100 Deutsche mark

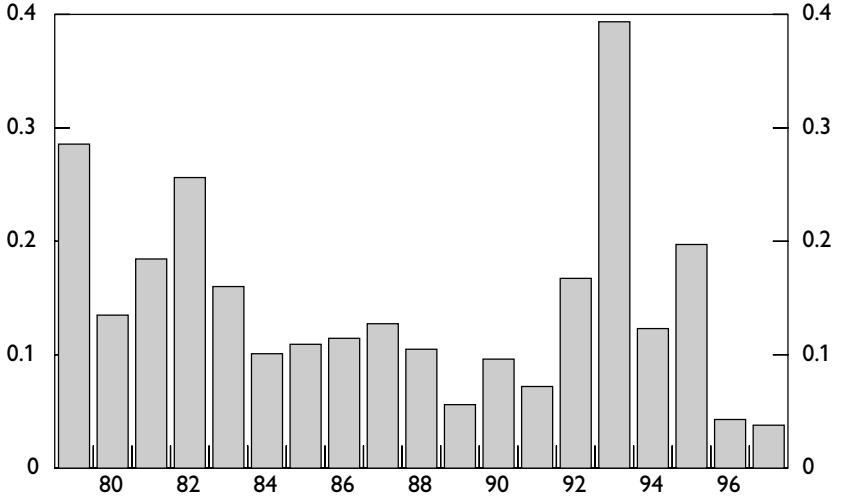


months following the breakdown the overall strategy was a combination of repeating the exchange rate policy to the public and maintaining the high interest rate differential towards Germany. The policy encouraged a strengthening of the krone and showed market participants that the hard currency option was still in place. Slowly the krone strengthened and the confidence of the Nationalbank in its own instruments grew. In periods of currency unrest market participants have also returned to the well known pattern of stabilising the krone exchange rate as short term interest rates increase before the Nationalbank takes action. The March 1995 experience might be seen as an example. From February to the beginning of March 1995, there was an almost worldwide currency unrest, and the krone weakened from about 3.94 per Deutsche mark to a peak of 4.06 per mark. The short-term interest rate differential quickly widened significantly. Official rates were only raised on 8th March.

The Nationalbank has also gradually refined the strategy of revealed preferences. Since the beginning of 1995, intramarginal interventions have been in extensive use to stabilise daily movements in the krone exchange rate. The volatility of the bilateral rate against the mark is now lower than in the heydays of the ERM (Chart 10).

Chart 10

Standard deviation of daily changes in the krone vis-à-vis the Deutsche mark



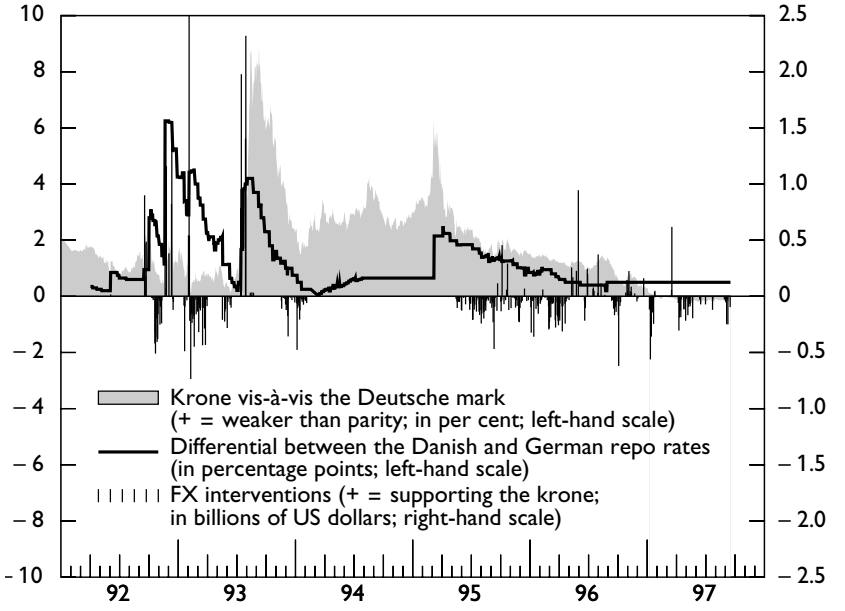
Note: The standard deviation is calculated on a series of daily changes for each year separately.

Decisions on changes in official interest rates will – as before the ERM-crisis – normally be triggered by either the exchange rate or changes in rates in other core countries. It might be pointed out that interest rate decisions today are perhaps made even more carefully than previously. This should be seen in connection with experiences in 1992 when official rates were lowered almost to German levels and where the krone weakened shortly after as a consequence of the general currency unrest. Also, the narrowing of the interest rate differential almost to zero towards the end of 1993 was followed by a gradual weakening of the krone against the mark. Chart 11 tries to illustrate the strategy in a compact manner.

Turning to the constraints, it is obvious that the effective krone exchange rate is not constant. However, this is not seen as a great problem, as the Danish public and the business sector in general understand that temporary swings in the effective exchange rate must be foreseen given the exchange rate policy. Perhaps more important, the Danish business cycle in general has differed somewhat from the continental European business cycle. From time to time this means that the levels of interest rates and effective exchange rates are not "correct",

Chart 11

Danish monetary policy measures and the krone exchange rate



Note: Interventions before August 1993 only took place if the krone was close to the intervention margin of a currency participating in the ERM. This is not illustrated by the chart since it only shows the krone's position against its Deutsche mark parity.

judged from the position in the business cycle. However, there is a broad understanding between the Nationalbank and the government that, if necessary, fiscal measures should compensate for these effects to reap the benefits of the fixed exchange rate policy.

The level of short-term rates is not a significant constraint. The financial structure in Denmark is dominated by long-term borrowing at fixed rates via mortgage credit institutions (up to 30 years). Thus the political pressure against taking what is considered the necessary steps to protect the exchange rate is only moderate. Occasionally, foreign investors have been complaining about the increased funding costs but these complaints are not a significant constraint on policy. It might be added that in times of (milder) currency unrest only the repo rate is raised, whereas the discount rate is often kept unchanged or is only raised slightly, so that only the professional money market is affected significantly.

In April 1992, the Nationalbank changed its monetary policy instruments in qualitative terms. Today the Nationalbank's monetary policy instruments resemble the instruments used in most EU countries but there is no automatic end-of-day overdraft facility and no reserve requirements. This means that there is no ceiling over day-to-day money market rates and that the day-to-day money market rate fluctuates quite considerably compared to most other European countries.

The present instruments comprise current accounts deposits, certificates of deposit and repurchase agreements. Prior to the adjustment in April 1992 individual banks had access to liquidity directly from the Nationalbank on an ongoing basis and at their own initiative, but subject to certain limitations. There was little activity in the money market, and a liquidity surplus or deficit was usually balanced directly with the Nationalbank. The Nationalbank also steered longer term rates because it acted as a market maker in Treasury bills. In the new system, on the other hand, the Nationalbank normally supplies liquidity to the banks only once a week as 14-day repurchase agreements. At the operations the Nationalbank enters into repo agreements (supplying liquidity) and sells central bank CD's (absorbing liquidity). This procedure ensures that:

1. The net size of the structural position of the banking system does not matter, since it is always possible to sell more CD's than repo's and vice versa.
2. The banks get CD's. The CD's can be sold with immediate liquidity effect, as opposed to ordinary repo transactions which only can be settled on a tomorrow-next basis or later.

As an extraordinary measure the Nationalbank may also supply liquidity during the week but, in general, the banks themselves must ensure that their total deposits with the Nationalbank are sufficient to cover the need for liquidity during the week. Since overdrafts at the close of the day are not accepted, the banks must settle liquidity among themselves. This settlement primarily takes place in the money market.

There were several reasons for the changes. The most obvious one was that the changes provided the Nationalbank an additional official interest rate (the repo rate). This enabled the Bank to influence money market rates in a more flexible and marked-based manner, without affecting banks interest rates towards smaller customers. Such a facility was called for because it became obvious that changes in the discount rate were "too powerful" an instrument for fine-tuning developments in

the money and FX markets. The change of instruments also helped to partly separate monetary policy from government debt policy, and meant that the Nationalbank no longer had to operate in the money market (Treasury bills) on an everyday basis.

An additional factor was the international tendency for banks to exercise restraint in providing uncollateralised loans to each other, which had already almost eliminated the deposit market. The Nationalbank's adjustment contributed to the transition from uncollateralised to collateralised money market transactions by creating the basis for a more broad-based repo market.

Finally it was also recognised that the adjustments would make it necessary for the banks to establish a more efficient day-to-day management of liquidity which would encourage a more widespread use of the money market.

In retrospect, the absence of automatic access to central bank liquidity helped the Nationalbank during the ERM turmoil in 1992 and 1993. First, the lack of automatic access to liquidity meant that money markets rates rose quickly as the Nationalbank bought kroner in the market, thereby, in itself, stabilising speculation even before official rates were raised. Second, because the instruments are symmetrical it was possible for the Nationalbank to buy enormous amounts of Danish kroner during the turmoil without creating a need for additional operations even though the net position of the banks turned from negative to positive.

(iv) Have there been major "surprises" during the last 4–5 years to which monetary policy had to respond. On hindsight, could policies have been conducted better?

It is evident that the breakdown of the old ERM system in 1993 represents a major surprise that monetary policy had to respond to. The response is described in the answer to (iii). Also the outcomes of the two Danish referendums on the Maastricht treaty in 1992 and again in 1993 might be described as such events, first of all because of the immediate effects. In a longer perspective the adoption of the opt in clause for the EMU – that was a part of the package at the second referendum and meant that Denmark will not participate in the EMU at least not from the beginning – have brought along a somewhat higher interest rate differential vis-à-vis Germany.

In assessing whether policies could have been conducted better several considerations could enter the discussion. Most important, it was in principle an option to abandon the hard currency policy in August 1993. This would, in retrospect, have been unwise and was in fact not considered in the first place. Other issues are of a much more marginal nature. Among issues for discussion have been the speed at which interest rates were lowered, and the pros and cons of announcing specific numbers for the exchange rate unilaterally.

Even in retrospect the answers to such questions are not obvious. In general it was a question of assessing potential risks and benefits. The answers turned out to be on the cautious side.

Annex

Statement by Governor Erik Hoffmeyer on 13th August 1993 on foreign-exchange-policy issues

As a result of the lack of political willingness to defend the Exchange Rate Mechanism of the EMS, France and Germany in reality suspended the ERM temporarily, leaving Denmark's exchange-rate policy without a safety net to support us in times of crisis for the first time in 21 years.

This gives rise to greater uncertainty in the market, thereby influencing expectations. Fortunately we derive some strength from the economic policies pursued in recent years. As mentioned on many occasions, our economy is one of the most stable in Europe.

Against this background the following issues are important.

1. The government and the Nationalbank agree that the present circumstances provide no grounds for changing the krone's central rate against the present core ERM countries.
2. An agreement on a considerable narrowing of the wide fluctuation margin temporarily fixed at ±15% will be sought under the auspices of the EC.
3. The uncertainty influencing expectations will entail considerably wider fluctuation in exchange rates during a transition period. As a result residents with foreign-currency-denominated debt, and non-residents holding krone assets, may wish to eliminate their foreign-exchange risk. This may gradually be offset by increased public borrowing abroad. This conversion will have no impact on Denmark's net debt.
4. These transition problems might for a short period weaken the krone more than the economic fundamentals would justify, but after this a strengthening can be expected. Under these circumstances monetary conditions will be normalised, resulting in a drop in the high inter-bank interest rates, but the possibility of lowering short-term interest rates will be limited for some time.

Statement by the Danish Prime Minister on 2nd August 1993 concerning the exchange-rate policy

The Prime Minister states as follows:

At the meeting of the EC Ministers of Economic Affairs and Finance and Central-Bank Governors it was agreed that the economic fundamentals gave no grounds for realigning the EMS exchange rates.

Against the background of recent considerable capital flows and foreign exchange interventions the negotiations resulted, however, in a temporary adjustment of the present exchange-rate system's two thresholds for obligatory marginal intervention purchases of foreign exchange to the significantly wider fluctuation margins of ±15%.

Denmark's economy is one of the strongest in Europe, with the lowest inflation rate in the EC, a substantial balance-of-payments surplus and a relatively modest budget deficit.

The agreed temporary adjustment of the ERM does not give any reason to revise Denmark's economy-policy objectives of reducing unemployment and ensuring a continuing low rate of inflation.

In the new situation the objective of Danish exchange-rate policy will be to maintain a stable exchange rate against the core EMS countries. The government hopes that before the end of the year agreement can be reached on a substantial narrowing of the temporary wide fluctuation margins for all EMS currencies.

(The Nationalbank's translation)

Comments on "Monetary policy in Denmark since 1992"

Santiago Fernández de Lis

Exchange rate stability has been the cornerstone of Danish monetary policy in recent years. It is particularly important in this regard to assess the impact of the widening of the ERM bands in August 1993 on Danish monetary and exchange-rate strategy. Denmark has always been a defender of the old system of narrow bands for understandable reasons. Before the crisis of 1992–93, Denmark tended to make greater use of exchange rate movements within the band, as compared to the other two Basle-Nyborg instruments (namely, interest rate movements and interventions). Denmark relied more than any other ERM country on the use of exchange rate movements, which proved to be stabilising due to the credibility of the limits. When the Danish krone tended to approach the fluctuation limits, self-stabilising capital movements pushed the exchange rate back towards the central parity. Even during the ERM crisis, when the limits proved to be destabilising for most currencies, the Danish krone seemed to enjoy greater credibility. However, on some occasions of generalised turmoil, co-ordinated intramarginal interventions by ERM central banks in favour of the Danish currency were necessary to avoid a realignment.

The widening of the bands to ±15% in August 1993 changed this environment. The results of this broadening of the formal limits were somewhat paradoxical: short-term volatility of the exchange rates has been reduced for almost all participating currencies, not only compared to the period of tensions (1992–93), but also in comparison with the previous phase of stability (1987–92) (see Graph 1). This was also true for the Danish krone, as can be seen in Chart 10 of the Danish paper. Another indicator of the – to some extent surprising – greater stability of the new ERM of wider bands, is the reduction of the effective width of the band, defined as the distance between the weakest and the strongest currencies (see Graph 2). For most ERM countries, the widening of the bands apparently reduced the destabilising impact of the limits and increased the stabilising effect of the central parities. In the case of Denmark, these

Graph 1

Average volatility of ERM currencies*

* Volatility of the exchange rate against the Deutsche mark: standard deviation of logarithmic first differences, multiplied by 1,000.

Source: Banco de España.

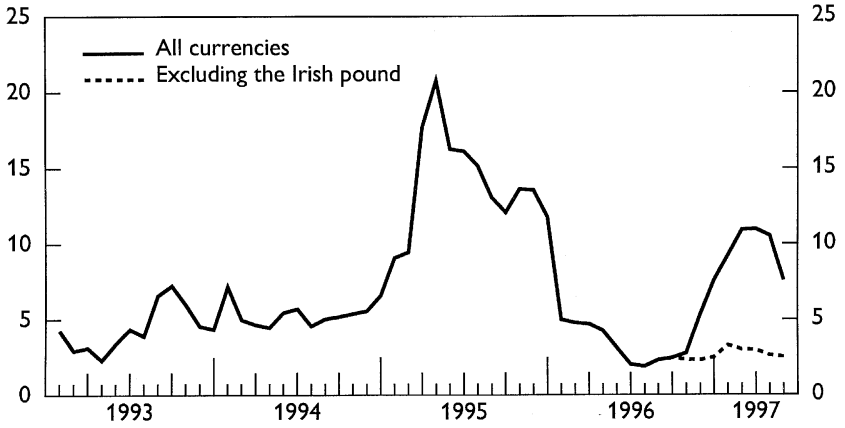
effects were possibly less clear, since the credibility of the limits was higher in the old system, though the data also seem to show some stabilising impact of the wider bands.

The performance of the Danish economy since 1993 has been very satisfactory: GDP growth accelerated, unemployment reached levels much lower than in other European countries, interest rates were reduced, inflation was kept low, the current account has been in surplus, the public deficit was reduced – which permitted a lowering of the debt ratio. Overall, this improvement in the economic climate seems to be mainly a result of structural transformations of the economy and appropriate economic policies. Nevertheless, one may wonder to what extent the widening of the bands also played a role in this economic performance.

The assessment of the working of the ERM with the old and the new systems is very relevant for Denmark. In the event of non-participation in EMU from the beginning, Denmark will face the choice, in the ERM-2, of either joining the standard wide band or trying to establish some kind of closer link with the euro area. In this decision, an appropriate assessment of the historical experience is crucial.

Graph 2

Width of the ERM band*



* Deviation between the strongest and weakest currencies of the ERM, measured as the percentage difference between their market exchange rate and bilateral central parity.

Source: Banco de España.

The reduction in the exchange rate volatility since 1993 has been parallel to an increase in interest rate volatility. It seems that there was some transfer of volatility between both variables. To what extent was this induced by a different use of the Basle-Nyborg instruments? Apparently, the Danish authorities have tended to rely more, since 1993, on the use of interest rates and on intramarginal interventions, and less on movements of the exchange rates. It is, in any case, difficult to compare the use of the exchange rate as an instrument with, respectively, a 2.25% and a 15% band. In relative terms, a 2% depreciation in the former system would be equivalent to a 13.3% movement in the latter, whereas in absolute terms the fact was that the Danish krone was able to depreciate as much as 8% in September 1993, much beyond the former limits, and to subsequently recover very close to the central parity. One may conclude that, in absolute terms, the use of the exchange rate movements was greater in the new system, whereas in relative terms it was smaller.

A very interesting idea developed in the paper relates to the appropriate policy reaction when there are differences in the business cycle with the anchor country. In the last few years, Denmark has been further advanced in the cycle which, under a basically fixed exchange rate policy,

has led to a level of interest rates which has been too low for the economy. This has required a tightening of fiscal policies which was quite successful in reducing the relatively high ratio of public debt and allowed Denmark to be among the few EU countries to meet the deficit criterion as defined by the Maastricht Treaty.

As mentioned earlier, the reduction of exchange rate volatility has possibly been related to the increase in volatility of short-term interest rates. One may wonder whether the new monetary policy scheme might also have played a role in this respect. A system of no reserve requirements with no possibility of overdrafts is equivalent to a zero reserve requirement with no averaging provisions. This system, which is very demanding for the banks' liquidity management, combined with a framework for intervention rates with a floor and a repo, but without an upper limit for market interest rates, might create some short-term volatility in these rates. In turn, this might present some advantages from the point of view of stabilising the exchange rate.

Monetary policy in Finland: experiences since 1992

Pentti Pikkarainen, Antti Suvanto, Juhana Hukkinen and Ilmo Pyyhtiä

This paper discusses monetary policy experiences in Finland since 1992. The paper starts with a discussion on general macroeconomic developments (Section 1) then focusing on inflation developments (Section 2). Changes in the monetary policy framework are discussed in Section 3. Finally, Section 4 draws some conclusions.

1. Macroeconomic development

1.1 Demand, output, employment and external balance

Finland's recession of the early 1990s left a problematic legacy for economic policy. At the start of 1993, aggregate output was at a level 14% lower than three years earlier. During the same period, the unemployment rate had increased fivefold, the ratio of public sector debt to GDP had increased fourfold, the ratio of net external liabilities to GDP had doubled and asset prices had decreased by 50%. Several exceptional measures, such as extensive bank support, were needed to overcome the crisis.

The severity of the recession is completely explained by a contraction in private consumption and private investment (Chart 1). The same demand components had fuelled the economic overheating of the late 1980s. This overheating increased the severity of the recession, because the subsequent fall in asset prices aggravated the financial position of overindebted households and firms. Moreover, the country's large foreign currency-denominated debt became a contractive factor when the markka weakened.

The Finnish economy began to pull out of the recession in the summer of 1993 largely as a result of rapid export growth. At the start, export growth was driven by the depreciation of the markka. Later, despite a substantial strengthening of the markka, competitiveness remained high owing to wage restraint and a jump in productivity.

Chart 1

GDP growth contributions, 1985–96

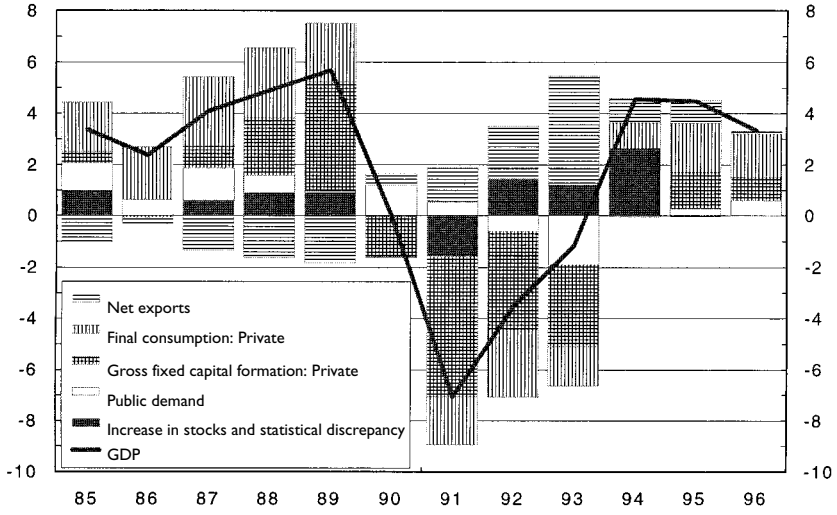


Chart 2

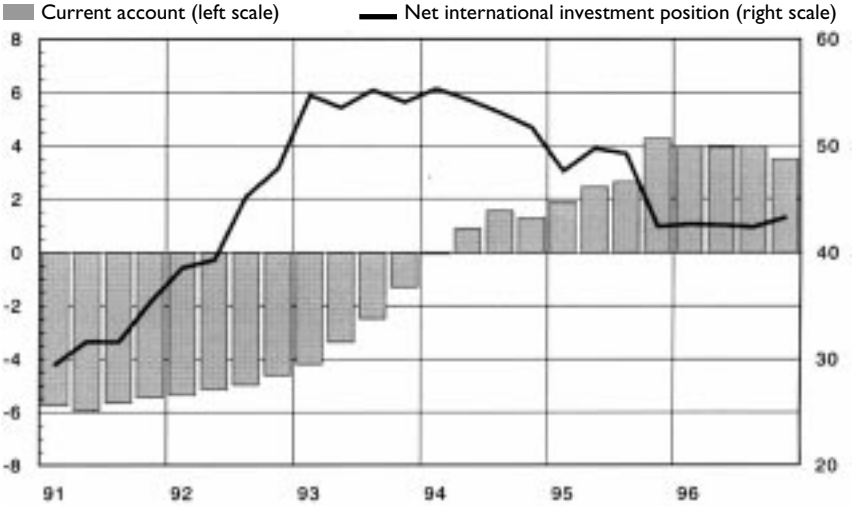
Employment and unemployment

1,000 persons; seasonally adjusted

Chart 3

Current account and net international investment position

As a percentage of GDP



Since 1993 economic growth in Finland has been highly robust by international standards. In line with the typical cyclical pattern, the driving force shifted from net exports via inventory adjustments to other domestic demand components. Growth of domestic demand started with investment in the manufacturing sector and later spread to private consumption. The recovery of construction investment from the trough of the recession did not begin until the latter part of 1996.

The recent growth in private consumption is based on favourable developments in real income, lower interest rates and rising asset prices. Household confidence has remained high. The recovery of the domestic sector stems largely from the same factors.

Unemployment peaked in the first half of 1994 (Chart 2). Despite fast growth in output, the number of unemployed has declined sluggishly. This is partly due to a rapid improvement in productivity and an increase in labour supply. The decrease in unemployment that has occurred over the last couple of years is attributable largely to more active labour market policies.

In 1994 the current account recorded a surplus for the first time in almost twenty years. The growth of the foreign liability position halted

both in markka terms and especially relative to a rising GDP. The current account surplus was not due merely to muted imports stemming from a sluggish economy; robust export growth was a key factor (Chart 3). The large surplus of exports over imports as well as lower debt servicing costs will keep the current account surplus at a high level even as the recovery of domestic demand leads to increasing imports.

1.2 The role of macroeconomic policies

During the first half of the 1990s, Finnish economic policy was consistently aimed at curbing external liabilities and strengthening firms' balance sheets. Because of the large external liability position, it was felt that there was no viable alternative to this strategy, even though it was clear that it would generate very few new jobs.

As the current account began to move into surplus in 1994, the focus of economic policy turned to bolstering employment and consolidating central government finances. The major economic policy goals of the new Government formed in the spring of 1995 were to increase labour market efficiency, maintain low inflation, reverse the growth of central government debt via expenditure cuts and to shape a tax policy that encourages work and entrepreneurship. The cumulative sum of spending cuts effected by the current and previous Governments will rise to FM 68.9 billion by 1999, which is equivalent to 8.8% of GDP (see Lehtonen (1996)).

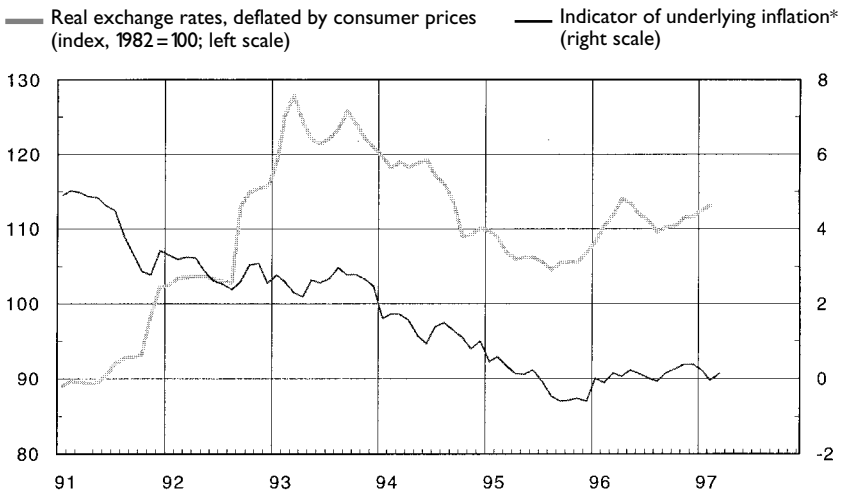
The Finnish markka was allowed to float in September 1992. It was decided to discontinue the markka's ECU linkage, because it had proved impossible to defend the markka exchange rate. The markka depreciated sharply during the initial phase of floating in autumn 1992, while differentials against German interest rates narrowed across the entire yield spectrum.

In February 1993, the Bank of Finland announced it would aim directly at price stability. The inflation target was specified as stabilisation of underlying inflation at about 2% as from 1995. Underlying inflation was defined as CPI inflation excluding the effects of indirect taxes and subsidies as well as capital costs of housing.

One reason for announcing the inflation target was concern over a possible acceleration of inflation following the sharp depreciation of the markka in the initial phase of the float. It was preferred that the markka's real exchange rate would strengthen via nominal appreciation rather than higher inflation.

Chart 4

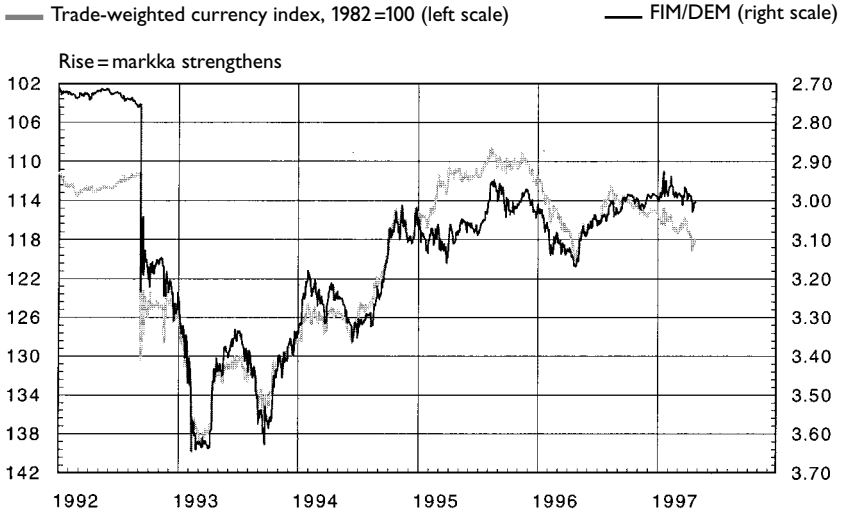
Real exchange rates and indicator of underlying inflation



* Twelve-month percentage change in CPI excl. indirect taxes and subsidies and capital costs on owner-occupied housing (mortgage interest payments and depreciation).

Chart 5

External value of the finnish markka



Finnish economic policy has produced the desired results. The markka's real exchange rate strengthened without an acceleration of inflation (Chart 4). The nominal exchange rate has been relatively stable since autumn 1994 (Chart 5). The level of both nominal and real interest rates has declined.

The decline in the interest rate level has been associated with a rise in asset prices. At the beginning of the recession, asset prices – in particular housing and other real estate prices – fell to an exceptionally low level. The rise in asset prices has strengthened private consumption and fostered a pick-up in construction investment. The Tobin-q effect seems to have been more significant than the effect of lower interest costs.

1.3 Developments in financial markets and overall demand

The behaviour of financial institutions was a major cause of the economic overheating in the 1980s. Although the emergence of a banking crisis aggravated the recession, it would be inaccurate to say that Finland experienced a general credit crunch. The contraction in the stock of bank lending derived from the demand side of the loan market, not from a decrease in supply (Vihriälä (1997)). Banks have, however, required more and better collateral for loans, which may have somewhat constrained the borrowing capacity of small and medium-sized companies.

Large companies in the export sector have not needed bank loans to finance their investments; most of them have been able to rely on internal sources. Nor have large companies been dependent on domestic financial institutions. At the moment, corporate finance margins are at a historically low level.

It was not until the end of 1996 that the total stock of bank lending started to grow slowly. Vigorous credit expansion is not expected.

The rise in housing and other real estate prices is largely based on the fall in nominal and real interest rates. Share prices have been boosted by firms' good performance prospects as well as international demand and a dearth of new share issues.

Asset prices have already affected consumer demand via the wealth effect. This has been reflected in a decrease in the savings ratio, which will continue to fall in 1997. The rise in housing prices has a direct and rapid effect on housing investment.

2. Inflation

2.1 Factors behind price and wage developments

Although import prices rose by 9% in 1993, the upward trend came to a halt already in the early months of the year (Chart 6). Subsequently, markka-denominated import prices have remained very stable.

Owing to the high rate of unemployment and widespread crisis awareness, wages developed moderately in the early years of the 1990s (Chart 7). In several of those years, contractual wages did not rise at all. Wage drift also remained moderate. Unit labour costs in manufacturing decreased, which kept competitiveness strong despite the revaluation of the markka by 6.4% in 1993–94.

The decline in unit labour costs and stable import prices helped constrain the rise in consumer prices. The rise in the Bank of Finland's target gauge, the indicator of underlying inflation, fell below 2% in the course of 1994 (Chart 8). In 1995, the most important factor affecting consumer prices was the fall in food prices following Finland's entry into the EU. In the absence of this decline, the rise in indirect taxes would have pushed consumer price inflation above 2.5%.

Chart 6
Import prices (total)
Index, 1990=100

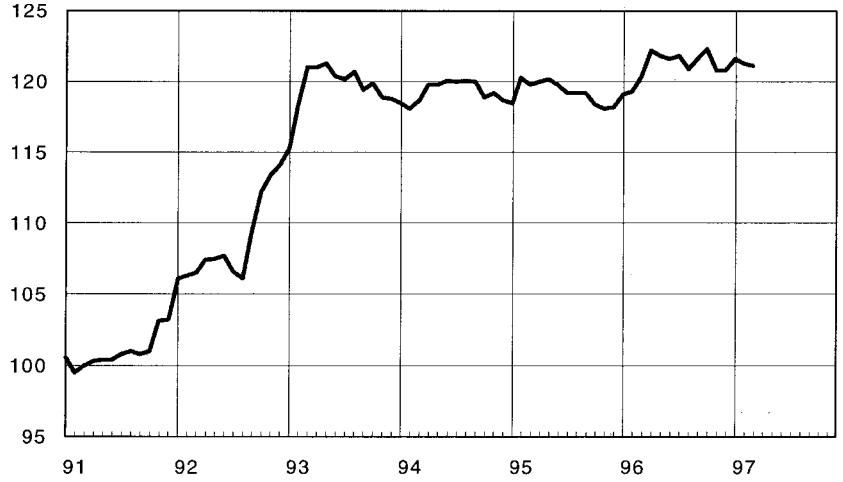
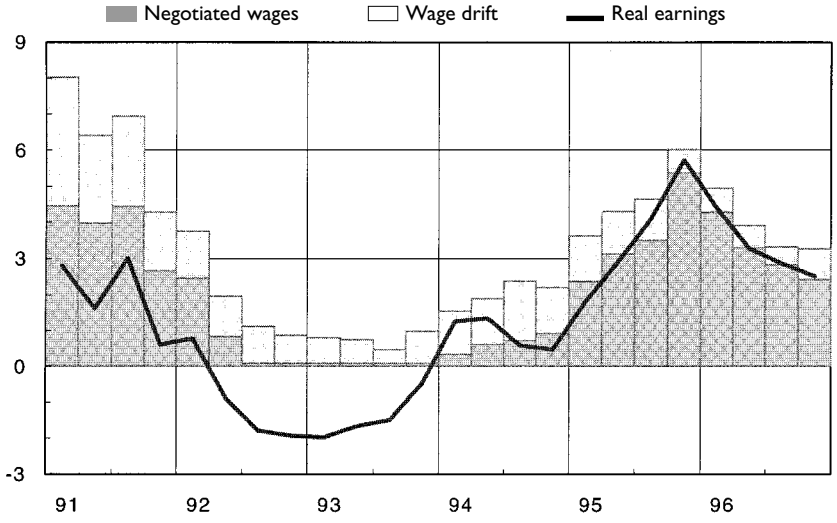


Chart 7
Earnings
Percentage change from previous year



In late 1994 and in the first half of 1995, stable price performance was threatened as labour costs and inflation expectations started to rise as a result of pay settlements negotiated in 1994. There was concern over the possibility that the extremely high profitability of the export sector would be passed through to domestic costs. Because the improvement in profitability did not fully compensate for the increase in labour costs, rising unit labour costs clearly triggered inflation pressures.

On the other hand, appreciation of the markka – reflected in a slight decline in import prices – helped to curb inflationary pressures.

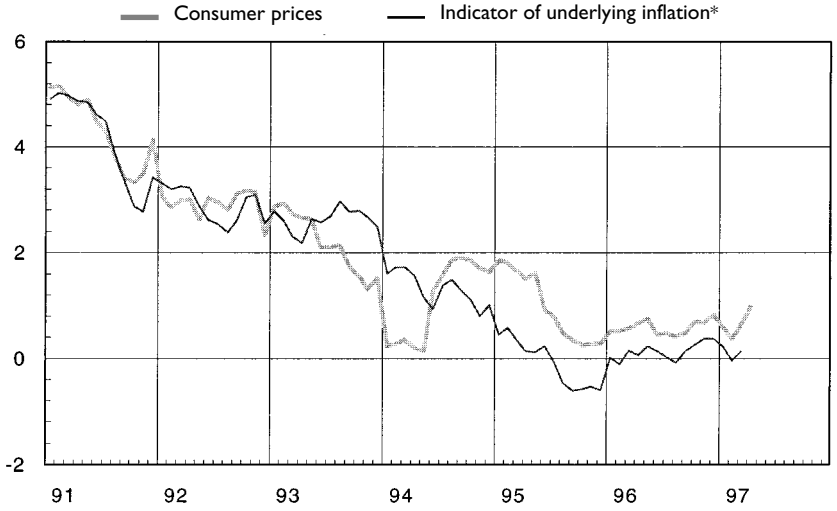
The strengthening of the markka may also have constrained the propensity to pass on higher costs to prices. Thus exchange rate developments, along with lower food prices, tended to dampen inflation expectations.

In mid-1995 it seemed that the low inflation target was gaining ever wider acceptance. Labour market organisations considered it important to conclude a long-term pay settlement that would keep labour costs in check. As a result, a centralised two-year pay settlement covering

Chart 8

Consumer prices

Twelve-month percentage changes



* CPI excl. indirect taxes and subsidies and capital costs on owner-occupied housing (mortgage interest payments and depreciation).

virtually all wage and salary earners was concluded. So far, wage drift has remained moderate.

In 1996, the rise in consumer prices continued at a moderate pace as a result of decelerating domestic costs, declining fixed costs (as interest rates fell) and continued stability of import prices. Despite improved economic prospects and rapid growth in consumer demand, inflation expectations have remained subdued.

For 1998, inflation is forecast to accelerate to 2% or slightly higher. The forecasts are based on stable international price developments and wage increases that are consistent with low inflation expectations. There is, however, some risk that inflation prospects could deteriorate. Although current output is probably still below potential GDP, the gap is narrowing rapidly. Rapid growth may lead to bottlenecks and thus to rising prices. The rise in housing prices may boost consumer demand more rapidly than forecast, which in turn could increase the risk of demand-pull inflation.

The Bank of Finland adopted a direct inflation target because of the need for a new, transparent nominal anchor for the economy after the changeover to a floating exchange rate regime. Because the exchange rate had lost its role as nominal anchor and it was not possible to specify some other intermediate target – such as a monetary aggregate – the only practical alternative as a nominal anchor was a specific inflation target.

The credibility of the new monetary policy regime was soon strengthened when, in the spring of 1993, the Government announced its support of the inflation target and its adoption of a programme of sizable central government budget savings covering several years (Lehtonen (1996)). The markka began to appreciate rapidly against the major currencies, reaching its pre-float level in 1995.

Inflation and inflation expectations rose again in the autumn of 1994. This led to some monetary tightening in December 1994, although unemployment was still high. By June 1995 the Bank of Finland's tender rate had been raised three times by a total of 1 percentage point (Chart 9). Although the rise in the tender rate was moderate, it demonstrated

Chart 9
Central bank interest rates

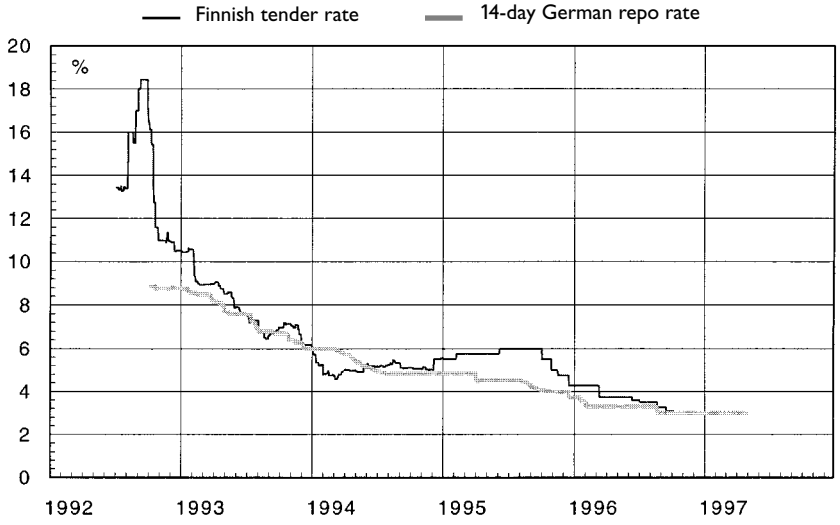
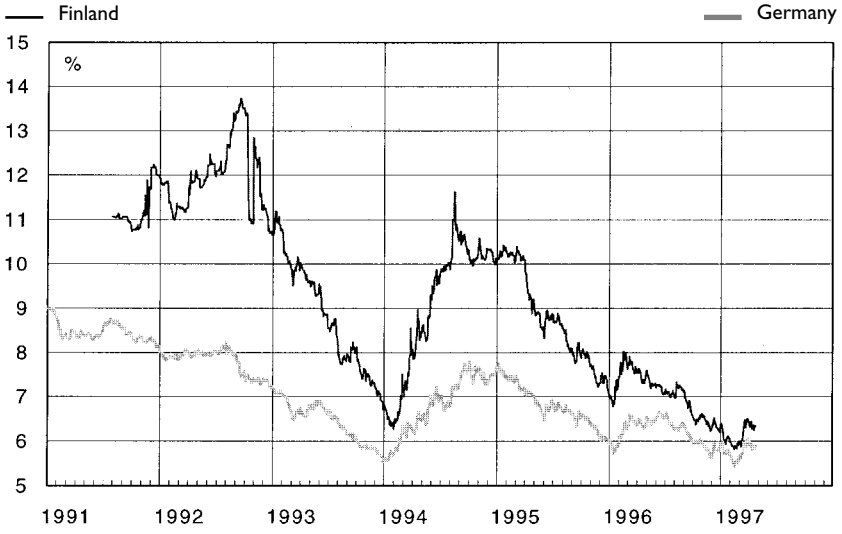


Chart 10

Long-term interest rates

Government bond yields, close to 10-year maturity



that the central bank was serious about the inflation target and that the essential factor was expected inflation rather than current inflation.

Several indicators showed that inflation expectations abated rapidly in the summer of 1995. Monetary policy probably played an important role in curbing inflation expectations, but equally important was the new Government's commitment to further budget deficit reductions over the next four years. The new Government also announced its support of the Bank of Finland's inflation target. Finally, the two-year moderate pay settlement confirmed the accomplishment of a fundamental lowering of inflation expectations. The pay settlement and budget cuts paved the way for a substantial easing of monetary policy starting in the autumn of 1995.

The substantial decline of the long-term interest rates and the narrowing of the differential vis-à-vis the German rate reflects improved fundamentals, including lower inflation expectations and the improvement in government finances (Chart 10).

3. Monetary policy framework

3.1 Considerations in the formulation and implementation of monetary policy

Defining an inflation target in terms of a gauge other than the change in the overall level of consumer prices always presents problems, as it is impossible to define a completely unequivocal indicator of underlying inflation. Further problems may also arise from the fact that decisions affecting wage determination tend to be based on "headline" rather than on underlying inflation. Although an appropriately defined indicator of underlying inflation will track the consumer price index over the long run, the two measures may from time to time deviate to a significant extent. Therefore, using the consumer price index as a basis might be as readily justified as using an indicator of underlying inflation (Pikkarainen (1996)).

An appropriately defined indicator of underlying inflation would exclude "correctly defined" temporary factors and economic policy effects and thus would not affect the conduct of monetary policy. On the other hand, if temporary factors can be precisely identified, it should be possible to justify the same monetary policy stance by specifying the exceptional factors that affect the course of consumer prices but which should not elicit monetary policy responses.

As examples of exceptional factors, one can cite the harmonisation of taxation and the fall in food prices that followed Finland's entry into the EU. An increase in value-added taxes in June 1994 raised the CPI but did not affect the indicator of underlying inflation. The fall in food prices had only a temporary effect on both the CPI and the indicator of underlying inflation. Although the Bank of Finland noted these factors, the stance of monetary policy was not changed as a result. In public debate, however, appeals were repeatedly made for an easing of monetary policy, in light of an inflation rate that was below the announced target level.

When Finland changed over to a floating exchange rate regime, the conceptions of roles and relative information content of different indicators were murky. Subsequent research conducted at the Bank of Finland went a long way toward clarifying the picture (Pikkarainen and Ripatti (1995)). The findings were put to good use while the markka was floating, both in assessing the stance of monetary policy and in communicating interest rate policy decisions.

The markka joined the Exchange Rate Mechanism (ERM) of the European Union on 14th October 1996 in order to ensure that Finland would

fulfil all the EMU convergence criteria. The markka's central rate was set at a level close to its average exchange rate level for the previous couple of years, which was slightly weaker than the prevailing market rate. The markka's ECU central rate was set at 5.80661, with a corresponding DM central rate of 3.04. Following the ERM linkup of the Italian lira, the markka's ECU central rate became 5.85424. The agreed central rate level is consistent with the Bank's estimates of the long-term fundamental equilibrium exchange rate. These estimates are based on calculations of both purchasing power parity and exchange rate pressures based on the Bank's quarterly macroeconometric model.

The ERM link-up did not cause any essential change in the conduct of monetary policy, because low inflation, which remained the primary objective of monetary policy, is consistent with the objectives of other ERM countries. However, the central rate will probably act as a kind of restraint on monetary policy. Under normal circumstances the aim will be to maintain a stable exchange rate. The wide fluctuation range is significant mainly as a deterrent to speculation but also could serve as a buffer in case a conflict arises between the price stability objective and the selected central rate.

3.2 Changes in operating procedures

Earlier, during the fixed exchange rate regime, the Bank of Finland's tender rate was partly determined by market forces in that the Bank conducted variable-rate tenders. The Bank also intervened at different maturities, mostly one and occasionally three-month maturities and in exceptional circumstances even at the twelve-month maturity. In the early stages of the float, the Bank of Finland operated in the money market much as it had under the fixed exchange rate regime, although it did steer interest rates to a somewhat greater extent than before.

In order to improve its communication of monetary policy, the Bank of Finland, in the autumn of 1994, gradually revised its intervention procedure by starting to focus clearly on stabilising short-term – one-month and to some extent three-month – money market rates and by seeking to smooth fluctuations in the tender rate. The Bank effected this change quietly without informing the markets, which did not clearly perceive the change until the Bank of Finland actively tightened its monetary policy by raising the tender rate in December 1994 via a fixed-rate tender. In a fixed-rate tender, the Bank of Finland discretionally sets the tender rate.

Fixed-rate tenders are indeed well suited to the floating exchange rate regime: the central bank sets the tender rate according to its longer-term inflation forecast and thus signals the markets and general public as to the level of short-term interest rates it considers to be consistent with the inflation target. Whereas more flexible auction procedures might have been preferable from the viewpoint of bank's liquidity management, the fixed-rate tenders have more clearly communicated the stance of monetary policy and have thus probably reduced uncertainty about the policy stance. This may in turn have reduced the risk premium contained in market interest rates and thus lowered the level of market rates.

Within the Bank of Finland's liquidity credit facility, the interest rates on liquidity credit and excess reserves have followed the tender rate closely, being respectively 2 percentage points below and above it. The interest rate on excess reserves is decided separately.

The earlier agreement-based cash reserve system was changed to a statutory minimum reserve system in July 1993. Under the new system, deposit banks and branches of foreign credit institutions must hold a certain amount of funds in non-interest-bearing accounts at the Bank of Finland. The reserve requirement is calculated on the basis of the reserve base as at the last day of each calendar month. The lag between the end of the computation period and the end of the corresponding reserves maintenance period is two months.

The reserve requirement, which may not exceed 5% of a mandatory reserve holder's total liabilities, is determined on the basis of monetary aggregates. The reserve requirement on deposits payable on demand is 2%, on other deposits 1.5% and on other domestic liabilities 1%.

The minimum reserve system was revised so that reserve requirements are fulfilled on an averaging basis as from October 1995. This procedure was aimed at smoothing interbank overnight rates and facilitating banks' liquidity management.

The banks' ability to manage their liquidity was further improved by the new auction procedure, whereby the Bank of Finland only sets the interest rate while each bank determines its own quantities. As a result, the need to arrange tenders has diminished but, on the other hand, the volatility of bank liquidity has increased. The reform has at least not yet significantly dampened fluctuations in the interbank overnight rate. The rather large fluctuations in the overnight rate are partly explained by the oligopolistic structure of the Finnish banking sector. About 90% of

reserve deposits are accounted for by three large banks. Fluctuations in the overnight rate are not harmful as such, as the rate applies to overnight loans of excess reserves and apparently has no impact on longer-term rates in Finland (Kuosmanen (1996)).

4. Lessons

The biggest surprises were already experienced in the late 1980s and early 1990s and were connected with the liberalisation of capital flows in the financial markets.

The most difficult phases in the first half of the 1990s related to management of the banking crisis and external indebtedness. Borrowing from abroad by the central government increased rapidly, offsetting capital exports of the private sector. Without the central government's external borrowing, the markka would probably have weakened even more in 1993, which would have aggravated the recession.

Experiences from the float were surprisingly good and the inflation target set in February 1993 has functioned well as a nominal anchor. The changeover to a floating exchange rate regime could have been accomplished earlier, perhaps already in the mid-1980s when the final stage of financial market liberalisation started.

Since 1993, actual inflation in Finland has repeatedly been lower than forecasted (Hukkinen and Suvanto (1997)). This is not attributable entirely to monetary policy, because the recession played a part in slowing inflation, as did Finland's entry into the EU at the beginning of 1995. Other reasons for lower-than-forecast inflation rates were, first, that the markka's appreciation had not been taken into account in the calculations. Instead, the forecasts were based on the usual assumption of an unchanged exchange rate. Secondly, firms' pricing practice changed decisively during the recession: markups were narrowed when demand was weak. Finally, wage restraint has persisted very well during the last settlement period and wage drift has remained smaller than forecasted.

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Comments on "Monetary policy in Finland: experiences since 1992"

Peter Schmid

Overall economic developments

The Finnish recession of the early 1990s left a heavy burden: the unemployment rate rose dramatically; public debt and net external debt increased rapidly, a banking crisis developed.

The authorities' strategy for overcoming the problems was centred on the growth of the export sector. The markka was devalued and then floated in 1992. This export-led orientation was successful. The fall in the markka did not lead to inflation, owing to the weakness of the labour market and a prudent monetary policy.

The recovery at first masked what the OECD called a "persisting dualism" in the economy, with weak activity in domestically oriented sectors.[1] In the meantime, domestic demand has recovered, however. Economic growth is largely without tension and above the west European average. If it continues unabated, we might expect consequences concerning interest rates or the exchange rate.

Finland has made headway in fiscal consolidation, too. It is a good example of a country in which a policy of fiscal policy consolidation is in the country's own best interests and does not primarily serve to meet the convergence criteria of the Maastricht Treaty. Without the consolidation of public finance, government debt would have run out of control. Furthermore, consolidation has helped to maintain a comfortable external position, which is important given the country's high foreign debt.

Unemployment has remained high, however. Finland is certainly not the only country facing difficulties on the labour market; the unsatisfactory situation in Germany is a case in point. In Germany, as in Finland, the expected rate of economic growth is not sufficient to bring about a substantial reduction in unemployment. Structural factors, such as over-

[1] See OECD (1996), p. 3.

regulation, the high burden of taxes and levies, high wages and insufficient wage flexibility obviously play a crucial role in this context.

Progress in these areas is proving to be particularly difficult within the framework of the European consensus model. Significantly enough, in its latest Annual Report, the European Commission rejected the so-called US model of sharp wage differentiation since the model of the working poor is not acceptable in Europe.[2] In Finland it seems, if anything, to be even more difficult to overcome structural difficulties. As in other Scandinavian countries, the Finnish society tends towards a more uniform income distribution.

In the past, recourse was often taken to incomes policy. The policy package adopted in September 1995 suggests that the use of incomes policy in the form of social contracts is still considered an appropriate means of bringing the challenges of global economic change into line with social conditions.[3] However, the package seems to provide only limited cause for hope: owing to tax cuts agreed at the same time and the reduction in the contributions to unemployment insurance, the moderate nominal wage increases were accompanied by a much higher rise in real net wages. In addition, the task to be tackled is not only general wage restraint, but also greater nominal wage flexibility and wage differentiation between the export sector and the domestic sector.

In other countries people tend to rely on the emergence of changing attitudes and approaches among wage negotiators. Even though it must be admitted that Germany is undoubtedly lagging behind in the structural adjustment process, there are encouraging signs that this is now happening in Germany, too. The latest wage settlements, which will be effective well into 1998, have been quite moderate. Flexibility and realism are increasing in the field of wage policy, and the erosion of industry-wide wage bargaining is making headway.

It will be interesting to see which course the European countries will choose to pursue in wage and labour market policy in the European monetary union. Generally speaking, owing to the growing common nature of European labour markets, it will no longer be possible to prevent pay policy from becoming more flexible and decentralised. Even more than before, wage policy will become locational in nature, and its implications for employment will be felt more directly than hitherto.

[2] See European Commission (1996), p. 60.
[3] For a more detailed discussion of the Finnish experience see, for example, Kuntze (1997).

However, in view of the social environment in some countries, incomes policy, too, might remain a subject of debate, especially if the use of a compensatory monetary or fiscal policy is limited by European monetary union and the stability pact.

Monetary policy

In 1993, Finland introduced inflation targeting; as in other countries, this measure was a matter of necessity. It was adopted because monetary policy needed a new nominal anchor and a new credibility after the fixed exchange rate had been abandoned. Following the loss of exchange rate stability, inflation targeting seemed to be more appropriate for a relatively small country than monetary targeting. Analyses of the stability of the Finnish demand for money likewise argued in favour of that decision.[4]

In the general view, the inflation targeting regime has served Finland well. The transparency of monetary policy and the credibility of the Bank of Finland (BoF) have increased, especially after the publication of the BoF's inflation forecast. Inflation has been brought down substantially. Risk premia on interest rates have fallen, too.

However, the Finnish experience also seems to indicate that "the introduction of explicit inflation targets does not provide an expressway to high policy credibility".[5] That may have something to do with the uncertainties of inflation forecasts. Credibility can be brought about only by establishing a track record. In that respect, the BoF was certainly helped by international developments, fiscal consolidation and the slack in the labour market. This raises the question for the future – and not only in Finland – about the price trend to be expected if unemployment declines again. The precise effect of inflation targeting is thus somewhat difficult to disentangle from the impact of positive economic and political developments. Nevertheless, the tightening of Finnish monetary policy in 1994–5 undoubtedly made its contribution to the subsequent decline in inflationary expectations.

Whether or not a strategy of inflation targeting is to be preferred to an intermediate targeting strategy depends on whether the linkage

[4] See, for example, Ripatti (1996).
[5] Åkerholm and Brunila (1995), p. 104.

between the instruments of monetary policy and the inflation rate is stronger than the linkage via any intermediate target which displays a stable relationship with the path of inflation.

That raises the following questions:

- To what extent is the inflation rate controllable by the instruments of monetary policy in Finland, given external and social constraints?
- How reliable is the inflation forecast given the changes in the economy and the monetary policy regime?
- What role is assigned to the exchange rate and the monetary conditions index as an indicator of monetary conditions and a predictor of inflation?

If I read the situation correctly, the BoF relies in its inflation forecast more on real variables, whereas monetary variables are looked upon with scepticism. Our situation is different. We still think that money demand is reasonably stable in the longer term. In addition, we believe that monetary targeting has political advantages (transparency, self-constraint, accountability). That explains to some extent the different approaches.

The importance of price stability in the framework of inflation targeting implies that other goals can only be pursued to the extent that they do not conflict with the inflation target. That raises the question of whether inflation targeting may run into problems if the banking system still turns out to be rather fragile.

In addition, one may discuss the role of inflation targeting after Finland's entry into the ERM. The wide margin in the ERM offers some leeway. However, if this step is interpreted to mean that the markka should fluctuate only a little around its central rate in view of the planned entry into European monetary union, this exchange rate orientation might lead to conflicts with inflation targeting or, in fact, replace it.

In contrast to the majority of central banks which pursue inflation targets, the BoF focuses on a point target for the inflation rate rather than on a target range.[6] In keeping with the target, inflation was to be kept at about 2% from 1995 onwards. The point target was motivated by the argument that "it would provide a better guide for the formation of inflation expectations, given the country's history and high inflation expectations …".[7] It was feared that the public would construe the upper

[6] For an international comparison of practical issues concerning the inflation targeting framework see, for example, Debelle (1997).

[7] Brunila and Lohdenperä (1995), p. 129.

margin of a band as the factual target rate.[8] However, one might ask whether a single figure, together with the use of an underlying measure of inflation, provides the right balance between credibility and flexibility.

Other central banks have taken the opposite route in monetary and inflation targeting. The Bundesbank, for instance, has defined its monetary targets virtually exclusively as ranges ever since 1979. Ranges provide more room for manoeuvre, but are also a better guide to expectations than a single figure because everybody knows that you cannot reach a single figure anyway. In the case of Finland, the problem is mitigated by the fact that deviations from the target have so far been downwards.

This, however, raises the question of the rationale for an inflation target of 2%. From a theoretical point of view, zero inflation would be consistent with price stability. In practice, however, the concept of price stability is often affected by additional considerations. First, possible measuring errors in the price statistics suggest that price stability is likely to be associated with a low positive rate of inflation. Secondly, the downward rigidity in prices and wages is given as a reason for an optimal inflation rate higher than zero.

The Bundesbank has flatly rejected the concept of an optimal inflation rate. For us, zero inflation is desirable from a theoretical point of view. In our eyes, there is no reason to belittle the adverse effects of low inflation.[9] The Bundesbank sees its medium-term inflation target of 0 to 2%, which is included when deriving the annual monetary targets, as putting the concept of price stability into operation in practical policy. The toleration of an undershooting of the inflation target by the BoF is not *a priori* incompatible with such ideas. On the other hand, this may be due to the fact that decisive stimuli were generated by declining agricultural prices associated with entry into the EU. This decline is rated by the BoF as a one-off effect that is to be accepted, irrespective of its direction.

As regards the implementation of monetary policy, the Finnish paper mentions two innovations in Finland which are rather interesting from the German perspective as well.[10]

One is the introduction of a minimum reserve system with the aim of smoothing interbank overnight rates and facilitating banks' liquidity management. Against the background of liberalised and globalised financial

[8] See Åkerholm and Brunila (1995), p. 93.
[9] For a more detailed discussion see Deutsche Bundesbank (1996).
[10] See Pikkarainen et al. (1997), pp. 9–11.

markets, this step is rather surprising. It also runs counter to the trend towards reducing reserve requirements discerned by the BIS in the Nordic countries.[11] However, it tends to support our perceptions. As is well known, the Bundesbank has always had a minimum reserve system. Among the different goals which such a system may serve, the emphasis has recently clearly shifted to the money market aspect. Minimum reserve requirements which are to be met on a monthly average work as a buffer in the money market, they limit interest rate fluctuations and permit central bank action with little intervention; these are advantages which should be particularly felt in the decentralised implementation of monetary policy in EMU.

The second innovation in Finland is the transition to the fixed-rate tender in open market policy. Here, too, there are certain parallels with the Bundesbank's policy. Whereas the Bundesbank preferred the variable-rate tender in the past because it provided more scope for market forces and was more flexible, the fixed-rate tender and a steady-as-she-goes approach in interest rate policy have clearly predominated in the past few years. Much the same as in Finland, the fact that fixed-rate tenders have reduced uncertainty as to the policy stance played a part in this. Given the periodic increase in financial market volatilities associated with the liberalisation and globalisation of the financial sector, setting clear interest rate signals appeared to be a greater requirement than before, as opposed to the danger of exacerbating interest rate uncertainty.

Regardless of the tender form, the Bundesbank has always geared the allotment of repo transactions to its own liquidity forecast and not to the assessments of the market. This ensures that the liquidity supply of the market is in line with monetary policy requirements. Volatilities of bank liquidity and the overnight interbank rate could therefore be kept very low. I am not quite sure about the extent to which the greater volatility of the market for day-to-day money in Finland is connected with the structure of that market or the Band of Finland's allotment policy, which allows allotments to be determined mainly by the banks' bids.

[11] See BIS (this volume), pp. 230–263.

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Monetary policy in Iceland during the nineties

Már Guðmundsson and Yngvi Örn Kristinsson*

Introduction

Iceland is a small open economy with a natural resource based export sector. It has a population of 270,000 people and a GDP of around US$ 7.3 billion (1996) or around 40% of that of Luxembourg and 2½ times that of Malta,[1] both small countries but with somewhat bigger populations than Iceland.[2] Living standards are relatively high. GDP per capita in 1996 was US$ 25,400 at current PPPs, which was the fifth seat among OECD countries. Exports of goods and services amount to just over ⅓ of GDP. More than ¾ of merchandise exports are fish products and an additional 15% are the products of two metal smelters using Iceland's ample energy sources. More than 90% of merchandise exports and 65% of total exports are natural resource based, if agricultural products are included. External shocks and economic fluctuations have been bigger than in most OECD countries, with a relatively large asymmetric component. Inflation was, until recent years, much higher than in other OECD countries but unemployment lower. Exchange rate policy did play an important role in adjusting the economy to external shocks, with relatively good success on the real side of the economy but at the cost of high and variable inflation. A stability oriented policy has been pursued in recent years, with the important result that inflation has been below or at the level of that among trading partners since 1994.

This paper is on monetary policy in Iceland during the 1990s. The 1990s have so far been a period of large structural changes in the Iceland economy, not least in the financial sector. Iceland was facing negative external shocks during the first years of the nineties at the same time as it was going through a disinflation process of historical dimensions. The

* The views expressed in this paper are those of the authors and do not necessarily have to reflect the views and policies of the Central Bank of Iceland. We are indebted to Gerður Ísberg, Tómas Hansson and Þórarinn G. Pétursson for research assistance.

[1] Comparisons are based on 1993 figures.

[2] Luxembourg has a population of around 400,000 and Malta of around 360,000.

conditions for the operation of monetary policy were therefore radically changed. The paper reflects this by first discussing the fundamental choice of exchange rate policy and financial reforms before moving to macroeconomic developments and monetary policy as such.

The plan of the paper is as follows. In Section I we discuss exchange rate policy, both the economic elements on which it is based and its development during the nineties. In Section II we discuss the financial reforms that have radically altered the conditions that monetary policy is operating in. In Section III we describe the monetary instruments and operating procedures. Finally, in Section IV, we discuss macroeconomic developments and policies during the nineties.

1. Exchange rate policy[3]

Exchange rate policy has played a major role in the overall monetary policy framework in Iceland. Nevertheless, economic policy priorities in this regard have shifted from time to time between facilitating the adjustment to adverse real external shocks and providing the economy with a firm monetary anchor. A devaluation bias along with adverse external shocks was a major factor behind the chronically high inflation that Iceland experienced during the seventies and the eighties. The more stable exchange rate policy that has been followed in the nineties played a major role in the disinflation process that brought inflation down to a level similar to that of trading partners. The contradiction between the exchange rate as a monetary anchor and a major adjustment price in a volatile economy is, however, always present and the króna was devalued twice during the nineties. This experience indicates that the contradiction between the need for a flexible exchange rate due to the characteristics of the real side of the economy and the need for a stable exchange rate to provide a nominal anchor and an intermediary target for monetary policy has *de facto* been resolved by following an adjustable peg regime for the Icelandic króna. With the development of financial markets in recent years and an increased credibility of the goal of low inflation for monetary policy, other possibilities to tackle this issue are opening up, either by

[3] The material in this section is partly based on Gudmundsson, M. (1994b).

allowing a greater exchange rate flexibility within a wider band and/or adopting a direct and explicit inflation target.

Structural characteristics

Many of the structural characteristics of the Icelandic economy indicate that a flexible exchange rate regime might be optimal. Here one can mention the following points:

- Iceland is faced with asymmetric and real external shocks and fluctuations have tended to be greater than in most OECD countries.
- Iceland is specialised in its export production and generalised in its import demand.
- The economy is not so open as to make the microeconomic costs from exchange rate flexibility too large and the macroeconomic benefits too small.
- Real wages are flexible in the face of external shocks.

The nature of shocks and fluctuations is one of the more important elements affecting the choice of an exchange rate regime. Economic fluctuations in Iceland are more pronounced than in most OECD countries. Iceland is subject to idiosyncratic external shocks, such as falling fish catches, as well as shocks common to other industrial countries, such as oil price increases. This can cause problems for a fixed exchange rate policy.

In an earlier study of Iceland and other OECD countries it emerged that the standard deviation of the growth in GDP per capita during the period 1952–89 was 5% in Iceland, compared to standard deviations in the range of 1½–3½% for the other countries.[4] Iceland was the only country, apart from Japan, with a significant decline in the variability of the growth in GDP per capita during the period.[5] The fluctuations in GDP are the products of both the external shocks affecting the economy and the domestic adjustment to those shocks. Fluctuations in merchandise exports in terms of import unit values are a rough measure of external shocks, at least for a small open economy as Iceland. It is a product of the terms of trade and the volume of merchandise exports, and would in

[4] See Gudmundsson, G. (1992), quoted in Gudmundsson, M. (1994a). The countries in the study apart from Iceland were Austria, Denmark, France, Germany, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom and the United States.

[5] The trend in variability was measured by regressing on trend the absolute value of the error term from the regression of GDP per capita growth on trend.

Iceland's case be dominated by changes in fish catches and the terms of trade. One study on Iceland and thirteen other OECD countries[6] showed that the standard deviation from growth in this series was highest in Iceland during the period 1961–90 and among the highest during the period 1976–90. The fluctuations in this series were significantly correlated with fluctuations in the industrial countries as a whole, but only just so during the second period.[7]

Table 1 also gives some interesting statistics related to this issue. It compares volatility, measured by the standard deviation, in GDP growth, the terms of trade, the growth in real exports and in export revenue[8] in Iceland and among its trading partners. The table shows that during 1961–95 volatility of GDP growth was 75% higher in Iceland than on average among its trading partners. The difference regarding export revenue is even higher. The table also gives the percentage share of the change in the relevant series in Iceland that is symmetric with its trading partners, i.e. that can be explained by a regression on the trading partner series and a constant. That share is in all cases well below 10%, except for export revenue in 1961–95, which is explained by the common oil shock in 1973–74.

The predominance of the fishing industry in exports is an important structural feature of the Icelandic economy. Marine products account for nearly 80% of merchandise exports. In this sense, Iceland is probably closer than many other OECD countries to being specialised in production and generalised in consumption. Two factors should, however, be borne in mind. First, the fishing industry is a very diversified in terms of species, modes of processing and markets. It is also very dynamic in the sense of being able to shift supply between markets as conditions change. Secondly, the supply elasticity with respect to price of the industry as a whole is rather low as changes in relative prices will not increase fish stocks or total allowable catches.[9]

It seems to apply among the OECD countries, that the smaller the economy the more open it is. Although Iceland's economy is more open than many OECD countries, it is not as open as one would think *a priori*,

[6] The countries were Denmark, Finland, France, Germany, Ireland, Japan, the Netherlands, New Zealand, Norway, Portugal, Sweden, the United Kingdom and the United States.

[7] The material in this paragraph is presented in more detail in Gudmundsson, M. (1994a).

[8] Export revenue refers to exports of goods and services in current prices deflated by import prices. It thus measures the purchasing power of exports against imports.

[9] See Gudmundsson, M. (1992).

Table 1
Volatility[1] and symmetric change in Iceland and among trading partners (%)

	Trading partners[2]		Iceland		Symmetric change[3]	
	1961–95	1976–95	1961–95	1976–95	1961–95	1976–95
GDP growth	2.3	1.9	4.0	3.3	6.5	8.5
Terms of trade	8.8	5.9	8.6	4.9	4.3	1.0
Real export growth . . .	4.7	4.2	7.7	6.3	5.2	0.1
Export revenue[4] growth	5.2	4.5	9.7	8.1	22.9	3.3

[1] Defined as the standard deviation. [2] Defined as the trade-weighted average of individual country statistics. The average volatility is the trade-weighted average of individual standard deviations. [3] Defined as the R^2 obtained by regressing the series for Iceland on the trade-weighted average of the same series in trading partners and a constant. [4] Defined as exports of goods and services deflated by import prices.

given its size. In 1994, the degree of openness measured by the sum of exports and imports of goods and services as a percentage of GDP was 69% in Iceland, which is slightly above the average EU level but lower than in at least seven Western European countries.[10] The reason for this is probably that Iceland's export industries are not as highly integrated with other economies as in many small European economies. Iceland's exports are, to a large degree, based on the use of domestic resources in contrast to many small European countries that have a higher share of exports of manufactured goods that are often based on the processing of imported intermediate manufactured goods. That "throughput" is much lower in Iceland's case.[11]

External labour mobility has not been on such a scale that it can be counted on to adjust to external shocks on its own. During the recession of 1968–70, which was the deepest in Iceland's post-war history, around 1.7% of the population emigrated, mostly to other Nordic countries. Nonetheless, unemployment increased considerably even though two

[10] These countries were Austria (74%), Belgium (137%), Ireland (148%), the Netherlands (116%), Luxembourg (138%), Norway (73%) and Sweden (72%).

[11] We owe observations in this paragraph to Krugman (1991). He points out that Iceland is a clear outlier on a plot for OECD countries of the size of population and the share of exports of goods and services in GDP.

large devaluations and other adjustment measures were also undertaken. External labour mobility seems to be limited by the relatively high standard of living and social and cultural factors. Iceland's participation in the European Economic Area (EEA) might, though, increase external labour mobility.

Real wage flexibility has been higher in Iceland than in most other OECD countries.[12] This flexibility, however, is partly the result of the accommodating exchange rate policy that up until a few years ago was followed in Iceland. The policy was to keep the nominal exchange rate fixed during the upturn and devalue in the downturn. During recessions real wages were therefore cut through devaluations. These cuts were always accepted in the end by the population. Consequently real wage resistance did not make inflation explosive. The existence of wage contracts with indexation clauses did not prevent this process from working, as wage indexation was either abandoned or weakened by agreements or legislation in order to ensure that nominal devaluations during recessions were turned into real devaluations and not dissipated completely in a higher inflation rate.

This policy worked reasonably well in adjusting the real side of the economy to external shocks and in keeping unemployment low. The problem was its inflationary bias. It can also be argued that it had harmful effects on long-term growth, as the export industries were too strongly insulated from external shocks and did not make the necessary internal adjustments. This policy was therefore abandoned. Devaluations were used much more reluctantly and only when the equilibrium real exchange rate had clearly fallen and the inflationary dangers could be minimised. Until the present period of exchange rate stability beginning in June 1993, the longest period of exchange rate stability of the króna since the early seventies was from December 1989 to November 1992, when the króna was devalued by 6% in the wake of the turmoil on the European foreign exchange markets.

In a low inflation environment the kind of real wage flexibility that has existed in Iceland in the past requires flexibility of nominal wages. There is no Icelandic experience to indicate that such a flexibility will be forthcoming and experience from other countries indicates that it will

[12] See OECD (1991). During the period 1970–87 the standard deviation of real wages in Iceland was more than twice that of output. Only Portugal had greater variability of real wages while the values for most other OECD countries were around or below 1.

probably not. If Iceland is to live in a low inflation environment in the future, as should be the aim, then real wage flexibility will very probably be significantly lower than in the past and will not play the same role in adjusting the economy to external shocks.

Policy during the nineties

In December 1989 the gradual depreciation of the króna that had taken place in the course of that year came to an end and it was decided to keep it stable against a trade-weighted basket of currencies. Formally, there was a fluctuation band of ±2¼% but it was not used in practice as there was no interbank market for foreign currency. The króna was therefore kept completely stable against the basket during 1990 and 1991.

At the beginning of 1992 the króna was pegged to a basket of currencies composed of the ECU with a weight of 76%, the US dollar with a weight of 18% and the Japanese yen with a weight of 6%. The new basket replaced a trade-weighted basket of 17 currencies. The stable exchange rate policy that had been followed from December 1989 was reaffirmed in the autumn of 1991 in a thorough reappraisal of exchange rate policy that was partly initiated because of the ECU pegs in Norway, Sweden and Finland. It was decided to postpone the decision of a full ECU peg until 1993, but the new basket was considered an intermediary step. At the same time, it was decided to strengthen the basis of the stable exchange rate policy in various ways, of which the most important were:

- to establish an interbank market for foreign currency, where the forces of supply and demand could have a stronger and a more direct influence on the exchange rate of the króna.
- to develop a money market and increase the scope for the Central Bank to influence short-term interest rates. It was considered important for this purpose to reduce the access of the Treasury to direct and automatic borrowing from the Central Bank.

The new currency basket adopted at the beginning of 1992 did not imply significant changes in the weights of the European currencies as a group, the US dollar and the Japanese yen. Significant changes did, however, take place in the weights of individual European currencies, especially as the weights of the Nordic currencies, other than the Danish krona, went to zero and the weight of the pound sterling was greatly reduced. These changes were at the time not considered to be important.

It was generally expected that European cross-rates would be relatively stable in the phase leading up to monetary union and most European currencies of any significance to Iceland's foreign trade were at this time either in the ERM or unilaterally pegged to the ECU.

These conditions were no longer fulfilled after the turmoil on European currency markets in the autumn of 1992. The devaluation of the pound sterling was most important in this respect, as it had a weight of less than 10% in the new basket, whereas around 25% of merchandise exports went to Britain. The devaluation of the pound in September 1992 therefore caused a terms of trade shock and a revaluation of the króna in effective terms. When the devaluations of the Swedish krona, the Portuguese escudo and the Spanish peseta were added and pressure mounted on the Norwegian krona, it was decided to devalue the Icelandic króna on 23rd November by 6%. This was a somewhat bigger devaluation than a technical correction of the effective revaluation would have warranted because the Icelandic economy was going through a difficult recession in 1992, caused by lower fish catches and a deterioration in the terms of trade.

The króna was devalued again at the initiative of the government by 7.5% on 28th June 1993. The devaluation was made in connection with the decisions taken by the government on total allowable catches for the fisheries' year 1993/94.[13] They implied cuts in the catch of many important species, especially cod. This was expected to lead to a 6% fall in the real value of the fish catch in the coming year, creating difficulties for the fisheries and the economy as a whole, on top of the 9% fall in the price of marine products on international markets that had already taken place. There had not been any pressure on the króna on the new interbank market in the days leading up to the devaluation, except during the last day; by then, however, rumours about the planned measures had already surfaced in the press.

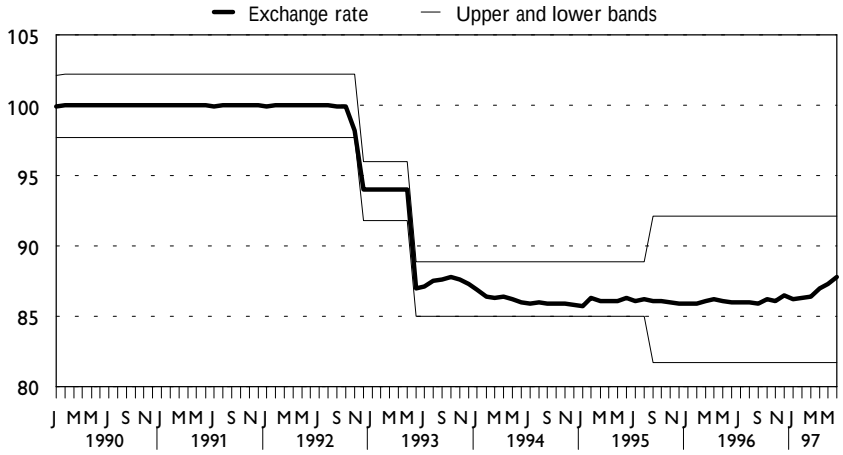
The króna has been very stable since the devaluation in June 1993 until the present day as can be seen from the graph below. Part of the reason is that the Central Bank has been very active in the foreign exchange market and has therefore smoothed the development of the exchange rate. But it is also a combination of the historically low level of the real

[13] The fisheries' year begins 1st September. The government usually decides in May or June on total allowable catches of those species subject to quotas.

Graph 1

Official exchange rate of the Icelandic króna and fluctuation band

End of period, December 1991 = 100



exchange rate reached after the June 1993 devaluation and the relatively favourable developments of fundamentals since then. It is interesting in this respect that the European currency turmoil in July and August 1993 had no noticeable effect on the króna.

In spite of this the Central Bank became worried, in light of the European experience and the fact that capital movements had become fully liberalised in the beginning of 1995, that a band of ±2¼% was really too narrow. The problem was how to widen the band without harming credibility. At the same time it had become clear that the rationale behind the currency basket had weakened significantly. The Central Bank therefore started internal policy deliberations in the autumn of 1994 leading to proposals to the government that were finally adopted in late summer 1995.

On 6th September 1995 the official currency basket was changed to a trade-weighted basket and the fluctuation band was widened to ±6%. Great care was taken in explaining to the markets and the public that this did not imply any change in the fundamental framework of monetary policy. The exchange rate would continue to be the intermediate target of monetary policy with price stability as its main objective.

The new currency basket is composed of 16 currencies. The weights were based on the 1994 shares in trade of goods and services. The basket is revised annually, based on the previous year's trade. It should be noted that the new basket also encompasses non-factor services. Previous trade-weighted baskets were based on merchandise trade only. This change reflects the growing importance of services in Icelandic trade. Moreover, third-country effects, i.e. the effects of competition with third countries in export markets, are now also reflected in the basket.

In order to understand what motivated these changes, it is useful to recall that the premise of the currency basket adopted in the beginning of 1992 was the stability of the cross-rates in the ERM and the ECU linkage of some of the Nordic currencies. That premise had been gradually eroded. In the autumn of 1992 the pound sterling was floated and the ECU peg of the Nordic currencies was abandoned. In the summer of 1993 fluctuation bands of most ERM currencies were widened to ±15%. Moreover, as Norway rejected EU membership in a referendum in November 1994, it became clear that the currency of an important trading partner and competitor in foreign markets would not be included in the ECU in the foreseeable future.

The fluctuation band that was effective until 6th September 1995 was adopted in May 1993, when the interbank market for foreign exchange began its operation. By adopting a relatively narrow fluctuation band, the Central Bank intended to send a clear message to the market that a greater role for the market in the determination of the exchange rate did not imply a deviation from the policy of exchange rate stability. At that time, fluctuation bands of ±2¼% were common in Europe. Although maintaining confidence in the official policy of exchange rate stability was on balance considered to be the most important policy aspect at the time, there was also awareness that a number of other factors, especially the potential volatility of the external sector, argued for a wider band. But after more than two years of operation it was considered sufficiently demonstrated that establishing an interbank market for foreign exchange did not in any way imply a departure from the policy of exchange rate stability.

By widening the fluctuation band to ±6%, the Central Bank was seeking to enhance its ability to respond to temporary fluctuations in the foreign exchange market, caused by volatile trade flows and capital movements, without resorting to excessive changes in interest rates. The

experience from the crises in the ERM had also shown that narrow fluctuation bands may be conducive to one-way bets of speculators against a currency. At the same time, the Central Bank considered that a fluctuation band of ±6% was not so wide as to render the policy of exchange rate stability meaningless.

The exchange rate of the króna has been well within the old narrow band since its widening in September 1995. This has made the claim of the Central Bank that this was a precautionary measure more credible. The available evidence does not suggest that the change had any detrimental effects on the credibility of the stable exchange rate policy.[14]

The current framework

The goal of price stability, which is one of the preconditions for innovation and sustainable growth, has in recent years been given greater weight in the formulation of monetary and exchange rate policy. This development to a certain extent reflects international trends in economic policy discussion but also a shift in attitudes towards inflation in Iceland, where the experience of high and volatile inflation along with extensive use of financial indexation led to an understanding of the desirability of price stability for households and firms.

The exchange rate has been the declared intermediate target of monetary policy since December 1989, although, as mentioned, the króna has been devalued twice since then. These devaluations were prompted by external circumstances, when the outlook was for unchanged nominal wages and a weakening economy. In such conditions a nominal devaluation is likely to lead to a real depreciation of the króna rather than to inflation, and this also turned out to be the case.

The exchange rate has many of the desirable attributes of an intermediate target for monetary policy in a small open economy, such as Iceland. Its link with prices is close. It is recorded at least daily which makes it easy for all to observe. The Central Bank can, through its interventions on the foreign exchange market and its monetary instruments, have a significant impact on the development of the exchange rate. Experience has shown, however, that to ensure the stability of the exchange rate it is necessary

[14] The calculated implicit forward rate using three-month interest rates has, since the beginning of 1995 when short-term capital movements became fully liberalised, always been within the old ±2¼% band.

that the real exchange rate be consistent with economic fundamentals. Similar circumstances can arise when a stable exchange rate is inconsistent with price stability. This applies in particular if the real exchange rate is depressed at the start of a strong upswing. For these reasons, it may be necessary, under certain circumstances, to change the reference value of the exchange rate which serves as the intermediate target of monetary policy, given economic fundamentals and the inflation outlook. Such flexibility needs to work both ways; otherwise the exchange rate policy will have a built-in inflationary bias.

2. Financial reform

Financial liberalisation began later in Iceland than in most other industrial countries. However, the capital, money and foreign exchange markets have developed significantly in Iceland in recent years along with internal and external liberalisation. These developments have radically altered the framework for monetary and exchange rate policies and have gradually moved Iceland closer to the situation of other developed industrial countries with open capital markets. Table 2 gives dates for the financial reform process in Iceland since the beginning of the 1980s that are of particular importance to exchange rate and monetary policy.

Table 2
Financial reform in Iceland

Event	Date
Financial indexation	1979
Liberalisation of domestic bank rates	1984–86
Interest Rate Act	1987
A regulation on the stepwise liberalisation of capital movements	Summer 1990
Closing of Treasury overdraft facility in the Central Bank	1992–93
A new foreign exchange legislation	1992
Iceland becomes a member of the EEA	January 1993
Interbank market for foreign exchange	May 1993
Long-term capital movements fully liberalised	January 1994
Short-term capital movements fully liberalised	January 1995
A new legislation of foreign direct investment	1995
CB relinquishes market making in long-term government bonds	February 1996

Some aspects that are important for understanding the framework and operation of monetary policy during the 1990s are discussed below.

Financial indexation

The main characteristic of the Icelandic financial market is the extensive use of indexation. Indexation has a long history in Iceland. High and variable inflation along with controlled nominal interest rates was the main stimulus to its widespread adoption. In the seventies this resulted in highly negative real interest rates that caused a significant fall in financial saving and disintermediation. The ratio of M3 to GDP was about 40% at the end of the 1960s but had gone down to just over 20% by 1978, when domestic real rates of interest were negative by some 20%. Ways to reverse this trend needed to be found. In order to push real rates of interest up past the zero mark, indexation was introduced by linking financial liabilities to changes in the so-called "credit-terms index", which was based on available price indices. This could also have been achieved with flexible, high nominal rates of interest, which would greatly have increased the repayments burden for loans. However, at the time this would have been unrealistically punitive and there was no support for such an approach.

The credit-terms index was introduced in 1979.[15] In that year banking institutions were authorised to index their lending, and the following year this was extended to indexation of deposits. Initially the minimum period for indexation of deposits was two years, but this was reduced to three months in 1982, in the wake of growing reluctance to raise nominal interest rates in line with higher inflation. Indexed deposit accounts enjoyed great popularity from the outset and contributed to reducing the outflow of funds from the banking system.

In a continually changing inflation environment, it often proved difficult to strike a balance between yields on indexed and unindexed items. Regular comparison of interest terms could lead to phenomenally high yields on accounts. The reference period for indexed accounts with banking institutions was harmonised in 1989 and a minimum period of 6 months was set, which was extended to 12 months in 1994 under reforms which reduced the level of uncertainty faced by the banks.

[15] Initially, the credit terms index was a weighted average of the CPI and the building cost index and in 1989 the wage index was added to the average; from 1995 the credit terms index is solely based on the CPI with a one-month lag.

In the past, banking institutions have repeatedly shown a substantial indexation imbalance on their balance sheets. According to the regulation issued by the Central Bank in July 1993 the maximum imbalance between indexed assets and liabilities is 20% of the capital base. If imbalances exist, the banks will try to match the yield on indexed and non-indexed instruments ex ante on the basis of estimates of inflation. A forecast error on inflation can cut the interest margins of the deposit money banks, which they would try to counter by raising interest rates. The dual interest rate system (indexed and unindexed) can thus exert an unnatural impact on interest rate formation, whereby interest on the banks' unindexed short-term lending is determined more by their indexed long-term interest rates than by nominal interest rates in the money market.

In the period September 1993 to the end of 1995 the Central Bank countered risks associated with the mismatch between indexed asset and liabilities by offering the commercial and savings banks swap agreements, whereby the Central Bank swapped indexed assets for non-indexed liabilities in order to limit the exposure of the banking sector in this area, thus strengthening the ability of the commercial and savings banks to meet short-term fluctuations in inflation without significant changes in interest rates. This was done in response to the aforementioned regulation, which stipulated that the banks should, before the end of 1995, abide by a maximum of 20% for their imbalance between indexed assets and liabilities. This was also partly motivated by the desire to minimise the influence on nominal interest rates of the temporary increase in the rate of inflation in the wake of the June 1993 devaluation. These contracts were phased out gradually towards the end of 1995 being renewed every 4 months. The structure of these swap agreements was such that the Central Bank made an inflation forecast for the next 4 months and, using the yield in the bond market for government bonds and after adding a small risk factor, arrived at a nominal yield for the non-indexed counterpart of the swap agreement.

Financial indexation has on the whole been highly beneficial in Iceland. It reversed the trend of falling financial saving and disintermediation and thus created the basis for the development of the capital markets that took place later in the 1980s. It made it possible to develop fairly long-term forms of lending and financial instruments. It also saved the Treasury interest expenses, especially after domestic interest rates had been fully liberalised, as inflation risk premia on long-term nominal bonds would

have been rather high. Finally, it played a beneficial role in the disinflation process (see later).

These benefits of indexation apply mostly to the longer end of the market. At the shorter end it can create various problems, including the operation of monetary policy. The main disadvantages of indexation have been higher operating risks among banks, with imbalances developing between indexed assets and liabilities on their balance sheets, and distortion of interest rate formation whereby the banks' unindexed short-term interest rates have been determined with reference to those on indexed long-term bonds. The latter problem arises because of a persistent imbalance between indexed assets and liabilities, whereby interest rates on non-indexed terms partly have to follow the development in indexed terms. Another problem is that indexation formed a barrier between the domestic market and foreign market, where indexation is relatively unknown, thus reducing the benefits to be derived from opening up of the capital market.

For these reasons it has been decided to reduce the scope for indexation at the shorter end of the market. In rules on indexation of deposits and lending issued by the Central Bank in 1995, the minimum period for which deposits must be tied in order to qualify for indexation will be extended from one year to three at the end of 1998. It is the aim to prohibit indexation of deposits in 2000, and in the interim the minimum period for indexation of lending will likewise be extended from three to seven years. Once these reforms have been phased in, all issued indexed bonds will be subject to the same minimum maturity requirement.

Table 3
The scope of financial indexation

Stock of market securities, end-1995	Deposits and credits of deposit money banks	
	Division by form	
	Credits:	*Deposits:*
Indexed 95%	Indexed 51%	Indexed 35%
Non-indexed . . . 3%	Non-indexed . . . 40%	Non-indexed . . . 58%
Foreign-currency denominated . . . 2%	Foreign-currency denominated 9%	Foreign-currency denominated . . . 7%

Banking institutions will then, as before, be able to issue indexed bank bonds with the same minimum maturity period as the loans they grant.

Despite recent steps to reduce the scope of indexation, it is still very widespread, as shown (Table 3) in the breakdown of the stock of securities in the financial market and deposits and credits of the deposit money banks.

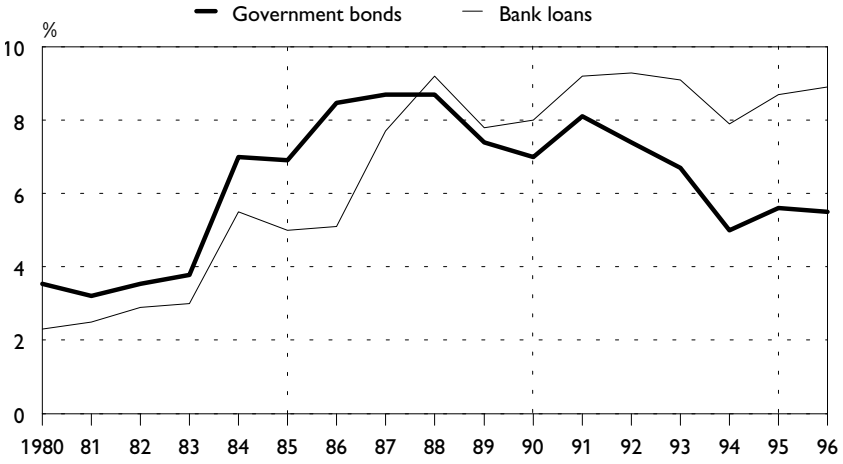
Domestic interest rates

The major steps in the internal liberalisation of interest rates were the widespread permission to use price indexation of financial obligations in 1979, the freedom of the banks to decide their own deposit and lending rates that was established in two steps during the years 1984–86 and the replacement of the former Usury Act with a new Interest Rate Act in 1987, establishing almost complete negotiating freedom for interest rates.

With the benefit of hindsight, it can be argued that this development had been delayed and was both taking place too fast and occurring at a bad time in the economic cycle. The year 1987 was the final year of the boom that had lasted from 1984 and was characterised by a severe overheating in the economy. The inevitable increase in real interest rates that occurred with the transition from repressed to deregulated capital markets was therefore reinforced by the overheating in the economy. It was also a problem that no developed money market existed and the capital market was not as developed as it is now. The potential for the Central Bank to influence interest rates through intervention in these markets was thus less than desirable, given the full freedom of the banks to determine their own rates. Real interest rates increased considerably with this development and became as high as 8½% in 1987 and 1988 on long-term indexed government bonds. Although real interest rates declined somewhat in 1989 and 1990, they increased again in 1991, and actually stayed very high in historical terms and in international comparisons until the last months of 1993 when the Central Bank and the Treasury pushed interest rates down in the money and bond markets through a combined effort. Since then long-term interest rates on indexed government bonds have moved in the 5–6% range, as can be seen in Graph 2.

Graph 2

Real interest rates on indexed government bonds and bank loans, 1980–96



Capital movements

The process of liberalising capital movements was much smoother than the process of internal liberalisation. It did not begin in earnest until the summer of 1990, when it was decided to gradually lift most restrictions on long-term capital movements until the beginning of 1993, later postponed to the beginning of 1994. The access of Icelandic residents to foreign borrowing had been increased somewhat in the years before 1990. Direct investment as well as long-term portfolio investment abroad by Icelandic residents was subject to ceilings in the adjustment process.

A new foreign exchange legislation was adopted by Parliament (Althing) in November 1992, whereby all capital movements became liberalised at the beginning of 1995 after a gradual lifting of restrictions. The legislation on foreign direct investment was revised in 1995 in accordance with the EEA agreement. The revision reduced further the restrictions in this area, making fisheries the main sector that is still closed to foreign direct investment.

The links between the domestic and foreign capital and money markets have grown stronger with these developments and were further strengthened by the emergence of a developed money market in 1992/93

(see later) and the advent of the interbank market for foreign currency in May 1993 (see later).[16] The scope for an independent monetary policy with a stable exchange rate has not completely disappeared though. The final restrictions on short-term capital movements disappeared only very recently. There are also some indications that, in spite of full formal freedom of capital movements, the special characteristics of the Icelandic capital market, such as widespread indexation, will initially weaken the link between domestic and foreign interest rates compared with, for example, the other Nordic countries. It is interesting in this regard that the gyrations on international bond markets after the US Federal Reserve Board increased short-term interest rates in early 1994 had no noticeable effect on interest rates in Iceland, in spite of full freedom of long-term capital movements. In as much as these fluctuations were caused by fluctuations in long-term inflation expectations, this development can, at least in part, be explained by the widespread indexation on the Icelandic capital market.

The current regulations will make large outflows possible if ever there is a widespread lack of confidence in the Icelandic króna. Domestic residents have, until now, been most likely to be behind such outflows, as foreigners do not have large enough króna holdings and markets are not yet developed and liquid enough for them to risk selling the króna short. In 1996 and 1997 the interest shown by foreign investors in the domestic money and securities markets has increased significantly and indications are that they have started investing in these markets. The stability of the exchange rate, low inflation, strong growth and high interest rate differential vis-à-vis international markets have contributed to this development.

The interbank market for foreign currency

Until the end of May 1993, the price of foreign currencies used to be quoted unilaterally by the Central Bank during every business morning. The quotations were based on foreign cross-rates in international markets on the one hand and the desired value of the official currency

[16] An econometric study done in the Economics Department of the Central Bank of Iceland on weekly data on 3-month Treasury bill rates for Iceland, the United States, Germany and a trade-weighted foreign rate from 9th February 1993 until 1st October 1996 indicates a strong increase in the estimated feedback on domestic interest rates from interest rate spreads in the case of the US dollar and the currency basket from the pre-deregulation period to the post-deregulation period. The period is split at the beginning of 1995. It is interesting that feedback is much stronger from US rates than from German rates during the post-deregulation period.

index on the other. The Bank quoted both buying and selling rates. These rates were then used by the banks in all their transactions with their customers during that day. The banks could place orders with the Central Bank to buy and sell currencies in any amounts at the quoted rates for two hours after the morning quotation. Consequently, the current balance between supply and demand for foreign exchange had no immediate effect on the exchange rate. This system would have become impossible to manage once all capital movements had been fully liberalised. For that reason and due to the perceived need to let market forces play a bigger role in the determination of the daily exchange rate, an organised interbank market for foreign currency began to operate in Iceland on 28th May 1993. The main features of the new system were the following:

- The agents on the market, which are the Central Bank and the four commercial banks,[17] met at a fixing session every morning where the rate of the króna was fixed against individual currencies on the basis of transactions at the meeting and international cross-rates.
- The banks were free to set rates and spreads in transactions with their customers. They were also free to transact between themselves or with the Central Banks outside the fixing meetings and at other rates than set at the meetings. The Central Bank, on the other hand, was free to turn down such offers or quote a new rate.
- The banks were allowed to take net foreign exchange positions amounting to 10% of equity capital for individual currencies and 20% in total.

This system was changed at the beginning of July 1997. The daily fixing sessions were abolished and the banks assumed the obligation to quote two-way prices on a continuous basis. The Central Bank will fix the official exchange rate on the basis of quotations of the market participants. This change will limit the Central Bank's involvement in the market and the Bank can approach the market on more discretionary basis.

The money market

One of the most important changes in the framework for monetary policy in recent years is the agreement, originally made in June 1992, to close the automatic overdraft facility of the Treasury in the Central Bank. This was to be done in two steps. The Treasury was, according to the

[17] Including the commercial banking institution of the savings banks.

agreement, to meet its short-term financing needs through regular auctions of short-term government paper. The agreement has been revised twice without there being any change in the main direction. A ceiling of 3 billion krónur was put on the overdraft facility during the second half of 1992. It was then closed at the beginning of 1993, but the Central Bank bought specially issued, but in principle marketable, Treasury bills if an overdraft occurred. At the beginning of 1994 all direct lending by the Central Bank to the Treasury ceased, except that the Central Bank can make non-competitive bids at the auctions of Treasury bills. The important point here is that it is the decision of the Central Bank whether and to what degree it does so. Its possibilities to influence short-term nominal interest rates are therefore no longer restricted by any form of automatic direct lending to the Treasury.

A significant and effective money market did develop in less than two years, due to this agreement, which greatly increased the possibility of the Central Bank to influence interest rates through market operations. As an indication of the speed of the development of the money market it can be mentioned that the Treasury sold short-term paper through auctions for IKr 65 billion in 1993, compared to IKr 10 billion in 1992 and nothing in 1991. The volume has remained in this region since then. At the same time the turnover of this paper on the organised secondary market increased from nothing in 1991 to IKr 58 billion in 1993 and gradually to IKr 81 billion in 1996.

Central Bank market making in government instruments

A part of the agreement with the Treasury in 1992 was that the Central Bank should assume the role of a market maker in Treasury bills in order to facilitate their liquidity and price setting. At that time the Central Bank was already a market maker in government bonds on the Iceland Stock Exchange. From 1994 onward the Central Bank felt it increasingly necessary to get away from this role as market making in long term bonds could compromise its monetary policy stance. This was indeed the case in 1994 when the Central Bank bought significant amounts of long-term government backed bonds in order to support the interest rate policy of the government adopted at the end of 1993.

In February 1996, the Bank, following a bidding process in December 1995, reached agreements with three member firms of the Stock Exchange that they would manage a portion of the Bank's bond portfolio

and act as market makers in government bonds. The agreements ran through 1996 but could be rescinded by either party at one month's notice. In December, the agreements were extended to the end of February 1997 and before that time the Central Bank made new agreements with three security firms for another 12 months.

With these agreements, the Central Bank has withdrawn as a market maker from the long-term market, except in extraordinary circumstances. This decision was premised on the Bank's view that the market had become sufficiently developed to no longer require daily interventions. The Central Bank still, however, operates as a market maker in the Treasury bill market but has been encouraging market participants to take over that role. The commercial banks have recently shown increased interest in market making in the Treasury bill market.

3. Monetary instruments and operating procedures

The Central Bank of Iceland has independence in setting its own interest rates but the use of some of its other instruments is subject to government consent, the most important being the reserve requirement. Exchange rate policy is also in the domain of the government, but formally the Central Bank decides the exchange policy after having obtained the consent of the government.

Current Central Bank legislation stipulates several and to some extent contradictory goals for monetary policy. However, through consensus the goal of price stability has gradually become the main objective of monetary policy. A stable exchange rate is the intermediate target of monetary policy.

Money market interest rates are the Bank's main instrument. Daily turnover on the interbank market for foreign exchange provides information on the expectations and assessments of market participants and forms a basis for the Central Bank's operations on the foreign exchange and money markets. The Bank's transactions both on the interbank foreign exchange market and with other parties, especially the Treasury, are reflected in changes in the international reserves. The international reserves give the Bank the opportunity to smooth short-term fluctuations on the foreign exchange market and a room for manoeuvre concerning interest rates.

Since 1992, starting with the agreement with the Treasury on non-access to central bank financing, the Central Bank has moved increasingly towards indirect monetary control. Reserve requirement have been lowered and the Central Bank relies primarily on open market operations, i.e. repos and outright transactions in the secondary market in its liquidity management.

A particular complication for the Central Bank has been its market making role in government securities, especially for government bonds. This was particularly pronounced in the period 1994–95 when the

Table 4
Instruments of monetary policy, May 1997

Facility	Maturity	Interest rate	Notes/remarks
Current account	Overnight	2.7%	
Certificates of deposits	45 and 90 days	6.5% and 6.7%	Sold on demand, if supply of Treasury bills is low
Reverse repos	10 days	6.4%	Based on Treasury bills or Central Bank CD's, made on tap
Discount quota	Overnight	6.5%	Limited facility to meet unexpected overdraft on current account
Repurchase agreements	10 days	6.9%	Based on Treasury bills or Central Bank CD's, made on tap
Special repurchase facility for market makers in government guaranteed securities	10–45 days	7.2%	Subject to a quota based on a moving average of trading in secondary market for the issue in question
Reserve requirement	10 days	7.2%	Lagged by 1 month, maintained as a balance with the Central Bank, no averaging, 4% of liquid deposits, 2.5% of other domestic funds
Liquidity requirement	–	–	Fulfilled by commercial and savings bank by holding specific liquid assets. 12% of domestic assets

government set targets for the yields on indexed government bonds. During this period, especially in 1994, the Central Bank bought significant amounts of government bonds. This conflict has now been resolved by the market making agreements the bank made with the securities firms in early 1996, relieving it of its duties in this respect as described above. The Central Bank still makes market for Treasury bills[18] in all range of maturities, 3 to 6 and 12-month, but has made it known to the participants in the money market that it would welcome it if some or all of them would assume this role in the near future.

The main channel for liquidity provision are repurchase agreement and outright transactions in the secondary market in Treasury bills primarily of short maturity or less than 3 months. The Central Bank effectively sets the yield in the repurchasing agreements, by fixing the yield for trades in Treasury bills of comparative maturity (10 days), thereby fixing the short end of the yield curve for Treasury bills.

The Central Bank quotes on a daily basis prices on the Iceland Stock Exchange for Treasury bills, concentrating its bids and offers in 3 to 6 and 12-month maturities which are the benchmark issues. The bids and offers for the benchmark issues are renewed within the day as trading takes place.

The market making in Treasury bills does not necessarily compromise the liquidity management of the Central Bank as the bank can shift the yield in response to supply and demand in order to bring its holdings to a desired level. The fact that the Bank is a market maker, however, makes it possible for the participants in the money market to access significant amounts from the Central Bank before the Bank can adjust the yields in its bid and offers on the secondary market. As a result, it would simplify monetary control if the Central Bank was to be relieved of the task of market making.

Although the Central Bank still imposes a reserve and liquidity requirement on commercial and savings banks these are not actively used in monetary management. The reserve requirement was last changed in 1993 when the Central Bank relaxed monetary policy. In the present arrangement the reserve requirement is primarily intended to impact the structural position of the banking system vis-à-vis the Central Bank,

[18] The Treasury bills are quoted and traded on the Iceland Stock Exchange (ISE). The Central Bank only trades in Treasury bills on the ISE.

although this can be done in various other ways, including open market operations.

Foreign exchange intervention

The Central Bank intervenes in the foreign exchange market by buying or selling krónur usually at fixing meetings but also on the interbank market outside the meetings. The Bank intervenes so as to prevent the currency index from moving too far from the central rate. The Central Bank has set a lower and a higher limit for its international reserves as a guideline for the operation of monetary policy.

Evaluation of the present framework

The present framework gives the Central Bank a strong grip on the development of short-term interest rates and the short-term movements of the exchange rate. The fixed-interest rate offer of repurchasing agreements and to some extent the market making in the Treasury bill market smoothes interest rate fluctuations which would otherwise result from changes in bank liquidity. To some extent this is desirable given the present policy framework as the short interest rate in the money market operates as the instrumental variable. The system is, however, overdetermined in the sense that repurchase agreements and outright transactions are both done on a daily basis. For fine tuning of liquidity one or the other should be sufficient. The negative side to this arrangement is that the response of the Central Bank to, for instance, foreign exchange speculation might be slow as the banking sector can quickly acquire short-term finance by liquidating Treasury bills or accessing repos. This is, however, countered by operating with internal limits within the day for repos and outright transactions which call for an evaluation of the situation once certain quantitative limits are reached. The constant presence of the Central Bank in the foreign exchange market poses the same problem.

This is partly the background to the Central Bank's desire to be relieved of its role in market making of Treasury bills, i.e. to simplify the operational framework and increase the discretionary possibilities of the Bank in granting liquidity to the banking sector. In the future the Central Bank has considered moving the repurchase agreements to a weekly frequency in order to further enhance its discretionary powers. Fine tuning in such an environment could be accomplished with the present

discount quota or by introducing averaging in the application of the reserve requirement. Finally, fine tuning could also be made with outright transactions in Treasury bills.

4. Macroeconomic developments and policies

The Icelandic economy was in a state of stagnation during the early nineties, turning into a full scale recession in 1992. During the same period a historically significant disinflation process was taking place that reduced inflation in Iceland from double-digit levels down to a level similar to that of its trading partners. The stagnation of the early nineties was mainly caused by negative supply shocks and adjustment to the severe overheating that occurred in 1987; however, restrictive policies, that were part of the disinflation process, also contributed. Unemployment which had averaged less than 1% during the 1980s increased significantly during this period and peaked at 5% in 1995.

The development of asset prices did not play a large role in macroeconomic developments during the 1990s. The increased access to credit for households that took place in the 1980s and 1990s due to financial liberalisation and the increased scope of state supported housing finance systems had a more important role, probably lowering the household savings rate, boosting private consumption and increasing significantly both gross and net household debt. The fiscal stance has somewhat fluctuated during the 1990s. However, an initial position, that was relatively favourable in terms of debt levels, made it possible to use fiscal concessions to moderate wage developments during the disinflation process. Table 5 shows the development of some of the main macroeconomic aggregates during the 1990s.

Production and demand

The development of export revenue, i.e. the purchasing power of exports of goods and services in terms of imports,[19] is the main driving force of the Icelandic economy over the medium run. Actually, nearly 90% of the variance in national income over the period 1960–94 can be explained by current and lagged values of the terms of trade and the volume of

[19] This is really the product of the terms of trade and the volume of exports.

Table 5

Macroeconomic indicators

Annual percentage changes or ratios

	1980–89[1]	1990	1991	1992	1993	1994	1995	1996	1997[2]
Real value of marine production	5.7	−1.2	−2.2	−1.9	5.9	7.4	−3.2	8.8	0.0
Exports of goods and services	2.8	0.0	−5.8	−1.7	6.6	9.8	−2.3	9.9	2.8
Terms of trade[3]	−0.2	−2.0	3.4	−2.7	−5.1	0.1	1.0	−3.6	0.7
Export revenue	2.6	−2.0	−2.6	−4.4	1.2	9.9	−1.3	5.9	3.3
GDP	3.3	1.2	1.2	−3.3	0.9	3.5	1.2	5.7	3.5
National income per capita	1.8	−0.3	1.4	−5.5	−1.8	2.6	1.7	3.8	3.2
National expenditure	3.1	1.5	5.1	−5.3	−4.1	1.5	3.4	7.4	7.0
Current account balance[4]	−3.3	−2.2	−4.7	−3.1	0.1	1.9	0.8	−1.9	−5.0
Inflation[5]	41.3	14.8	6.8	3.7	4.1	1.5	1.7	2.3	1.7
Employment	2.0	−1.1	−0.2	−1.2	−0.8	0.6	1.4	2.3	1.3
Unemployment[6]	0.8	1.8	1.5	3.1	4.4	4.8	5.0	4.4	3.7

[1] Period averages. [2] Forecast. [3] Of goods and services. [4] As a percentage of GDP. [5] As measured by consumer prices. [6] As a percentage of the labour force.

Sources: The National Economic Institute, Statistics Iceland, Ministry of Social Affairs and Central Bank of Iceland.

exports.[20] This should not come as a surprise considering the small size and the openness of the Icelandic economy.

Export revenue peaked in 1987, but then fell in every year until 1993 due to falling fish catches and deteriorating terms of trade, or by a total of nearly 14%. This was strongly reflected in the development of national income per capita. It fell between 1987 and 1990, and then recovered slightly in 1991, due to improved terms of trade and a domestic demand led boom, only to fall further by more than 7% during 1992 and 1993. The recession in 1992 was caused by a further fall in fish catches, a deterioration in the terms of trade and more restrictive fiscal and monetary policies. This policy stance was a response to a demand boom and the widening current account deficit in 1991. Export revenue fell by 4.4% and national expenditure contracted by 5.3% compared to an increase of more than 5% the year before.

The Icelandic economy started to recover in 1993 and the recovery gained momentum in 1994. It was export led, as is most usually the case in Iceland, but the fall in import demand, partly reflecting the June devaluation, also made some contribution in 1993. The relaxation in monetary policy, with the lowering of interest rates in November 1993 (see later), had a further positive impact on demand in 1994. This development swung the current account balance into surplus in 1993 and 1994 for the first time since 1986. Consumption started to pick up in 1994 after having fallen by nearly 9% during the years 1992 and 1993. But investment was still contributing negatively to growth. There was a growth pause in 1995 mainly due to falling marine production; however, consumption grew by 4.6%, being the only demand component that was contributing significantly to growth. The result was that the current account surplus was greatly reduced.

[20] This model analyses national income in constant prices, using exports in constant prices and the terms of trade as explanatory variables. The data are annual and span 1960 to 1996. The model is of the error correction form (with heteroscedastic consistent t-values in parenthesis):

$$\Delta y_t = \underset{}{0.431} + \underset{(7.52)}{0.322}\Delta x_t + \underset{(5.91)}{0.628}\Delta\lambda_t - \underset{(9.47)}{0.480}(y_{t-1} - x_{t-1}) - \underset{(7.27)}{0.487}(y_{t-1} - \lambda_{t-1}) + \underset{(6.37)}{0.395}y_{t-1}$$

(5.99)

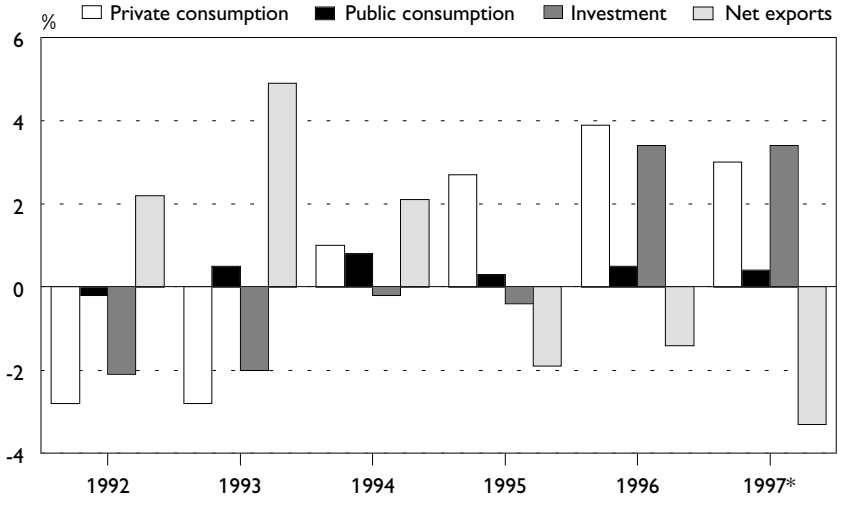
OLS, 1960–96, $\bar{R}^2 = 0.88$, $s = 1.75\%$, DW = 1.74,

where y is the log of national income in 1990 prices, x is the log of exports of goods and services in 1990 prices and λ is the log of the terms of trade. Δ denotes annual changes. The long-run solution of the model is:

$y = 0.84x + 0.85\lambda + 1.01$ or

$y = 0.85(x + \lambda) + 1.01$.

Graph 3
Contribution to economic growth



* Forecast.

At 5.7%, growth was very strong in 1996. Part of the reason was the pick-up in real exports, nearly 10%, though this was partly offset by a worsening in the terms of trade. But as imports grew even more strongly the contribution of net exports to growth was actually negative. It was consumption and investment that were the main demand components behind growth. Gross capital formation expanded by 23½% after having fallen every year since 1991. This pattern is predicted to be repeated this year, with consumption and investment contributing strongly to growth but net exports contributing negatively. As a result, the current account surplus turned into a deficit in 1996 and in the spring of 1997 the deficit was predicted to widen to 5% of GDP in 1997. However, it now seems that it will be somewhat smaller.

The developments in 1996 and 1997 have to be seen against the background of positive supply shocks. These supply shocks are:

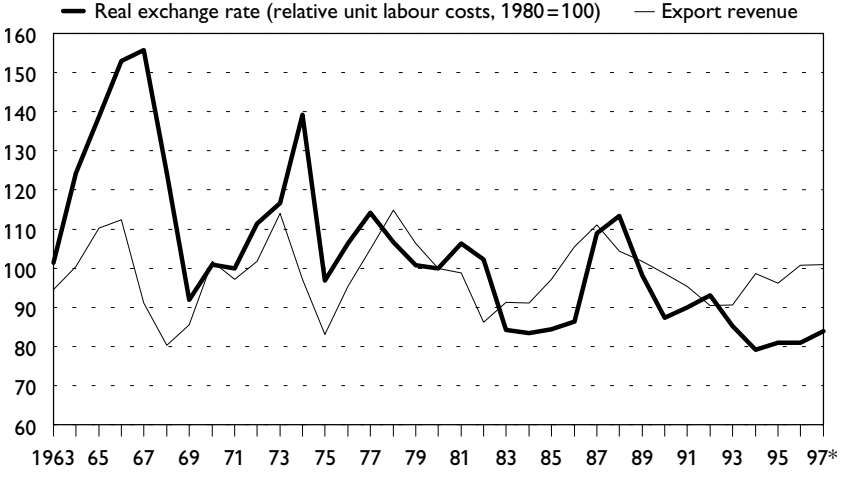
1. The expansion of the capacity of an existing aluminium smelter that was decided in the autumn of 1995.
2. The increase in the cod quota in the spring of 1996 and the prospects of further increases in the years ahead.

3. The decision in 1997 to build a new aluminium smelter and to expand the capacity of the ferrosilicon factory in Iceland.

These "shocks" have contributed to a higher current account deficit in 1996 and 1997 due to the investment needs associated with these projects as well as stronger consumption demand as permanent income is being reassessed. They also contribute to a higher equilibrium real exchange rate, as the current account should return to a new equilibrium once the investment period is over, the new export production materialises and the stock of consumer durables has been adjusted to the higher permanent income level. The increase in the real equilibrium exchange rate raises a policy issue about the adjustment; i.e. to what degree will it occur through an appreciation of the nominal exchange rate and to what degree through higher inflation relative to trading partners. The real exchange rate has in the past tended to fluctuate with export revenue, as can be seen in Graph 4.

Graph 4

Real exchange rate and deviations of export revenue from HP-trend



* Forecast.

The labour market

The Icelandic labour market has the following characteristics:

- A high participation rate compared to other OECD countries, or 77.5% in 1990 compared to an OECD average of 71.5%.[21]
- Long but variable working hours.
- External mobility that has, among other things, been underpinned by the Nordic Labour Market Agreement. This mobility has been reflected in net emigration during recessions and the import of foreign labour when bottlenecks occur.
- A high unionisation rate (over 90%) but also a high degree of organisation and centralisation on the employers' side.
- Relatively low replacement ratios, especially when compared to the other Nordic countries.[22]
- Relatively high flexibility in terms of firing and hiring.
- A high degree of real wage flexibility.

These features, along with the willingness of the authorities to use the exchange rate instrument to facilitate the adjustment of the economy to unfavourable external shocks, have undoubtedly contributed to the low level of unemployment in Iceland.

Unemployment was much higher during the nineties than in previous decades. It peaked in 1995 at 5% as can be seen in Graph 5. Subsequently, the strong growth in 1996 reduced unemployment, which is predicted to fall further this year to 3.7%. The changes in the employment ratio are even more dramatic as can be seen in Graph 5. It should be recalled, however, that labour participation increased significantly in 1987 as that was a "tax-free year" due to the switch to a PAYE income tax system from the beginning of 1988. The increase in unemployment in the 1990s is to be explained by negative supply shocks and the relatively tight monetary conditions that were reflected in high real interest rates. It has also to be born in mind that the unemployment levels of the 1980s were associated with strong inflationary pressures in the economy and were thus unsustainable.

The increase in the unemployment rate during the 1990s and the subsequent fall during the last two years raise the issue as to what has

[21] See OECD (1995).

[22] Gudmundsson, B. and G. Zoega (1997) give a figure of 42% for 1990–95. OECD (1997), pp. 127, gives a figure of 53% in 1995 for the first year of unemployment for a single individual compared to 71% in Denmark, 65% in Finland, 62% in Norway and 76% in Sweden.

Graph 5
Unemployment and the employment ratio

Note: Unemployment is expressed as a percentage of the labour force, and the employment ratio is the number of employed as a ratio of the working age population.

* Forecast.

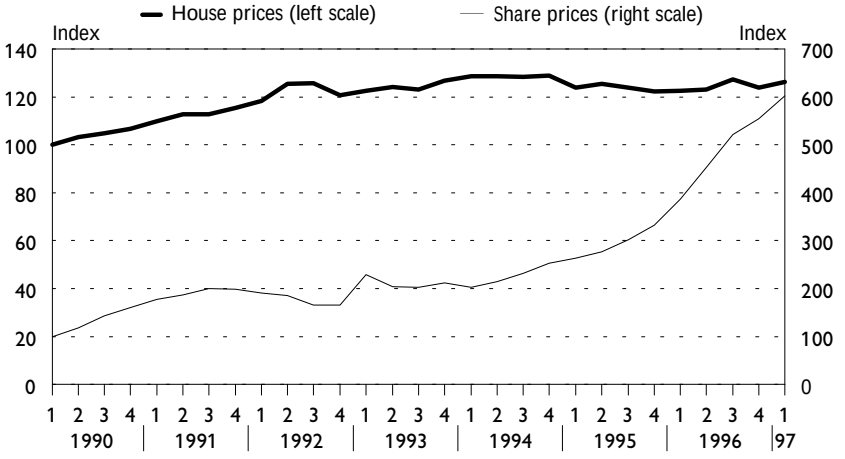
happened to the equilibrium unemployment rate during this period, if indeed it exists. One study on this issue indicates that the NAIRU has increased during the 1990s from possibly below 2% to as high as 4%. These estimates are, though, very tentative and subject to high standard errors.[23] Looking at all the available data, the Central Bank has recently been of the opinion that the slack that existed in the labour market in 1995 has mostly disappeared. That was one of the premises for the tightening of monetary policy in the autumn of 1996. There is also some concern that possible reductions in unemployment are subject to speed limits.

Asset prices and financial market influences

Asset prices have not played any major role in macroeconomic developments during the nineties. After increasing significantly during 1990 and 1991 nominal house prices have fluctuated in a relatively narrow range

[23] Gudmundsson, B. and G. Zoega (1997).

Graph 6
Asset prices, 1990–97
1st quarter 1990 = 100



(Graph 6). Thus the bottom never went out of the house market in Iceland in spite of the recession of 1992. The reason is probably that the access of households to housing finance was significantly extended in 1992 with the introduction of a new system. Although share prices fell somewhat in 1992 they have since been on a strong upward trend. However, this development does not have a significant effect on aggregate demand as the market has, until very recently, been small and relatively underdeveloped.

Although there were some difficulties in the Icelandic banking system during the early nineties as witnessed by growing bad loans and defaults and the need for equity injection into the biggest state-owned bank, there is no evidence of a credit crunch in Iceland during this period. Total lending of the credit system grew on average by nearly 10% per year during 1990–96. The slowdown in lending growth from more than 11% in 1993 to 4.8% in 1994 was probably mostly due to lower credit demand rather than supply. It is a significant factor in this regard that households had easier access to credit than ever before due to the financial liberalisation of the late 1980s and the expansion of state guaranteed housing loan systems during the early 1990s. This probably lowered the savings rate

and kept consumption at a higher level than otherwise would have been the case. It is also likely that it reduced the dependence of consumption on current conditions so that initially it contracted less during the recession.[24] It also made it possible for forward looking behaviour of consumption to play a bigger role when the economy was "hit" by positive supply shocks during the last two years. As a result, gross household debt increased from under 25% of disposable income in 1980 to around 130% in 1996. During the same period, the net asset position of households worsened from 92% of assets to 59% if pension fund assets, equity and household effects and consumer durables are excluded. A key question for the future is when will household debt levels begin to be a serious constraint on consumption demand?

Macroeconomic policies

Fiscal policy played a dual role during the 1990s. First, it was used to support wage moderation through fiscal concessions (see later). This was made possible by the relatively low debt level of the public sector as seen in Table 6. Secondly, it played a more traditional macroeconomic role through automatic stabilisers and discrete adjustments. Fiscal policy was tightened during 1992, thus aggravating the recession of that year, as can be seen in Graph 7.[25] But this tightening has to be seen in the light of the serious fiscal slippage in 1991. During 1993–95 fiscal policy was probably mildly expansionary. A new phase began in 1996 with a two-year fiscal consolidation programme aiming at eliminating the Treasury deficit on a cash basis in 1997.

Graph 7 also shows an index of real financial conditions, constructed as a weighted average of long-term real interest rates and the real exchange rate divided by the deviation of the real export revenue from trend. This correction is a crude way to adjust for changes in the

[24] There is some weak econometric evidence for this. Recursive estimates of the annual consumption function, where real changes in consumption is the dependent variable, indicate some lowering of the coefficient on current changes in disposable income during the 1980s. (The other explanatory variables are an error correction term involving the levels of consumption and disposable income and a constant.) If the sample going from 1963–96 is split into two, the coefficient is 0.85 during 1963–79 but 0.77 during 1980–96; however, this difference is statistically insignificant.

[25] The fiscal impulse measure implicitly assumes that the elasticity of treasury revenue with respect to GDP is 1 and requires expenditure to be constant in real per capita terms. Because these assumptions are ad hoc, the impulse only gives a rough guide to the stance of fiscal policy.

Table 6

Fiscal and monetary indicators

Annual percentage changes or ratios

	1990	1991	1992	1993	1994	1995	1996	1997[1]
General government in % of GDP:								
Financial balance	−3.3	−2.9	−2.8	−4.5	−4.7	−3.0	−1.8	−0.8
Gross debt	35.3	36.5	46.4	52.8	56.0	58.7	56.0	52.8
Net debt	17.6	17.5	26.6	34.3	37.8	37.9	36.2	34.4
Interest rates – end of period:								
Nominal money market yield[2]	11.2	14.9	11.3	5.5	6.1	7.3	7.1	7.0[4]
Indexed government bonds (real)[3]	7.0	8.3	7.8	5.0	5.1	5.9	5.8	5.5[4]
Indexed bank loans (real)	8.2	10.0	9.3	7.5	8.3	8.8	9.0	9.1[4]
M3 – end of period	14.9	14.4	3.8	6.6	2.3	2.2	5.8	6.6[4]
Exchange rate depreciation[5]	–	–	6.4	7.6	1.7	−0.2	−0.6	−1.9[6]
Nominal GDP	14.9	9.0	0.2	3.4	5.6	4.0	7.6	7.3
GDP deflator	16.8	7.7	3.7	2.5	2.0	2.8	1.8	3.7

[1] Forecasts or latest figures. [2] Three-month Treasury bills on the primary market (1990–91) and on the secondary market (1992–97). [3] Transaction averages on the Icelandic Stock Exchange (1990–91) and yield on the secondary market for 10-year government saving bonds (1992–97). [4] June. [5] Official exchange rate basket. [6] Twelve-month change to the end of June.

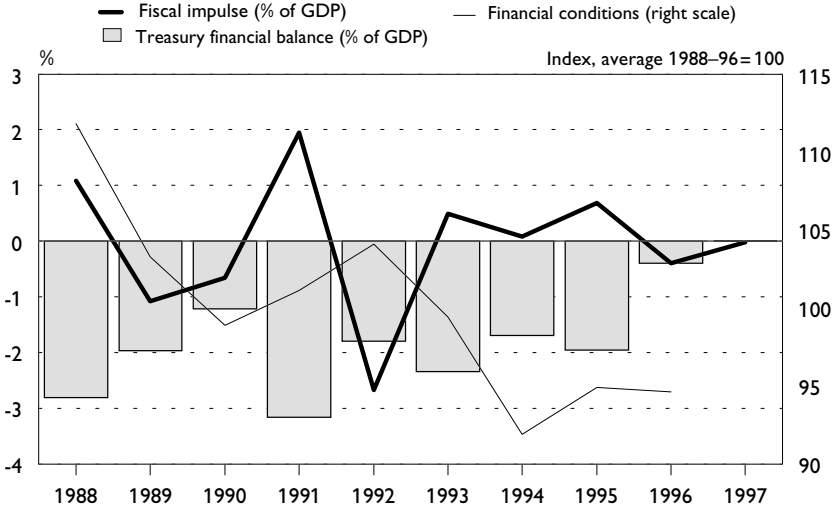
Sources: Central Bank of Iceland, Ministry of Finance and the National Economic Institute.

equilibrium real exchange rate. It is clear that this index cannot accurately reflect the monetary stance, but the long-term real interest rate and the real exchange rate have the strongest influence on aggregate demand among the financial variables in Iceland. The index indicates a tightening of financial conditions in 1992, a relaxation in 1993 and 1994 but some tightening since then. This conforms with the description below regarding the monetary stance.

The monetary policy stance was tightened around the middle of 1991 in response to the weakening of the fiscal position in the aftermath of the 1991 elections. Interest rates on Treasury bills and government bonds rose in response to an increase in the borrowing requirement of the Treasury. The Central Bank also responded to the situation by raising its own interest rates. These were reflected in interest rates of commercial and savings banks. Nominal yields rose from 14% at the beginning of the year to 23% in September but started to decline from then onwards as inflationary expectations diminished. Real interest rates, however, remained high as witnessed by the fact that real yields on indexed government bonds were over 8.2% on the secondary market at the end of the year.

Graph 7

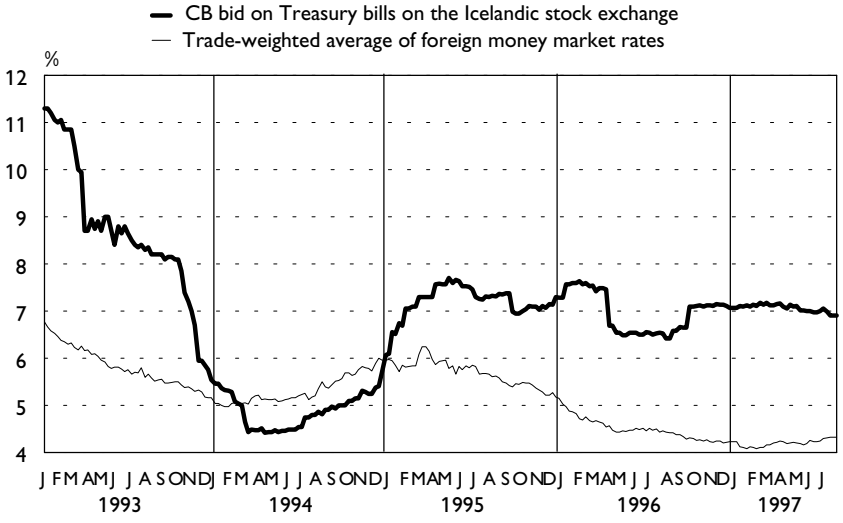
Fiscal impulse and index of real financial conditions



The devaluations in November 1992 and June 1993 implied a relaxation in the monetary stance, though interest rate levels remained broadly unchanged until November 1993 when the Central Bank and the Treasury through a concerted effort staged a reduction in interest rates. This was motivated by the weakness of economic activity, a lower public sector borrowing requirement and "stickiness" of interest rates. The Central Bank lowered the reserve and liquidity requirements significantly, thereby injecting liquidity into the market which forced down the interest rate in the money and bond markets. The Treasury announced that it would not borrow in the domestic market on indexed terms unless the interest rate was 5% or lower. The combination of these measures, as well as the favourable underlying situation pushed indexed yields on government bonds down to 5% and the yield on treasury bills down to 4.5%. At the time of these measures both short and long-term interest rates in international market were extremely low but they started to rise in February 1994. This gradually made domestic interest rate levels untenable, as the domestic sector responded to the negative interest rate differential between the domestic and foreign markets by a portfolio shift. Foreign debt was repaid and significant portfolio investments were made abroad

Graph 8

Three-month interest rates, 1993–97



using the new freedoms associated with the liberalisation of capital movements. This put upward pressure on domestic interest rates but the Central Bank and the government initially resisted this, with the Central Bank buying significant amounts of Treasury paper on the secondary market in 1994.

The impending final phase in the liberalisation of capital movements at the beginning of 1995 made it inevitable to raise short-term interest rates in order to prevent capital outflows. This was done in the autumn of 1994, with parity against a trade-weighted average of international rates reached at the beginning of 1995. Further capital outflows and weakening of the króna in 1995 required a further tightening, pushing the interest rate differential, so measured, up to 2% at the end of 1995. Part of this tightening had taken place through a gradual decline in international interest rates.

The 5% interest rate target on indexed government bonds was partially maintained, however, until late April 1995, when the government finally relented to market pressures and let the interest rate on long-term bonds be determined by the market. As a consequence the yields rose up to 5.9% and have since been fluctuating between 5–5.8% depending on maturity.

The relaxation of monetary policy in 1993 stimulated the economy in 1994. Developments in 1995 were, however, weak and the forecast for 1996 suggested that growth would slow in 1996. In December 1995, in response to strong outflows on the foreign exchange market, the Central Bank further tightened monetary policy by raising interest rates and allowing the interest rate differential vis-à-vis trading partners to rise to 3%. As foreign exchange flows turned around in the first quarter of 1996 the Bank decided to reduce the interest rate differential to 2%. As things turned out the prospects for growth were seriously underestimated and the Central Bank responded in September 1996, when this had become apparent, by raising interest rates again, effectively bringing the interest rate differential back to 3% and increasing the liquidity requirement of the commercial and savings banks by 2%. These measures were also motivated by increasing uncertainty associated with the forthcoming wage negotiations and ample liquidity in the system resulting from refinancing of outstanding Treasury debt. These measures restored balance in the foreign exchange market and stabilised price and exchange rate expectations.

In 1992, Iceland was in the middle of a historic disinflation process that had started in 1989 with inflation in double digits and came to an end in 1994/95 when inflation in Iceland had been reduced to a level similar to that of low inflation OECD countries. The direct source of this process was mainly twofold. First, the stable exchange rate from December 1989 to November 1992 and, secondly, a moderate economy-wide wage settlement in February 1990 that was based on forward-looking inflation expectations. Behind this process is, though, a fundamental shift in attitude towards inflation among the public at large, whereby the experience of high and variable rates of inflation, coupled with widespread price indexation, led to an awareness that the interests of households and businesses were best served by stability of prices and the economic environment in general. This made it possible to base the disinflation process on consensus and probably reduced significantly the cost of that disinflation.

Table 7 below gives an overview of the private sector general wage settlements in Iceland during the nineties. These wage settlements involved, in most cases, more or less the whole private sector and were also, to various degrees, replicated in the public sector. This was possible due to the high degree of centralisation of the wage bargaining process in

Table 7
Wage settlements during the 1990s

Date	Length in years	Initial wage	Total wage increase	Fiscal concessions increase	Escape clauses or revisions
Feb. 1990 . .	1½	1.7%	10.5%	Yes, but small	CPI thresholds
April 1992 .	1	1.7%	2.1%	No	No
May 1993 . .	1½	0%	0%	Yes: reduction in VAT	Yes: two reviews
Feb. 1995 . .	2	4%	7%	Yes: income tax reduction	Yes: review in November 1995
March 1997 .	3	5½–6%	14%	Yes: income tax reduction	Only very general

Iceland. It is also to be noted that the government is very much involved in the process, usually with fiscal concessions in order to increase wage moderation but sometimes also in trying to bring about the settlements. The government is further involved in trying to increase the forward-looking element in these settlements, usually with declarations of exchange rate stability but sometimes also by providing inflation forecasts.

The first settlement in 1990 was the trend setter and almost economy-wide, involving most of the private and public sector unions. There were no significant fiscal concessions but the government promised exchange rate stability and the lowering of nominal interest rates, which was, anyway, to be expected when the fall in inflation materialised. The settlement was for 1½ years. There were CPI thresholds in the settlements that could trigger further wage increases. The outcome was in all cases close to these thresholds and wages increased by around 11½% in total during the contract period whereas the settlement had envisaged 10½%.

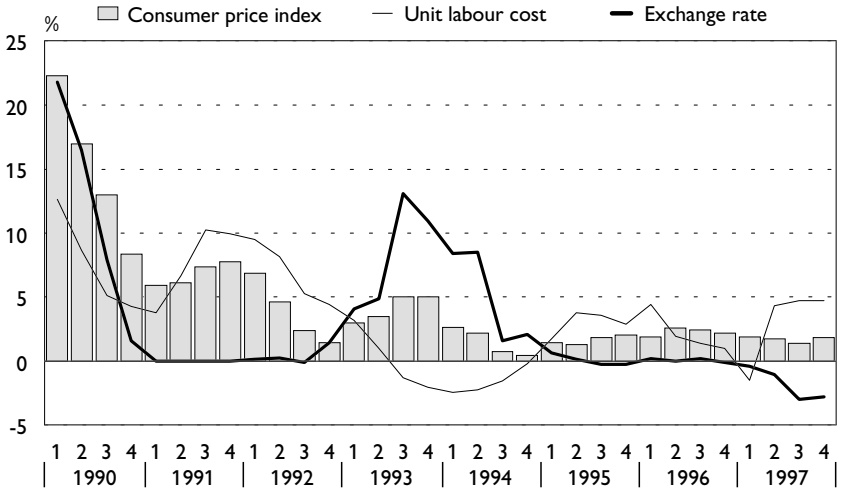
The settlements in 1992 and 1993 were based on the achievements of the 1990 settlement. But by this time the recession in the economy and growing unemployment were becoming serious concerns of the unions and had a significant effect on wage moderation, as can be seen in the table. The wage moderation in the 1993 settlement was, however, partly induced by a significant fiscal concession involving the reduction in VAT on many food items from 24 to 14%. This level of wage moderation came to an end in 1995 even though unemployment peaked during that year. At that time there was a perception that the economy had started to pick up and hysteresis effects might to some degree have started to set in. The latest wage settlement, in March 1997, has significantly higher wage increases than seen since inflation came down to the 1–3% range. It also involves significant fiscal concessions as the government has promised a phased reduction in the standard income tax rate of 4% until the year 2000. This settlement was, of course, made against the background of strong growth in 1996 and the prospects of a continuation of growth above the OECD average in 1997 and even beyond. This development has greatly reduced the slack that existed in the economy in 1995 and has contributed to a significant reduction in the rate of unemployment.

Graph 9 shows the development of inflation during the nineties as well as its underlying factors in the developments of unit labour costs and the exchange rate. As the graph shows, wage moderation along with the stable exchange rate brought the rate of inflation down to 1½% in the

Graph 9

Inflation and underlying factors, 1990–97

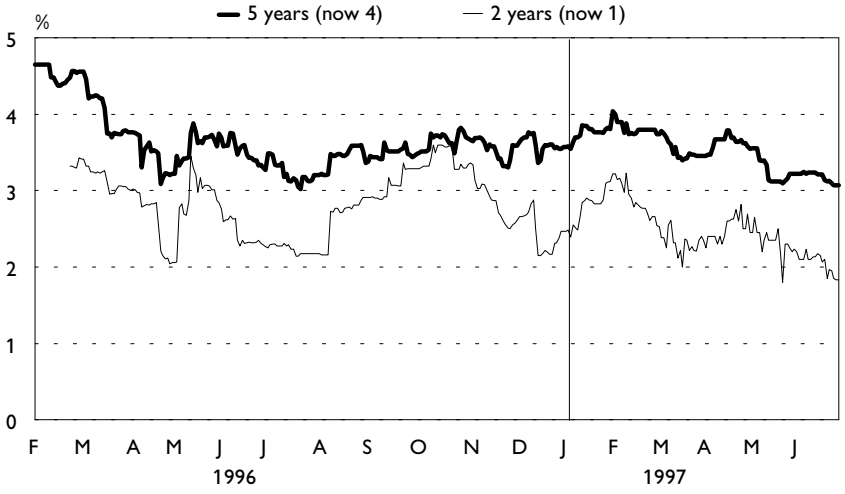
4-quarter change from previous year



fourth quarter of 1992. The devaluations in November 1992 and June 1993 then boosted the inflation rate for a while, with a peak at 5% during the second half of 1993. During this period unit labour costs were not contributing to inflation. Inflation fell again as soon as the effects of the devaluations had worn off, bottoming out at 0.4% in the fourth quarter of 1994. Since then increases in unit labour costs have been the major factor behind inflation along with some increases in import prices during the summer of 1996. The Central Bank predicted in April that inflation will be in the 2–2½% range in 1997 but possibly going over 3% in 1998 and then down to 2½% again in 1999. Price developments during the second quarter of 1997 turned out to be more favourable than expected, partly due to an appreciation of the currency, caused by capital inflows and a stronger confidence in the króna. The Bank has therefore lowered its inflation forecast for 1997 to 1.7%, year-on-year, but still predicts inflation to be in the 2½–3% range in 1998 and 2–2½% in 1999. This now assumes a further strengthening of the króna, which could very well take place. The low inflation regime seems thus to have withstood the test of an upturn in the Icelandic economy.

Graph 10

Yield difference between indexed and unindexed government bond (inflation premium)



The available evidence indicates that inflation expectations were higher than actual outcomes during the whole disinflation process.[26] This slow adjustment of expectations is usually one of the reasons for the costs of disinflation. It may have mattered less in this case as wages were being set in centralised wage settlements where the optimism on inflation was probably greater than among the public at large. Moreover, the widespread use of financial indexation prevented the increase in ex post real interest rates which usually goes hand in hand with disinflations of this magnitude. In the most recent period indexed and unindexed government bonds of the same maturity have existed side by side giving important information on the development of inflationary expectations and/or risk premia in the market. The development of this inflation premium is shown in Graph 10. As the graph shows, the inflation premium has come down after the wage settlements in the spring of 1997. That is further evidence that the Icelandic economy might manage a soft landing.

[26] There are two pieces of evidence available to the authors on this. First, sample surveys taken 2–4 times a year during the period 1984–93 show a significant tendency to overpredict during the nineties, except in one quarter. Secondly, annual forecasts made by company chairmen for 1991–97 overpredict in all years. For instance, the prediction for 1994 was nearly 4% whereas the outcome was only 1½%.

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Comments on "Monetary policy in Iceland during the nineties"

Jagjit S. Chadha*

I enjoyed reading this paper and learnt a lot about Iceland. The authors echo the recurring themes of open-economy macroeconomics. What is the appropriate form of nominal anchor? Should exchange rates be allowed to float freely? Should financial and real-side liberalisation be gradual? How important are the spill-overs from fiscal to monetary policy?

My discussion will centre on the first two questions in the preceding paragraph and the conclusion will touch upon some of the issues raised by the last two questions. But first I will quickly outline the results from the open-economy model which underpins much of the discussion today (see, for example, Devarajan and Rodrik (1991)). If we take a standard Barro-Gordon model and substitute the exchange rate for money and solve for quadratic losses under fixed (*f*) and floating (*nf*) exchange rates we get the following expression for the net gain from fixed exchange rates:

$$W_f - W_{nf} = \alpha^2\phi^2\left[\left\{\frac{y^* - \bar{y}}{1-\mu}\right\} - \left\{\frac{\beta^2\sigma^2}{(\alpha^2\phi + (1-\mu)^2)}\right\}\right] \quad (1)$$

where α and β are the elasticity parameters on an IS function for the real exchange rate and income (or, terms-of-trade shocks), ϕ is the weight attached by the authorities to the real (output) target relative to the nominal one, μ is the weight of non-traded goods in the domestic price index,[1] y is growth rate of real output and has an asterisk for the authorities' expansionary target and a bar for the economy's natural level of growth, and σ^2 is the relative variance of real (income or terms of trade)

* The views expressed in this document are those of the author and do not necessarily reflect those of the Bank of England.

[1] Which operates as an inverse proxy for openness in this set-up.

to nominal (money) shocks. The first term in the square brackets represents the benefits from fixed exchange rates and the second term the costs.

Equation (1) tells us that increases in α, β and σ^2 make it more likely that a floating exchange rate will be preferred. Second, the lower $(y^*-\bar{y})$ is, the more likely it is that a floating exchange rate will be preferred. Third, for plausible parameters, reductions in μ (i.e. greater openness) make it more likely that a floating exchange rate will be preferred. Fourth, the partial on ϕ is ambiguous: (i) if fixed exchange rates are preferred (i.e. $W_f - W_{nf} > 0$), then increases in ϕ will make a fixed exchange rate more beneficial (because the perceived inflation bias would be higher); and (ii) if floating exchange rates are preferred, increases in ϕ are ambiguous; but (iii) because the derivative of the term in square brackets with respect to ϕ is unambiguously positive there must be a value of ϕ which makes the monetary authorities indifferent between fixed and floating exchange rates.

This model analysis means that an open economy which is susceptible to large terms-of-trade and/or supply shocks (either through the size of the shocks or through the elasticity of output with respect to those shocks) relative to demand shocks, and whose monetary authorities have a relatively low preference for real output compared to inflation stabilisation may tend to prefer floating exchange rates. Following from what I have read, this sounds like a fair characterisation of the Nordic economies and Iceland, in particular.

In orthodox fashion, Iceland has a goal for price stability. But, as yet, no explicit target for inflation. Iceland's nominal anchor involves a peg of the external value of the króna to a basket of 16 countries with weights determined by relative trade in goods and services in 1994 with a fluctuation band of ±6%. So – because the paperby our Icelandic colleagues suggests in various places that their economy is quite likely to be in a world of asymmetric real shocks – the need for flexibility in the nominal exchange rate is recognised. And certainly the unusually large number of countries involved in the peg (16) means that there has been an attempt to mitigate the occurrence of idiosyncratic shocks at the cost of a directly identifiable external nominal anchor. That is, it is not clear to me that the average inflation rate of the 16 counterpart countries over the previous cycle is significantly lower than that of Iceland or likely to be lower over the next.

If the Icelandic authorities believe that shocks facing them are idiosyncratic then the next question to consider is whether the shocks driving the exchange rate are real (determined by equilibrium conditions in goods markets) or nominal (money or asset markets). Table 1 presents some indicative results from Chadha and Hudson (1997) and are generally in line with the consensus emerging from other studies (see, for example, Canzoneri et al. (1997)). The paper decomposes the variance of the effective real exchange rate for 17 OECD countries and finds that, for the most part, variations in the real exchange rate are accounted for by the identified real supply and real demand shocks, rather than by money demand shocks.[2] The table presents the results for the G-5 and four Scandinavian countries.[3] As the table shows, the finding of real shock dominance seems to apply across countries, over both the short and medium term. And as the paper also finds that such real shocks are generally idiosyncratic across countries, this might suggest that interest rate movements, and hence changes in nominal exchange rates, will typically be the preferable method of stabilising the real exchange rate.[4] This is because, when shocks are primarily real, real exchange rate adjustment will tend to be faster with floating exchange rates; adjustment through domestic inflation will be more sluggish as output typically has to respond to the inflationary or deflationary impulse before prices do.

But recall that even if we find that asymmetric real shocks dominate nominal shocks this is not the whole of the answer because of the authorities' credibility problem.[5] Specifically, optimal policies in the face of observed nominal and real shocks are still likely to lead to positive and persistently high rates of inflation. This is because, as well as stabilising in the face of shocks, authorities tend to face incentives which lead to the systematic generation of unanticipated inflation. The tendency by the authorities to generate unanticipated inflation leads agents to bid up the equilibrium inflation rate and create an inflation bias. The solution to this

[2] Identified money demand shocks are simply interpreted as shocks to the relative demand for money which would be automatically accommodated by a fixed exchange rate i.e. the price of the currency is held constant with respect to shifts in the money demand and supply functions.

[3] Time constraints prevented the extension of this analysis to Iceland, but it seems likely that the qualitative results would be the same.

[4] The idiosyncracy of shocks is measured in various ways in the paper but the finding of first and second principal components which explain relatively low overall variances of the shocks (15–30% and 10–15% respectively) for each 17-country series of identified structural shocks is the most strongly suggestive of idiosyncracy.

[5] Where ϕ is large enough to make fixed exchange rates preferable.

Table 1

The proportion of incremental real exchange rate variation explained by real versus nominal shocks in the G-5 and four Scandinavian countries over the short and medium term

In percentages

Shock horizon	Real		Nominal	
	2 years	5 years	2 years	5 years
France	54	55	46	45
Germany	76	75	24	25
Japan	95	95	5	5
United Kingdom	81	81	19	19
United States	96	96	4	4
Denmark	92	92	8	8
Finland	96	96	4	4
Norway	93	93	7	7
Sweden	94	94	6	6

inflation bias typically requires some domestic institutional mechanism which penalises the authority so that the marginal incentive to inflate is equalled by the marginal cost of doing so. Typically, if a nominal exchange rate peg is seen as the way of eliminating the domestic economy's inflation bias, as for example Giavazzi and Pagano (1988) suggest, a nominal peg would act to delegate monetary policy to another country's conservative central banker. And if the benefits arising from the elimination of this bias are greater than the costs associated with asymmetric real shocks then a fixed exchange rate regime may be preferable.

In fact, a pegged-but-adjustable exchange rate with wide bands is not very far, in technical terms, from an inflation target with an escape clause. But note now that if a domestic solution to the credibility problem could be found, i.e. without the need for an exchange-rate-based nominal anchor, then such a regime would – in macroeconomic terms – always be superior to an exchange rate peg because asymmetric shocks could be dealt with. And what then is the prospective welfare loss of an exchange rate peg versus a domestic inflation target? There are two related ones: (i) the loss of the tool of domestic output stabilisation and the possibility of pro-cyclical monetary policy; and (ii) the presence of asymmetric shocks will lead to agents rationally expecting some de- or revaluation of the nominal exchange rate at some point and this will act to reduce the

credibility of the exchange rate peg (see Obstfeld (1994)). The general point is that any reputational mechanism may tend to do little to buttress the credibility of governments which otherwise have strong incentives to inflate.

This is where the inflation target may come in. Such a target may eliminate the inflation bias by imposing a penalty on a central bank for missing the target; again this is not especially different from the penalty imposed by leaving an exchange rate peg. But the corollaries of the case for an explicit inflation target are many (see Haldane (1995)). For example, the debate on the inflation target can lead to some discussion of the constitutional status of the central bank. An independent central bank may reduce an inflation bias by: (i) increasing the credibility of the government's commitment to price stability; (ii) assuring a higher priority on inflation fighting in the net preferences of the public sector; and (iii) putting up barriers to the monetisation of government expenditure.[6] But a large number of subsidiary questions need to be addressed before this gain necessarily follows. Is the goal for price stability announced or enshrined in some act concerning the operational independence of the central bank? Is there a degree of political consensus (particularly from the financial sector (see Posen (1993)) for such a goal which would act to underpin, and possibly even protect, the decisions of the central bank? Given the paper's emphasis of the importance of asymmetric supply shocks, how would Iceland write an escape clause in the event of supply shocks?

If inflation targets were adopted would it then be likely that a freely floating exchange rate would aid stabilisation policy in Iceland? One simple method in trying to understand this is shown in Figures 1 and 2 which decompose changes in the effective nominal and real króna and sterling (as an example) exchange rate into variances attributable to a spectrum from low (0) to high (π) frequency variations for two sub-periods 1979–92 and 1992–97. This analysis is similar in spirit to that presented in Table 1, where we were trying to gauge the role of nominal and real shocks in determining variations of the exchange rate at different horizons, but where the univariate nature allowed us to split the analysis into sub-samples relatively easily.

[6] This might be perceived by agents to be a significant problem in Iceland where real interest rates are 5% and the trend real growth rate of the economy is 3%. In steady state, this would require a large primary surplus.

Figure 1

Spectral analysis of nominal and real exchange rates in the United Kingdom and Iceland, 1979–92

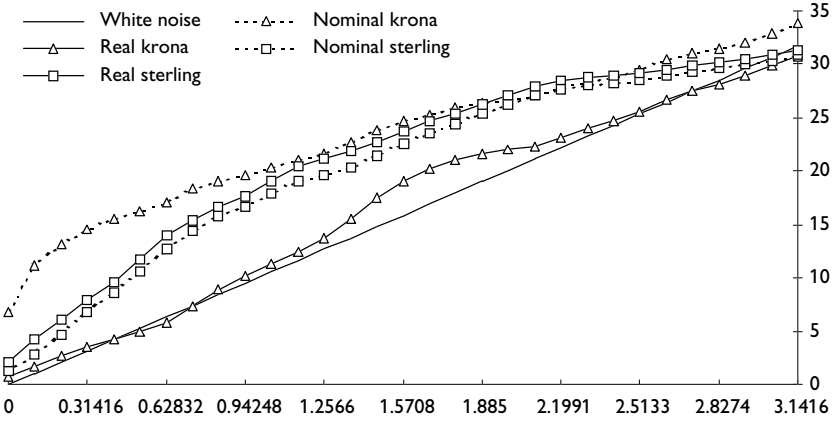
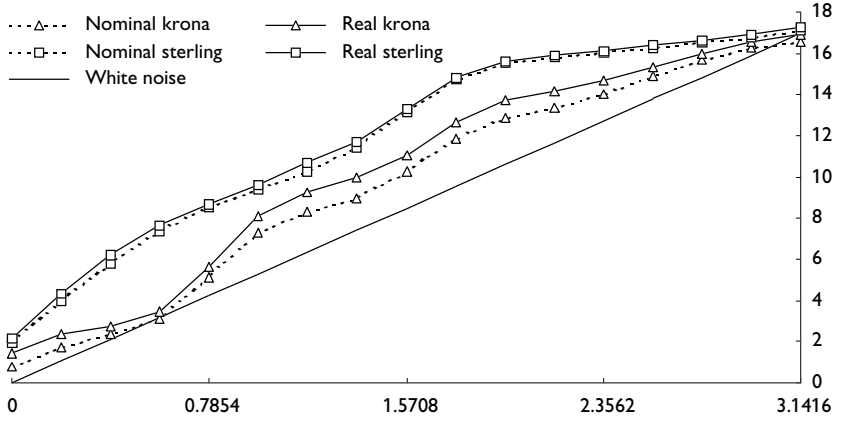


Figure 1 shows that nominal króna changes over the earlier period do not resemble a random walk, with a considerable variation explained by low frequency (trend) movements – implying, as suggested in the paper, an inflation bias over this period. The króna real exchange rate, on the other hand, looks very much like a random walk at all frequencies and so there would appear to be little impact on the real exchange rate of nominal exchange rate movements. This is an intuitive result and fits the result familiar from, for example, a Cagan-style money demand function where higher inflation rates have less impact on real activity because expectations are forward-looking. The extent of financial and real-side indexation in Iceland is a structural reason why high inflation may not impact very strongly on relative prices. Note that nominal and real sterling exchange rates have similar spectral densities at all horizons, suggesting that real shocks drive innovations in the nominal exchange rate: the charts also suggest that the nominal and real exchange rates have higher variation at business cycle frequencies.[7]

[7] Structural VAR work at the Bank by Astley and Garratt (1997) and Chadha and Hudson (1997) corroborates the view that real shocks dominate. The suggestion that business cycle frequencies dominate may intuitively support the view that the exchange rate acts to mitigate the business cycle.

Figure 2

Spectral analysis of nominal and real exchange rates in the United Kingdom and Iceland, 1992–97



Note: 0 represents the persistence of trend movements and as we move to π we add the variation of the contribution of each higher frequency. Each series cumulates to the window size of the estimation: approximately 30 for Figure 1 and 16 for Figure 2.

Figure 2 shows that, in the period of moderate inflation for both countries, the real and nominal exchange rates display similar spectral densities, with greatest persistence at business cycle frequencies. For Iceland this may suggest that, at moderate inflation rates, the nominal exchange rate provides an important method of adjustment.

All this suggests that under Iceland's recent moderate inflation the nominal and real exchange rates have looked very much like what would prevail if Iceland operated an inflation target. So why change? I wonder whether an explicit target for inflation would ultimately be more controllable than one for a nominal exchange rate with wide bands. The added benefit may then also be the sort of debate on the need for low inflation which has been so healthy in the United Kingdom. And with the continuing need for labour market and fiscal policy reform there may tend to be regular pressure to alter a nominal exchange rate peg to a new (uncertain) equilibrium. It might ultimately also be better to concentrate scarce policy resources on continuing to hit a medium-term inflation objective.

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Monetary policy in Norway – experience since 1992

Jon Nicolaisen and Jan F. Qvigstad[1]

Introduction

Norway has experienced a strong and continued upswing in the 1990s. Mainland GDP will, according to our latest estimates, have grown by some 18% in the five-year period from 1992 to 1997, implying an average annual growth rate of around 3¼%. Total GDP growth has been even stronger, due to higher oil production. As a result of increased oil revenues – as well as fiscal tightening and a cyclically induced increase in net tax revenues – the surpluses on the current account and the general government balance have also risen. The current account surplus was 7¼% of GDP in 1996, while the fiscal budget surplus was roughly 4½% of GDP. The petroleum sector currently accounts for around 13% of GDP, 38% of total exports and approximately 15% of total central government revenues.

Economic growth is reflected in a strong employment performance. From 1992 to 1997, some 170,000 jobs will have been created (net), implying an average annual growth in employment of nearly 1¾%. In 1996 alone, employment grew by more than 2½%. Unemployment has fallen from a peak of close to 7% (OECD standard) in 1993 to around 4½%.

In spite of strong growth, Norway has so far not seen any significant upward trend in inflation. We now expect price inflation to average 2½% in 1997, and wage growth around 4%. Available evidence suggests, however, that the output gap was closed during 1995. Hence, there is a risk that continued growth – which so far shows no sign of slowing down – will eventually result in an overheating of the economy.

The operational target for monetary policy was formalised by Royal Decree in May 1994. The decree stipulates that Norges Bank shall aim at

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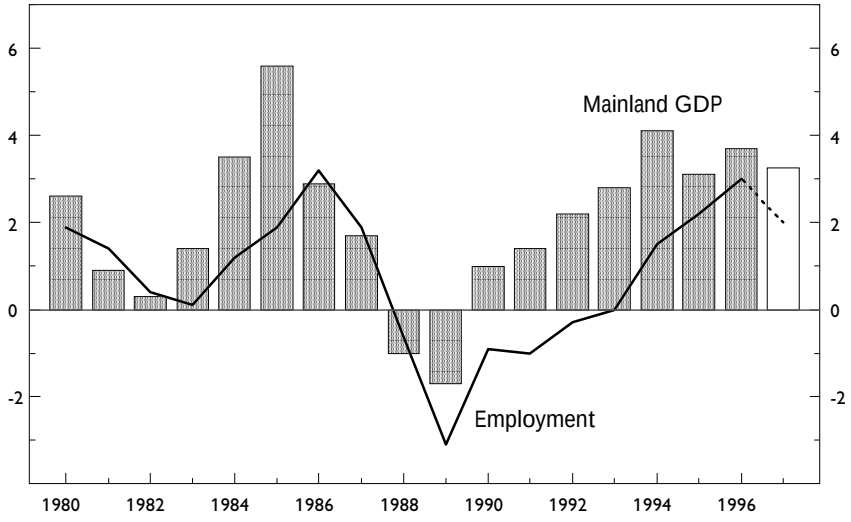
Chart 1
Growth in mainland GDP and employment
Annual growth



Sources: Statistics Norway and Norges Bank.

maintaining a stable krone exchange rate against European currencies based on the range of the exchange rate maintained since the krone was floated on 10th December 1992. There are no explicit fluctuation margins. Norges Bank uses both interest rates and interventions to stabilise the exchange rate, but not to the same extent as under the previous fixed exchange rate regime. In the event of substantial changes in the exchange rate, monetary policy instruments shall be aimed at gradually returning the exchange rate to its previous range.

This paper discusses possible underlying explanations for the current continued upswing, emphasising some particular features of the Norwegian economy that set it apart from most other European economies. It then goes on to assess the formulation of monetary policy in light of these features and economic performance in the 1990s.

1. Principal forces behind developments in demand components and growth

The upswing that took off in early 1993 was initially driven by a combination of strong household demand, growth in traditional exports and robust growth in offshore investments in the petroleum sector. By 1995, the upswing broadened to include investment in the mainland business sector. Throughout the last five years, household demand growth has been vigorous. In 1996, household consumption grew by 4.7%, the highest growth rate in 10 years.

Table 1
Main economic developments, 1990–96

	1990	1991	1992	1993	1994	1995	1996
Domestic demand, mainland Norway	0.1	1.3	2.3	1.3	4.7	4.0	4.7
Private consumption	0.7	1.5	2.2	2.2	4.0	2.7	4.7
Public consumption	4.9	4.3	5.3	2.2	1.4	1.0	3.3
Gross fixed investment	−7.0	−3.3	−2.2	−3.1	13.5	13.3	6.9
Oil investment	−2.5	29.1	12.2	12.1	−7.2	−13.6	−4.4
Exports	8.6	6.1	5.2	3.2	8.7	3.7	10.1
of which:							
Crude oil and natural gas	*3.2*	*17.2*	*11.3*	*5.9*	*3.2*	*8.7*	*3.7*
Traditional goods	*10.1*	*−2.7*	*5.7*	*3.2*	*12.5*	*4.2*	*10.3*
Imports	2.5	0.2	0.7	4.4	4.9	5.5	6.5
of which:							
Traditional goods	*9.2*	*0.6*	*4.1*	*1.2*	*13.1*	*9.4*	*9.3*
Gross domestic product	2.0	3.1	3.3	2.7	5.5	3.6	5.3
of which:							
Mainland Norway	*1.0*	*1.4*	*2.2*	*2.8*	*4.1*	*3.1*	*3.7*

Source: Statistics Norway.

Taken at face value, the performance of the Norwegian economy in the 1990s seems to reflect a combination of strong growth in demand components sensitive to changes in interest rates, some positive "exogenous" shocks – in particular related to investment in the petroleum sector – and fairly strong employment growth as productivity increases

were relatively low in the face of continued economic growth. We will argue that the principal underlying features which have made these developments possible are:

– The timing of the domestic cycle in Norway compared with other European countries.
– Activities in and revenues from the petroleum sector, which by and large have served to "cushion" changes in domestic demand and generally to improve the fundamental position of the economy.
– Sensitivity to interest rate changes, which has implications for the effectiveness of monetary policy.
– Real wage flexibility, at least on a macro level, and an elastic labour supply.

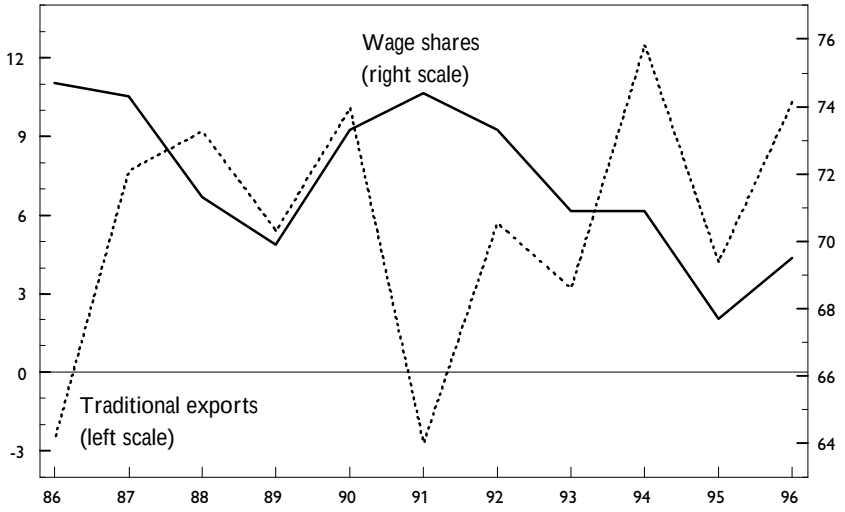
The first three points, connected to developments in demand, are discussed below. The last point, which is an essential element in determining price and wage developments, is discussed further in Section 2.

Timing

Norway was hit by the "boom-and-bust" cycle of the 1980s much earlier than the other Nordic countries. Financial deregulation had a strong impact on domestic demand in the mid 1980s, while interest rate regulation prevented a necessary tightening of monetary policy. This resulted in particularly strong growth in consumption and housing investment, as households adjusted their balance sheets to market-based credit lines and negative real after-tax interest rates. Thus, private consumption grew some 15% in 1985 and 1986. When the current account was hit by the fall in oil prices in 1986, it was necessary to tighten both monetary *and* fiscal policy, which led to a significant downturn during the late 1980s – as opposed to most other European countries. Employment fell five years in a row, levelling off in mid-1992. Unemployment did not peak until early 1993 when the upswing was already well under way.

The timing of the downturn had two notable effects. First, it meant that the initial and "heaviest" adjustment in the mainland economy in the late 1980s could take place in an otherwise rather favourable external environment – unlike, for instance, the adjustment taking place in Sweden and Finland. Thus, the current account adjustment was facilitated by a strong export performance as traditional exports (from mainland industry) rose by more than 35% from 1987 to 1990.

Chart 2
Growth in traditional exports and wage shares in manufacturing
In percentages

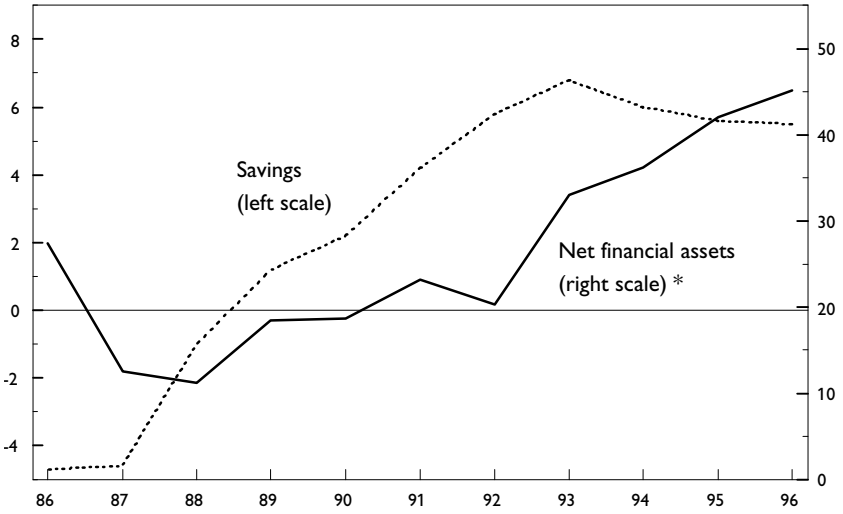


Sources: Statistics Norway and Norges Bank.

Second, the early downturn entailed that balance-sheet adjustment had already largely taken place by 1991–92. Household saving ratios and net wealth were back at historical levels, while the business sector had improved its earnings through lower wage shares. Indeed, many indicators suggest that the economy was already in a moderate upswing by mid-1992. Thus, the economy was well poised to take advantage of the international reduction in interest rates in 1993 – again unlike most other European economies.

It is probable that the economic trough around 1990 would have been much deeper, and subsequent drops in employment and GDP harder to reverse later on, if the boom in the mid-1980s had been allowed to continue for another year or two. Had it not been for the fall in oil prices in 1986, it is not unlikely that this could have happened. While hardly satisfactory from an analytical point of view, it would thus seem that fate – materialising as changes in oil prices – has had a significant impact on the current performance of Norway's economy.

Chart 3
Household net financial assets and savings
As a percentage of disposable income



* Break in series in 1992.
Sources: Statistics Norway and Norges Bank.

The petroleum sector and petroleum revenues

In more general terms, it is Norway's fate to preside over substantial petroleum resources. Although this in itself should not be a cause for worry, it has nonetheless been a source of great concern for Norway's authorities in the last two decades, among other things because the dependence on petroleum may threaten the long-term stability of the economy. During the latest cycle, the petroleum sector has affected the economy in at least three different ways:

– Partly due to a positive technological shock – allowing increased extraction of oil from each well – and partly due to the development of new oil and gas fields, offshore investment increased by 60% from 1990 to 1993, thus providing a strong positive impulse to the mainland economy in the early phase of the upswing.
– Following the initial fall in 1986–87, tax revenue from the petroleum sector again started to increase, thus cushioning the impact of the

downturn on the fiscal budget and allowing a counter-cyclical fiscal policy.

– While petroleum production is not expected to fall below its present level before around 2010, the fact that the oil revenue is temporary and uncertain is perhaps the primary rationale for the underlying macroeconomic policy strategy, including the present division of responsibilities between fiscal and monetary policy.

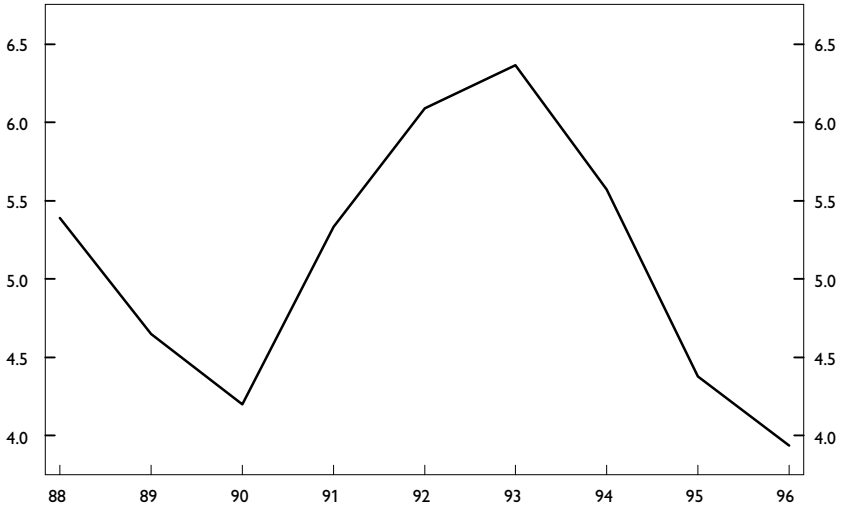
Petroleum investment obviously had the most direct effect on domestic demand at a critical point in the cycle, namely in the first years of the 1990s. However, it is important to note that petroleum investment *fell* after 1993. Thus, petroleum investment cannot explain the continuation of the upswing thereafter. It would therefore seem that petroleum investments have served to *cushion*, rather than exacerbate, the cyclical movements of the economy.

The importance of petroleum revenue for public finances can be illustrated by looking at the development of the fiscal *non-oil* deficit. While even this deficit is now well within the Maastricht criterion (roughly 2% of

Chart 4

Demand impact of petroleum investment

As a percentage of mainland GDP



Sources: Statistics Norway and Ministry of Finance.

GDP), it peaked at nearly 9% of GDP in 1993. At the same time, fiscal policy contributed to a total demand stimulus of some 8% of GDP between 1988 and 1993. Without the parallel increase in oil revenue (government petroleum revenue amounted to approximately 6% of GDP in 1996), it is hard to believe that this fiscal expansion would have been possible. On the other hand, such counter-factual analysis becomes difficult when taking into account that the Norwegian economy would have had some other source of income if oil had not existed (and, as pointed out above, the downturn might never have happened). Whichever way one wishes to see this, the fact remains that oil revenue has provided a "safety net" for public finances by allowing a counter-cyclical fiscal policy. This policy has, in turn, both served to cushion the trough from 1988 to 1992 and to moderate growth through a similar fiscal tightening in the five-year period from 1992 to 1997.

Interest rate sensitivity

The financial structure in Norway is characterised by a predominance of lending and borrowing at floating interest rates. This is especially true for the household sector. In 1993, around 64% of household loans were at floating rates, and another 25% had fixed rates adjustable within a year. For the private sector as a whole, around 55% of all liabilities were at variable rates and a further 23% at rates adjustable within a year.[2]

Norges Bank has not conducted any new studies of the interest rate structure, but there are no signs of any significant shift towards more fixed-rate borrowing. On the contrary, it seems likely that fixed-rate loans to some extent have been phased out as short-term rates have fallen considerably over the last five years.

The fact that a significant part of borrowing and lending is at variable rates means that changes in short-term money market rates have a comparatively large impact on the real economy. As can be seen from Chart 5, interest rates on bank loans and deposits are highly correlated with short-term money market rates.

High real after-tax interest rates contributed to prolonging the economic downturn in the beginning of the 1990s. The subsequent fall in interest rates probably contributed considerably to the higher growth. In

[2] R. Alstadheim and R. Madsen (1994): "A study of the interest rate structure of private sector assets and liabilities". *Economic Bulletin*, no. 4.

Box 1

Structural and behavioural changes in Norwegian financial markets

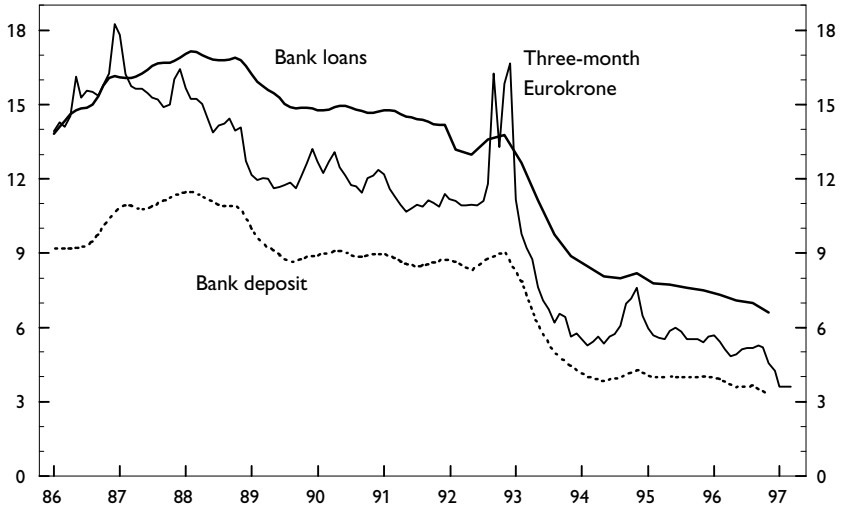
Both in the current and in the previous recovery, household demand has been a major force in the expansion. Private consumption increased by 18% from 1983 to 1986, and by 11% from 1993 to 1996. However, while the household saving ratio fell by nearly 10 percentage points from 1984 to 1986, it has, so far, declined by only 1 percentage point in the current recovery. Consequently, even though it has been increasing gradually, household gross debt is still modest compared with rates of more than 20% in the middle of the 1980s.

Developments in the 1980s have to be seen in the context of financial market liberalisation. Credit regulations were abolished at the end of 1983. Continued low, politically-determined interest rates and tax deductibility for interest payments combined with high marginal taxes led to strong credit demand. The real interest rate after tax was negative, around −2%, in 1983−96. Supply of credit was ample, partly reflecting strong competition and a focus on expansion among financial institutions which led to more aggressive lending practices.

The "bust" that followed the "boom" in the middle of the 1980s resulted in a significant balance-sheet adjustment among overextended households and a major banking crisis. The lessons from these developments have contributed to a more cautious attitude so far in the present recovery, on the part of both households and banks. The deregulation of financial markets meant that investments in Norway have to meet the required real return on international markets. Higher international real interest rates in the 1990s have thus increased the required return on business investment. In addition, the tax reform of 1992 meant an upward shift in the required return for firms and borrowing costs for households. Notwithstanding a fall in real after-tax interest rates to around ½–1%, there is still only moderate growth in household lending, which suggests some change in behaviour. However, the jury is still out as to whether the more cautious attitude is a permanent change. Consumer confidence has increased significantly since this recovery started, and there is evidence that banks again are engaging in more risky lending activities.

Higher required returns may also have induced many firms to invest abroad, although this should also be seen in the context of a general tendency towards internationalisation in the business sector. In 1988, total Norwegian direct investment abroad amounted to about NKr 25 billion. In 1995 (the last year for which comparable figures are available), direct investment abroad had risen to more than NKr 140 billion. Preliminary figures suggest that there was a further significant increase in such investment in 1996.

Chart 5
Effective interest rates



Source: Norges Bank.

1992, the household sector had net interest-bearing liabilities equal to 50% of disposable income, while interest-bearing liabilities in the enterprise sector amounted to 35% of GDP. This meant that the fall in interest rates had a positive income effect for the private sector.

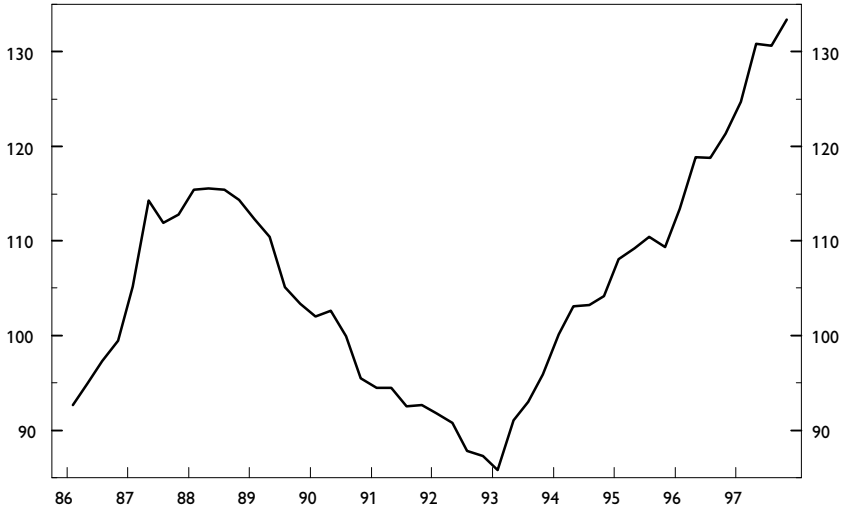
Interest rates also have a strong demand impact through wealth effects. In Norway, around 80% of all houses is owner-occupied. The

Table 2
Estimated effects of a 1 percentage point reduction in short-term interest rates
In percentage points

Effects on	After 2 years	After 4 years
Domestic demand	1	2
Employment	½	1¼
Wages	¼	1
Consumer price inflation	0	½

Source: Norges Bank.

Chart 6
House prices
Index 1990 = 100



Source: ECON.

sharp increase in house prices since 1993 – closely related to the fall in interest rates – has been one of the main factors contributing to the rise in private consumption. For example, the increase in house prices in 1996 alone (roughly 10%), increased household net wealth by some NKr 70 billion, or approximately 7% of GDP.

Calculations carried out using Norges Bank's macroeconomic model RIMINI may illustrate the effects of interest rate changes on economic developments (Table 2). Including wealth effects, we estimate that – at the present stage of the cycle – employment may rise by as much as 1% in the medium term as a result of a 1 percentage point reduction in interest rates. The long lags and strong medium-term effects implied in Table 2 are the result of wealth effects transmitted through (primarily) the housing market.

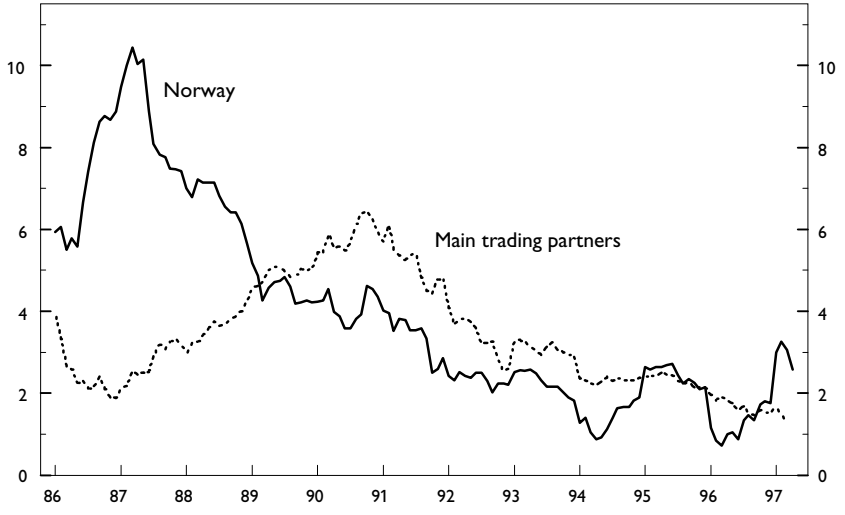
To conclude, the present economic upswing – particularly in light of the continued growth in household demand – may to a large extent be attributed to the sharp fall in interest rates in the first two quarters of 1993 (see Charts 5 and 6). Indeed, if we are to believe the estimates

presented in Table 2, *almost all* of the increase in employment from 1992 to 1997 can be attributed to this shift. While the effectiveness of monetary policy may have been a blessing in the past, the recent reductions in interest rates which were necessary to avoid an appreciation of the krone may be viewed with some concern. We will return to this issue when discussing monetary policy below.

2. Sources of price and wage inflation; wage formation and labour supply

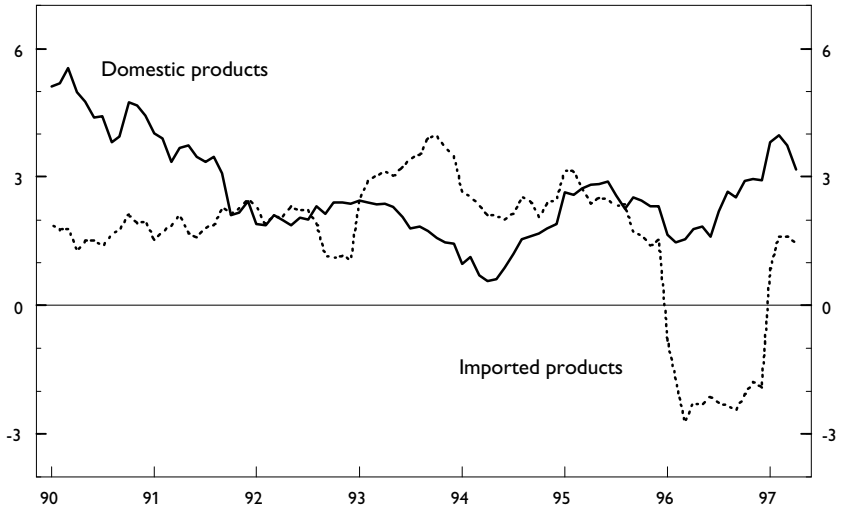
After the surge in consumer prices in the late 1980s – following a 10% devaluation in the spring of 1986 – consumer price inflation fell steadily from a peak of 10% in mid-1987 to just over 1% in early 1994. As illustrated by Chart 7, Norway's inflation performance closely follows the reduction in relative wage costs from 1989 onwards (Chart 9). Since late 1996, however, growth in CPI has again reached and exceeded interna-

Chart 7
Consumer price inflation
Percentage changes over twelve months



Sources: Statistics Norway and OECD

Chart 8
Consumer prices for imported and domestic products
Percentage changes over twelve months



Sources: Statistics Norway and Norges Bank.

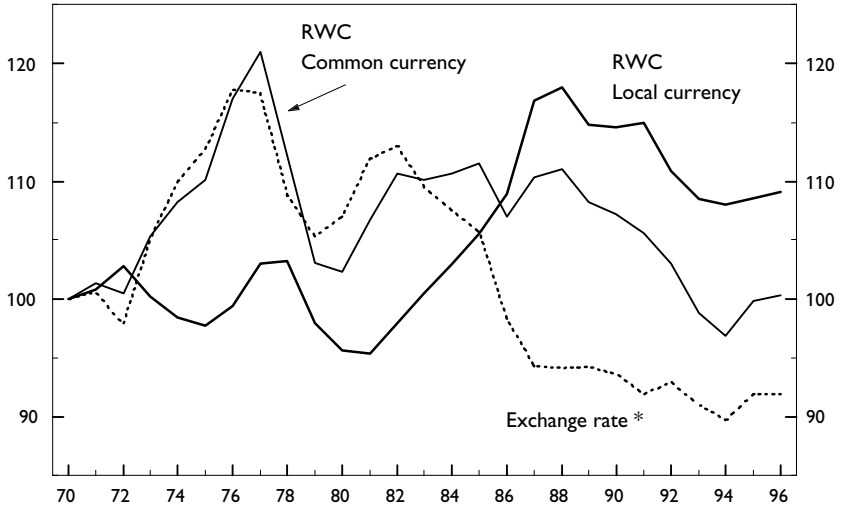
tional inflation. During the last two years, domestically generated inflation has also been above that of imported products, and the differential seems to be increasing (Chart 8).

So far, there is no strong evidence that inflation will accelerate dramatically. Wage growth in 1997, currently estimated at around or slightly below 4%, will be lower than previously expected. Furthermore, a fall in electricity prices will contribute to curbing consumer price inflation. In total, we expect CPI to increase by around 2½% in 1997. Underlying inflation (excluding indirect taxes and electricity) is estimated at about 2%. There is, however, a risk of overheating connected primarily to tight labour market conditions. Thus, there is a clear risk of higher wage growth in 1998.

Wage formation in Norway is characterised by centralised wage bargaining, combined with an explicit social contract called the "Solidarity Alternative". According to this alternative,[3] the main trade union (LO)

[3] See *NOU* no. 26 (1992): "En nasjonal strategi for økt sysselsetting i 1990-årene" ("A national strategy for increased employment in the 1990s").

Chart 9
Relative wage costs
Indices 1970 = 100



* Rising index = appreciation.
Sources: OECD, IMF, Statistics Norway, Ministry of Finance and Norges Bank.

is responsible for improving Norway's cost competitiveness by 10% between 1992 and 1997 through moderate wage growth, while the authorities are responsible for demand management through an active fiscal policy. A stable nominal exchange rate is seen as a precondition for this "contract".

So far, it seems that this strategy has been relatively successful. Chart 9 shows developments in relative wage costs in Norway vis-à-vis its trading partners. While the target for cost competitiveness has not been fully reached, relative wage costs have been reduced significantly. Private sector labour demand has soared, and private sector employment growth has accounted for 65% of total employment growth since 1992.

It may seem odd to tie wage moderation to cost competitiveness in this way, especially when taking into consideration that only a small part of Norway's labour force is actually directly employed in sectors exposed to international competition (Norway's exposed sectors are generally extremely capital intensive). However, the formulation of the "Solidarity

Box 2

Evidence of behavioural changes in wage formation

Wage growth (in manufacturing) has been more moderate in the period 1993–97 than indicated by the historical experiences embedded in Norges Bank's macroeconomic model RIMINI. On average, the model overpredicts wage growth by ½% per year from 1993 to 1997. The most significant prediction errors occurred in 1995 and in 1997.

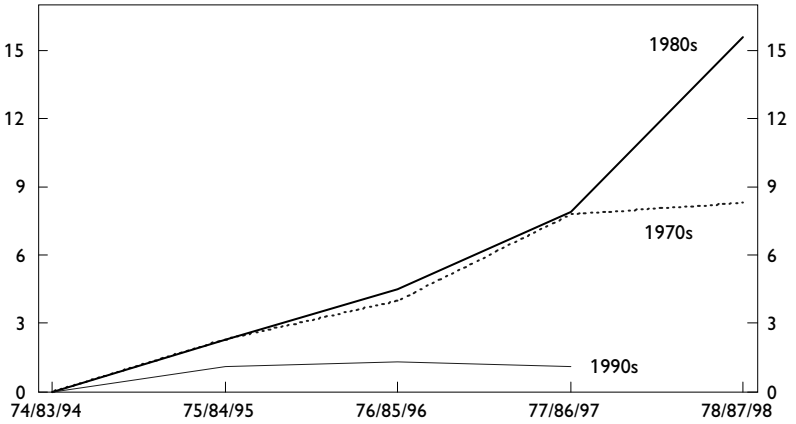
Econometric tests on the wage equation do not suggest, however, any structural breakdown of the wage equations, i.e. the errors that have occurred are within the "normal" uncertainty in the wage equations.[4] This could suggest that there has not been a significant shift in wage behaviour. The relatively moderate wage growth in the early 1990s may thus be related to low inflation and high unemployment by Norwegian standards.

Unfortunately, these tests can only be carried out on data up to 1994, as the Norwegian quarterly national accounts were significantly revised from 1995. Thus, it is not possible to re-estimate the wage equation due to a lack of revised national accounts data.

Chart A

Relative hourly wages in manufacturing

Percentage difference between Norway and trading partners



Sources: Statistics Norway, OECD and Ministry of Finance.

[4] Evjen, Snorre and Ragnar Nymoen (1997): "Har solidaritetsalternativet bidratt til lav lønnsvekst i industrien?" ("Has the Solidarity Alternative contributed to low wage growth in industry?"). Norges Bank *Working Papers*, no. 2.

Box 2 (continued)

Evidence of behavioural changes in wage formation

However, other evidence indicates that historical relationships may have changed. Chart A illustrates the difference between hourly wages in manufacturing in Norway and among our main trading partners in three recoveries. Relative wages grew by more than 15% from 1983 to 1986, while Norwegian wage growth has been roughly in line with our main trading partners from 1993.

Moreover, OECD estimates seem to indicate that the Norwegian NAWRU is around 4¾%. The unemployment rate fell below this in 1996 and has continued to decline in 1997. While wage growth did accelerate in 1996, there are no signs of any further pick-up in 1997. On the contrary, based on the wage negotiations so far, wages may grow at a somewhat slower pace in 1997 than in 1996, and more in line with wage growth earlier in the 1990s.

There are several explanations for the (potential) change in the wage formation process in the 1990s. The concerted effort by the trade unions, the employers' organisation and the government to establish a "Solidarity Alternative" which aims at moderating wage increases in order to achieve full employment while maintaining price stability. In the context of a stable exchange rate policy, the social partners have recognised their responsibility for cost competitiveness and thus for employment. Moreover, the required return on capital has probably increased in the 1990s. This may result in a permanently lower wage share over the medium term.

Based on this, our judgement is that the wage level has been permanently reduced compared to the levels predicted by the wage equation in RIMINI. In Norges Bank's wage forecast, it is assumed that there is no recovery of the wage level to the equilibrium level suggested by the wage equation; i.e. the impact on wage growth from the error correction term in the equation is neutralised. However, we recognise the uncertainty attached to this interpretation of events. In particular, there is uncertainty about the central trade union's ability to continue to restrain wage growth in an increasingly tighter labour market.

Alternative" has the important implication that unions in sheltered sectors are also tied to wage moderation – due to the centralisation of the wage bargaining system. Thus, improved cost competitiveness has resulted in a general reduction in overall labour shares, not just for those in exposed sectors. At least until 1996, this was certainly an important side effect.

High employment growth has almost been matched by similarly high growth in the labour force, as illustrated in Chart 10. While employment

Chart 10
Employment and labour force
In thousand persons

Sources: Statistics Norway and Norges Bank.

will have grown by some 8½% from 1992 to 1997, the labour force will have increased by approximately 6¼% during the same period. Hence, almost three fourths of the net increase in employed persons has come from *outside* the original labour force, which was high by international standards even in 1992 (68% of the total working-age population by OECD definitions).

Labour force participation showed a similar elasticity during the downturn in the late 1980s. Thus, the labour force *shrank* by 2½% from 1988 to 1992. This is certainly one reason for the similar rise in the labour force later on. However, this does not explain why the people who exited the labour force avoided a more permanent seclusion from the labour market. Nor can it fully explain the present participation rate, which for some groups is higher than ever recorded.

Two phenomena may have contributed to these developments. First, as the labour market slackened during the downturn in the late 1980s, recruitment into higher education soared. Thus, youth opted for education rather than unemployment, unlike the trends observed in many other

countries during recessions. Recorded youth unemployment rates were high at the time, but this reflected very low participation rates among youth rather than high absolute unemployment. As the cyclical situation improved, youth have again started to flow into the labour force, and recruitment into higher education has been somewhat reduced.

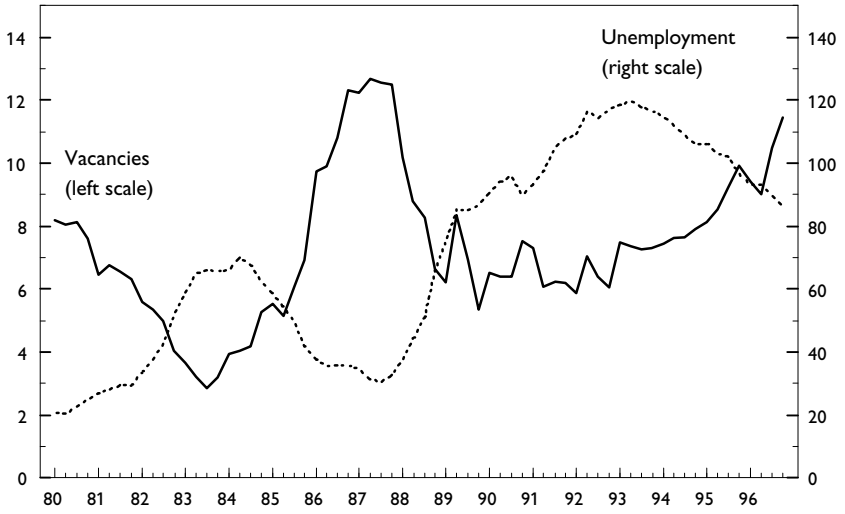
To some extent, this has been the result of government policies: funding was increased to accommodate the large increase in demand. In addition, the Norwegian unemployment benefit system is based on an insurance principle which does not allow benefits for people who have not previously been in the workforce. Hence, most youth were (and are) barred from the possibility of collecting benefits if they are unable to find work. While there is little empirical evidence to support this notion, it is conceivable that the lack of such benefits reduces benefit withdrawal rates and thus sufficiently improves the *ex ante* profitability of education – in spite of relatively low premia for educated labour.

Second, the Norwegian labour market is characterised – as are other Nordic countries – by high participation rates for women. Nevertheless, earlier empirical work suggests that labour participation among women is highly sensitive to real wages, so that when real wages increase, the female labour force tends to react elastically. This has probably contributed to preventing the build-up of bottlenecks in the labour market, especially in the public sector.

All in all, it is fair to say that the Norwegian labour market has performed better than we had reason to expect after the serious recession around 1990. However, as illustrated in Chart 11, several indicators now point towards a possible build-up of labour shortages, and that LO's capacity to moderate wages may come under increasing pressure from a tightening labour market. Real wage growth has picked up in 1996 and 1997, and although still moderate, inflation in Norway is now higher than among our trading partners. Obviously, a situation with significantly higher growth in employment than in the underlying supply of labour is not sustainable in the long run. Thus, proper management of macroeconomic policies will be crucial for avoiding an overheating of the economy in the coming years.

The general reduction in inflation and inflation expectations in Norway since the 1980s must be seen in connection with the change of monetary policy in 1986, with increased exchange rate stability. Given the then low credibility of monetary policy, it was necessary to anchor inflation

Chart 11
Unemployment and vacancies
Seasonally adjusted, in thousand persons



Source: Directorate of Labour.

expectations. By and large, and despite a small depreciation following the turmoil in the currency markets in the autumn of 1992, it is fair to say that this framework has been a success in the sense that inflation has been brought down, and the credibility of Norwegian monetary policy has been restored.

It is thus difficult to establish a clear distinction between the results of monetary policy on the one hand, and the results of wage moderation from 1989 onwards on the other. As these policies are interconnected through the "Solidarity Alternative", however, it is perhaps not very fruitful to seek to disentangle the effects of monetary policy from those of changes in wage behaviour. Similarly, it is difficult to assess the risk of a further increase in wage inflation without taking into account the current expansionary effects of monetary policy.

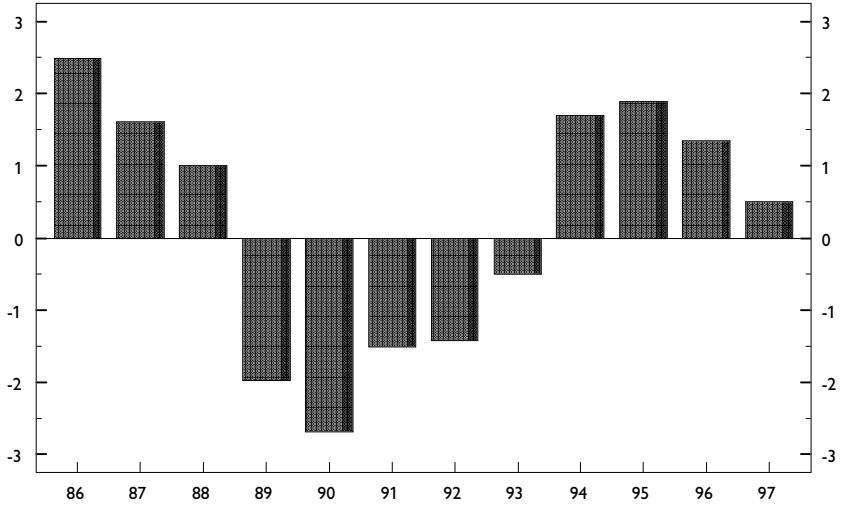
3. The role of macroeconomic policies

As is evident from the discussion above, the division of responsibilities in Norwegian macroeconomic policies is distinctly different from most other countries:

– Fiscal policy is responsible for both the long-term management of public resources (including large future social security liabilities and the structure of public services) and for demand management.
– Monetary policy is responsible for maintaining a stable nominal exchange rate against European currencies (and, hence, monetary policy cannot be charged with the task of stabilising demand).
– Incomes policy (the social partners) is responsible for ensuring moderate wage growth on a par with or below that of our trading partners.

This implies that policy makers must continuously consider at least two targets for fiscal policy, which tend to conflict with each other. On the one hand, the long-term sustainability of public finances and of the

Chart 12
Changes in the structural surplus
As a percentage of mainland GDP



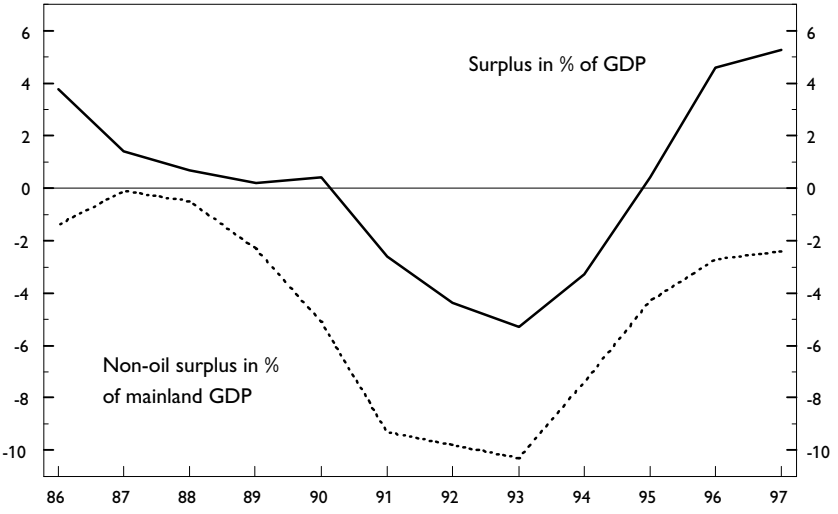
Source: Ministry of Finance.

structure of the public sector. On the other, the stabilisation of demand through fiscal policy.

In the recession, this conflict resulted in a fiscal policy that increased the structural public sector deficit, while moderating the impact of the recession through an expansionary policy stance (Chart 12). However, in spite of a total positive demand impact of around 8% of GDP from 1988 to 1993, fiscal policy all but failed to deliver stable demand conditions. It is likely that we can thank the flexibility of the labour market and wage formation for not falling into an even deeper recession, more in line with what was later experienced in other European economies.

Measured by the structural deficit, fiscal policy has been significantly tightened during the recovery in the 1990s, particularly in 1995. Over the last four years, the total demand impact of this policy is equivalent to some −5½% of GDP, almost reversing the earlier expansion. As a result, the central government non-oil deficit (excluding petroleum revenue) has shrunk from a record 10% in 1993 to an estimated 2% of mainland GDP in 1997 (Chart 13).

Chart 13
The central government balance



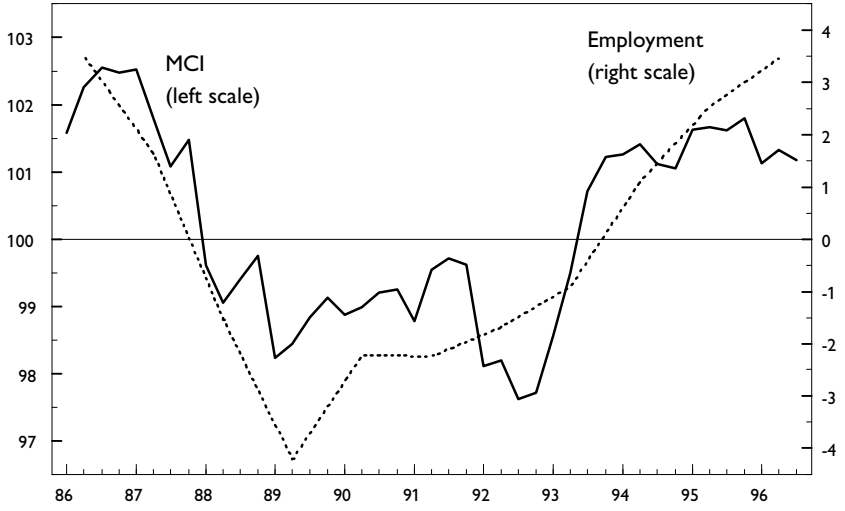
Source: Ministry of Finance.

Moreover, the tightening of fiscal policy has come through low expenditure growth. Underlying growth in government expenditure has been considerably lower than growth in mainland GDP from 1993 onwards. In 1996 public non-oil tax revenue, measured as a share of mainland GDP, was – at 47% – in line with the average for the EU, and roughly at the level established in the early 1980s.

While this policy has clearly moderated overall demand growth, it has again failed to deliver anything close to demand stabilisation (which, however, was not warranted during the first years of the upswing). In light of the general tightening of the economy, especially in the labour market, and the prospects for further robust demand growth in the next two to three years, it is not clear whether fiscal policy is sufficiently tight to prevent overheating and a further rise in wage and price inflation. In any case, we may conclude that fiscal policy has been clearly counter-cyclical and that one reason for the sustained upswing has been the moderating influence of a tight fiscal policy.

Chart 14

MCI and employment growth*



* Employment in business and industry.

Sources: Statistics Norway and Norges Bank.

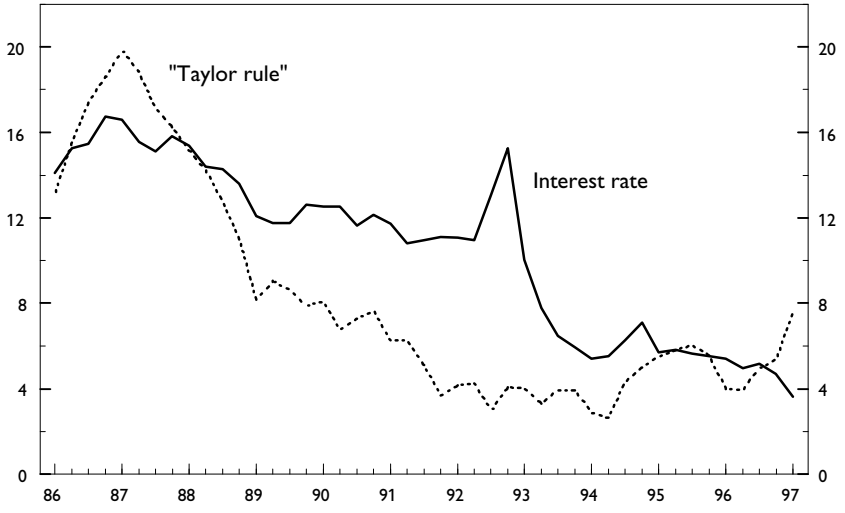
Monetary policy, on the other hand, has been clearly pro-cyclical, at least from 1989 onwards. Chart 14 compares the overall impact of monetary policy (measured by the MCI) with cyclical movements (indicated by growth in employment). From this chart, it appears that monetary policy was largely pro-cyclical from the mid-1980s onwards. However, the measures fail to recognise that, although employment started to fall in 1987, the Norwegian economy was still operating above normal capacity well into 1988. Using a simple Taylor rule to measure the effects of monetary policy, Chart 15 illustrates this point and also highlights the present conflict between exchange rate stability and domestic developments (the chart illustrates optimal interest rates in Norway according to a simple Taylor rule compared with actual short-term rates).

As has been highlighted previously in this paper, the monetary policy conducted may thus explain a large part of the cyclical movements, at least throughout the last 8 years.

However, it should not be forgotten that in any realistically conceivable monetary policy regime, Norway's interest rates must either be

Chart 15

Actual short-term interest rates and "Taylor rule" rates



Source: Norges Bank.

heavily influenced by European rates (especially German rates) or Norway is likely to face extremely volatile nominal exchange rates over time. Given the openness of the Norwegian economy, such exchange rate variations would probably, in themselves, have created domestic cycles, through overshooting. Thus, in so far as the current cycle can be traced back to changes in monetary policy (and real interest rate changes), it is not clear whether this is the result of Norwegian or German monetary policy. Given the movements in German interest rates over the last 10 years, it might be closer to the truth to say that changes in German monetary policy have generally aggravated the Norwegian domestic cycle.

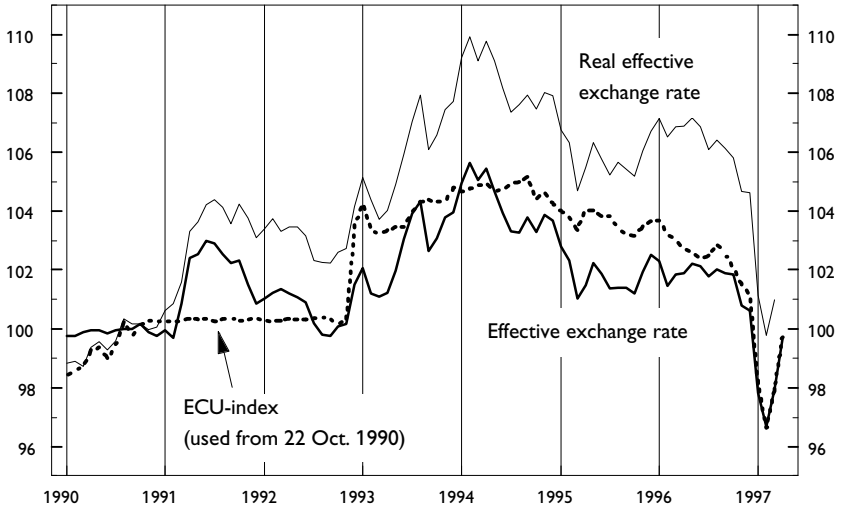
Nonetheless, there is little doubt that the exchange rate target – in isolation – has contributed to the expansionary effect of monetary policy, compared with alternative intermediate or long-term targets.

Moreover, it may be noted that impulses through international money and capital markets seem to have dominated the more traditional channel of demand impetus from the export sector. Hence, the bias towards strong pro-cyclical impulses from monetary policy – dominating other international demand impulses – may be a long-run and lasting effect of the deregulation of the capital markets in the 1980s. One possible consequence of this is that coming cycles will also tend to stem from changes in domestic demand (and monetary policy), rather than the more traditional channel of export-driven cycles. An important facet of this mechanism would then be that Norway's economy tends to react more violently to changes in interest rates than continental European economies. Norway may thus expect to *continue* to be out of phase with the cycles in other European countries.

Monetary policy has increasingly faced a balancing act between the exchange rate target and concerns regarding domestic developments. During 1994 and 1995, Norges Bank's rates remained unchanged, the exchange rate was very stable and foreign exchange interventions were modest. In spring 1996, however, the krone was exposed to growing appreciation pressure. In March 1996, Norges Bank lowered its key rates by a quarter percentage point in order to stabilise the exchange rate. Against a background of economic forecasts, indicating that growth in the economy would level off and inflation remain low, Norges Bank was fairly comfortable with this interest rate cut.

In September, the appreciation pressure against the krone intensified. At the same time, there were indications that the growth in the economy

Chart 16
Exchange rate developments



Note: A falling index means appreciation.
Source: Norges Bank.

was stronger than previously envisaged. Norges Bank intervened heavily, buying foreign currency in order to stabilise the exchange rate. In the beginning of November, key rates were lowered by a further half percentage point. This only had a temporary effect on the foreign exchange market. In late December and early January, the appreciation pressure intensified: In the view of market participants, the krone could only appreciate given the huge surpluses on the current account and on the central government budget. On 10th January, Norges Bank decided to temporarily refrain from intervening in the foreign exchange market – invoking the "escape clause" in the foreign exchange regulation that: "… in the event of significant changes in the exchange rate, monetary instruments will be oriented with a view to returning the exchange rate to its initial range".

In the three months to 10th January, Norges Bank made interventions equivalent to NKr 75 billion, around NKr 30 billion of which in January alone. In 1996, total interventions amounted to NKr 90 billion – twice the amount set aside in the Government Petroleum Fund. In March, Norges

Bank resumed interventions in the foreign exchange market in order to accumulate reserves for the Petroleum Fund. These interventions are undertaken on a daily basis at around NKr 3 billion per month.

After the "floating", the krone strengthened to a level around 7% higher than the 1996 average against the ECU. Since March, the krone has weakened again – and by mid-May it was back at the same level against the ECU as in November 1996. The Norwegian foreign exchange market has been very "thin" after Norges Bank ceased to intervene actively to influence the krone exchange rate. As a consequence, limited capital movements may lead to substantial changes in the exchange rate. It is too early to conclude whether or not the recent depreciation of the krone reflects a more fundamental shift in expectations about the Norwegian economy and exchange rate developments. However, there is growing concern that the economy may now be more at risk in terms of inflation than previously expected.

4. Conclusions on the formulation of monetary policy

Prior to the current formulation of the exchange rate regulation from 1994, Norges Bank emphasised the long-standing tradition in Norway for establishing a nominal anchor through an exchange rate target. Norges Bank also pointed to the need for a long-term anchor for monetary policy: "In Norges Bank's view the need for monetary guidelines robust enough for the economy to withstand serious disturbances calls for a clear declaration that low price and wage inflation will continue to be the long-term monetary policy objective. … The main economic policy objectives, as set out in the Long-Term Programme, are to secure a durable basis for sustainable economic growth and full employment, and to this end the best contribution monetary policy can make is to maintain low price and wage inflation in the long term ... if the economy is affected by serious disturbances or long-term and wide cyclical fluctuations, the intermediate exchange rate target ought to be adapted to the long-term objective of monetary policy."

In the Revised National Budget 1994, the Government (which is responsible for setting monetary policy guidelines) did not explicitly endorse Norges Bank's view that low inflation should be the long-term objective of monetary policy. It said that monetary policy, together with

the other components of economic policy, should lay the foundation for sustainable economic growth and low inflation.

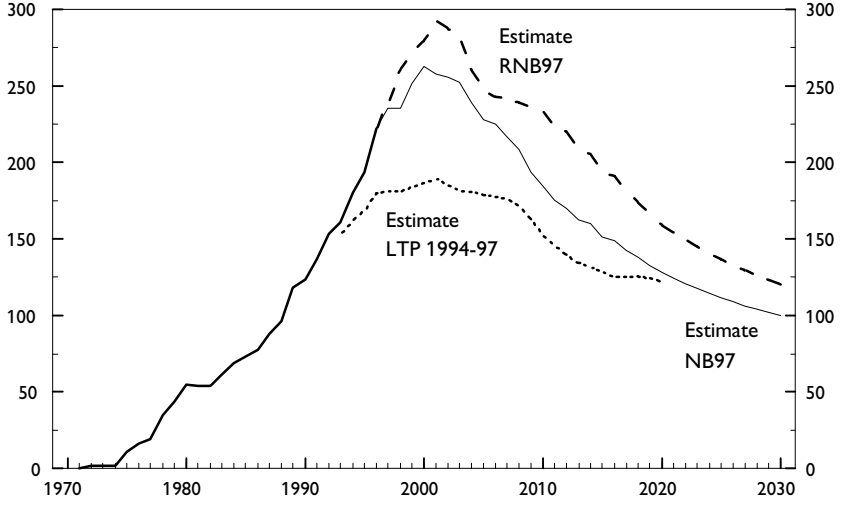
In 1994, when the current monetary policy framework was established, the outlook for the Norwegian economy was very different from today. The changes in the economic outlook, as well as our recent experience with a policy geared towards stabilising the exchange rate, raise the question of whether the current policy framework is sustainable in the longer term:

- Forecasts for petroleum production and the central government's petroleum revenue have been adjusted upwards several times. As a consequence, surpluses on the current account and the budget are (and will be) much higher than expected only a couple of years ago. A few figures may illustrate this point: In the spring of 1994, the Government expected a budget *deficit* of around NKr 15–20 billion in 1996–97. In 1996, there was a budget *surplus* of NKr 45 billion, expected to rise to NKr 57 billion this year. In the next few years, the current account surplus will amount to around 8–10% of GDP. According to the latest estimates, Norway's net foreign assets may exceed GDP within the next ten years.
- Once again we have experienced difficulties in stabilising the exchange rate within relatively narrow margins in an environment of free capital movements and closely integrated financial markets.
- The economic boom may lead to an increase in inflation. It is still an open question whether the current division of responsibilities in economic policy will be able to cope with this situation.

The Norwegian economy seems relative to move counter-cyclically to continental European economies. Norway is also exposed to asymmetric shocks through its heavy reliance on petroleum. With the benefit of hindsight, more flexibility in the monetary policy framework could have reduced the tendency of a pro-cyclical monetary policy.

Direct inflation targeting, as practised by a number of other countries, is the obvious alternative to the present framework. This would allow monetary policy to take more of the strain of cyclical adjustment, as this would occur naturally under an inflation target. Direct inflation targeting would probably also be more robust in the long term. In pursuing an exchange rate objective, there is always a risk that the peg must be abandoned – at least temporarily. In the absence of a clear-cut long-term objective for monetary policy, repetition of episodes like the one in

Chart 17
Production of petroleum
In millions of cubic metres



Source: Ministry of Finance.

January may erode confidence in the policy framework. The same may happen if market participants view the exchange-rate target as incompatible with a commitment to low inflation.

Moving to an inflation target does, however, pose several problems.

First, it is unlikely that it will be possible to establish a broad political consensus for such a move in the short to medium term. Inflation is still relatively low and the economy is doing very well, and there is no obvious need for a change in the monetary policy framework. Entrusting Norges Bank with the pursuit of an inflation target will be seen as granting Norges Bank more independence, loosening the Government's control over economic policy. Traditionally, there has been widespread scepticism towards a more independent central bank in Norway.[5]

Second, a move to inflation targeting could be seen as posing a threat to the current – and so far fairly successful – economic policy framework. The Norwegian Government underlines the need for preserving the present size of the exposed sector and limiting domestic dependence on

[5] On most international rankings, Norges Bank is ranked among the least independent central banks.

oil revenues. In order to facilitate the transition to the post-oil era, it is seen as important to maintain a competitive mainland industry. A formal revaluation of the krone within today's monetary policy framework or a shift to inflation targeting, risking an immediate appreciation of the krone, would seem incompatible with this view. By conducting a sufficiently tight fiscal policy, accumulating the surpluses in overseas investments through the Government Petroleum Fund, a stable nominal exchange rate will be compatible with low inflation.

It has been argued that abandoning the exchange-rate target would pose a threat to discipline in fiscal policy: If monetary policy is perceived as taking care of stabilising the economy, there will be no limits on spending since the budget balance is not a problem. This risk is exacerbated by the fact that Norway has a minority Government which depends on the support of other parties in parliament. However, the threat of a tighter monetary policy to offset an expansionary fiscal policy could also serve as a disciplining factor. The assumption of an "irresponsible" fiscal policy also inherently includes the belief that politicians will not take long-term considerations into account when formulating policy.

The current framework for incomes policy further complicates the issue. As discussed above, a stable nominal exchange rate is seen as crucial for promoting wage moderation. By revaluing or floating the krone, the Government could jeopardise the current consensus – a risk it would probably not take if not strictly necessary. Given the strength of the economy, Norway could probably also afford to have "a little higher" inflation than its trading partners without risking a speculative attack against the krone.

There are, however, arguments against this line of reasoning. The external and internal "imbalances" (with positive signs) of the Norwegian economy could be seen as signalling a real appreciation of the krone in the years to come. A real appreciation could come about either through an increase in inflation or a nominal appreciation of the exchange rate. Real appreciation through higher inflation will only postpone adjustments of the competitive sector. If underlying forces work in the direction of a real appreciation, Norway cannot avoid a downsizing of the exposed sector by trying to maintain a stable nominal exchange rate. Furthermore, if inflation is allowed to rise it would be much more difficult to reverse a real appreciation if conditions change – for example, if oil prices fall substantially.

An inflation target could substitute the exchange-rate target as an anchor for wage claims in Norway's centralised wage bargaining system. This would, however, also have to be accepted by the trade unions – which seems unlikely at the present stage. There is also little experience with inflation targeting in countries with a centralised – and in many respects – co-operative wage bargaining system. Inflation targeting may create difficult game situations between the trade union and the central bank. Views could be different as to what wage increases are compatible with a given inflation rate. A centralised trade union which is not satisfied with the policy of the central bank could, for example, threaten with higher wage increases if interest rates are not reduced.

Finally, it could be argued that Norway should postpone any major changes in the monetary policy framework until EMU is well established, and the uncertainty surrounding this project is reduced.

Appendix
Monetary policy operating framework

As in many other countries, Norway has undertaken several changes in the monetary policy operating framework in recent years. These changes have been driven by mainly three considerations:

– The need to adapt the operational framework to the change in the underlying structural liquidity position of the banking sector. Up to 1992–1993 the banks were heavily dependent on borrowing from the central bank. In recent years they have moved to a structural surplus position. At present, Norges Bank generally steers the banks from a surplus position. Norges Bank supplies liquidity for shorter periods when liquidity is withdrawn from the market due to tax payments, etc.
– To (re)introduce a collateral requirement for borrowing in the central bank.
– To adapt the framework to real time settlement.

The current operational framework has the following main features:

– An overnight borrowing and deposit facility. The interest rates on these facilities constitute a corridor for short-term interest rates. At present the overnight borrowing rate is 5¼%, the deposit rate 3¼%. As banks are steered from a surplus position, the deposit rate is the most important key rate.
– Banks may borrow overnight against collateral. Total borrowing over the two-week borrowing period is limited. Norges Bank sets the limit as a percentage of operating capital, which is the same for all banks. After the introduction of real time settlement (planned for this autumn) banks may borrow an unlimited amount through the day, provided they borrow within the limits set by their collateral.
– Three instruments are used for market operations: Repurchase agreements (repos) (supplying liquidity), fixed-term deposits and fixed-term loans (not collateralised, in the process of being phased out). Depending on a final decision by the Board, it will be possible to trade fixed-term deposits between banks and between Norges Bank and the banks. Interest rates are normally determined by tender; e.g. American auction. Interest rates on market operations are not used for signalling purposes.
– Norges Bank intervenes frequently in the market. As the central government's working account is in the central bank, the liquidity

position of banks changes quite rapidly – making it necessary to supply or withdraw liquidity at irregular and short intervals.

- There are no reserve requirements.
- Bonds and certificates issued by the public sector, state banks, mortgage institutions and state-owned enterprises are accepted as collateral for borrowing in the central bank. Bonds and certificates issued by other states may also be used as collateral, provided that certain formal procedures are followed.

Comments on "Monetary policy in Norway – experience since 1992"

John Murray*

It is always risky to comment on another country and to offer policy advise, especially when the country is not that familiar to you and is performing as well as Norway has over the past few years. Unemployment in Norway during 1996 averaged just 4.5%, while real growth was 5.1% – higher than that of any G-10 country. Inflation, meanwhile, was a mere 1.3%; the surplus on the current account was 6.5% of GDP; and the government's budget surplus was 6.3% of GDP. By way of comparison, I would note that Canada's unemployment rate during the same period averaged 9.7%, more than double Norway's rate, and its real rate of growth was only 1.5%. Its current account balance and public accounts both showed a modest deficit. The only major Canadian economic variable that was similar to that of Norway was our inflation rate, which stood at 1.6%.

Nevertheless, as a Canadian policy-maker, I cannot help but feel a certain affinity for Norway. Both Canada and Norway are (relatively) small open economies, in close proximity to a much larger industrial power. Both economies have large government sectors and a tradition of generous social assistance. Both are heavily reliant on the export of natural resources and are blessed with abundant supplies of oil and natural gas. While Canada's recent economic performance has been less than one might have hoped for, some of the lessons that we have learned operating under a flexible exchange rate and somewhat different monetary policy arrangements than Norway might nevertheless be of interest to Norwegian authorities.

Short-run demand pressures

The immediate challenge facing fiscal and monetary authorities in Norway would appear to be containing the excess demand pressures that have

* The views expressed in this document are those of the author and do not necessarily reflect those of the Bank of Canada.

emerged in the last two years and that now threaten to push inflation well beyond the 1.0 to 3.0% range that it has moved within since 1991. In a country operating under a more flexible exchange rate arrangement, responsibility for countering inflationary pressures and stabilizing the real economic activity would fall on the monetary authorities, who would raise interest rates causing monetary conditions to tighten and thereby dampen excess demand. While Norway officially operates under a flexible exchange rate system, and should have the independence to respond in this manner, the primary responsibility of the monetary authorities as described in the Royal Decree of May 1994 is to "[maintain] a stable krone against European currencies, based on a range of the exchange rate maintained since the krone floated on 10th December 1992." Responsibility for short-run stabilization, therefore, rests with the fiscal authorities, which are expected to stimulate or suppress economic activity, as appropriate, through discretionary changes in spending and taxation – while simultaneously ensuring the "long-term management of public resources."

This is clearly a challenging mandate for fiscal policy. In most industrial countries, it is all but impossible for fiscal policy to respond to cyclical fluctuations in a timely and delicate manner. In Norway, however, fiscal policy has the added responsibility of overseeing the long-run management of public resources. While the two functions may be complementary, concern might be raised about the risk of overburdening a single policy instrument with two rather ambitious objectives. The situation becomes even more complex when one realizes that the budget position of the government is already in significant surplus and that further tightening would only raise it further.

Unfortunately, as Qvigstad and Nicolaisen note, this policy dilemma is not unusual for Norway. As a large energy exporter, its economy is often subject to different shocks than its major trading partners. A fixed currency arrangement with other economies which often find themselves at a different phase of the business cycle is not an obvious or comfortable solution for Norway.

"Given the movements in German interest rates over the last 10 years, it might be closer to the truth to say that changes in German monetary policy have generally aggravated the Norwegian domestic cycle." (p. 124)

"Norway may thus expect to *continue* to be out of phase with the cycles in other European countries." (p. 124)

The Solidarity Alternative, a centralized wage bargaining process and explicit social contract in Norway, might be used to dampen wage pressures and to help preserve Norway's international competitiveness, but voluntary wage restraint programs such as this are seldom successful in the presence of sustained labor shortages. As a consequence, there would not seem to be any obvious or simple solution to the policy dilemma presented in Qvigstad and Nicolaisen's paper. Unfortunately, the problem is likely to get worse once other countries in continental Europe begin to grow, putting further upward pressure on world commodity prices and increasing the demand for Norway's exports. Ultimately, the real exchange will have to respond – either through an appreciation of the nominal exchange rate or a jump in domestic inflation. Of the two remedies, the former is clearly the more desirable.

Long-run policy challenges

Even if Norway escapes the latest situation unscathed, long-run policy problems are likely to emerge and will have to be addressed. The most obvious issue relates to Norway's questionable suitability for a fixed, or quasi-fixed, currency arrangement with its European neighbours. As an important energy exporter and producer of other industrial materials, optimum currency area considerations would suggest that a flexible currency arrangement would be more appropriate. Indeed, research conducted by the Bank of Canada, comparing the experience of different economic regions and countries in Europe and North America, has indicated that Norway is one of the least likely candidates for a fixed exchange rate in all of Europe.[1] As Table 1 shows, the correlation between supply shocks and demand shocks in Norway with those in Europe is essentially zero.

These empirical results, based on impulse responses and variance decompositions extracted from structural VARs, must be interpreted with caution. Moreover, they only focus on one dimension of the optimum currency area debate (though admittedly an important one).

[1] See also, Bayoumi and Eichengreen (1994).

Table 1
Variance decomposition of structural shocks – European model with 13 countries

Countries	Relative contribution of common component (%)	
	Supply shocks	Real demand shocks
Germany	51	51
France	12	22
United Kingdom	18	13
Italy	5*	5*
Spain	25	12
Netherlands	13	26
Belgium	14	20
Switzerland	44	37
Austria	12	11
Sweden	1*	4*
Norway	0*	0*
Portugal	5*	28
Greece	7*	0*

* Shocks that are not statistically related to the common component (5% significance level).
Source: Chamie, DeSerres and Lalonde (1994).

Nevertheless, they do suggest that, from a macro stabilization perspective, a common currency arrangement could pose a problem for Norway. The challenge for the Norwegian authorities, however, would appear to go beyond the question of fixed versus flexible exchange rates. Broader issues of policy assignment and transparency should probably be reviewed as well.

As noted above, and in the text of the paper, Norwegian policy is presently based on the following assignment of macroeconomic tools: (1) monetary policy is effectively charged with stabilizing the exchange rate; (2) fiscal policy is responsible for the long-run management of public resources *and* for moderating short-run fluctuations in the real economy; (3) the Solidarity Alternative is used to ensure domestic price and wage discipline and thereby preserve external competitiveness.

This matching of tools and targets would appear to be ill-suited to the needs of the Norwegian economy and at odds with the comparative advantage of the various instruments even in more benign circumstances.

More specifically, a fixed currency arrangement, as described earlier, would limit, if not vitiate, monetary policy independence and risk destabilizing the domestic economy. Fiscal policy is expected to fine-tune the economy while bearing responsibility for the longer-term financial health of the public sector. Finally, an incomes policy is expected to compensate for the restrictions inherent in a fixed exchange rate by containing wage and price pressures, maintaining the competitiveness of the tradeable goods sector and assisting in the re-equilibration process.

Independent of the target that is ultimately selected for monetary policy, there may be some advantage to adopting a more transparent policy framework, with a clear objective, greater central bank independence and increased accountability. At present, Norges Bank seems to operate under somewhat opaque and conflicting guidelines, which may complicate the process of policy implementation and lead to unnecessary confusion on the part of private agents regarding the intentions of the monetary policy authorities. The Royal Decree requires the Bank to stabilize the value of the krone, but does not specify which currencies are being targeted, how wide the target band should be, how long the exchange rate should be allowed to deviate from its desired level, or what the desired level of the exchange rate is. Greater clarity, both with regard to the long-term objectives of monetary policy and to the short-term operating strategies of the Bank would help condition market expectations and promote better performance. Ideally, this would be combined with greater independence on the part of the central bank and a greater willingness to see the exchange rate move. Absent a flexible exchange rate, however, independence has very little meaning.

Canada has operated under a flexible exchange rate system for most of the post-war period. Our preference for a flexible system is based, in part, on a belief that exchange rate movements are generally driven by market fundamentals, as opposed to destabilizing speculators, and that the costs associated with any short-term volatility in exchange rates and interest rates are relatively minor compared to the larger problems posed by excessively rigid exchange rates, misaligned relative prices, and an astricted adjustment process. In place of a nominal exchange rate anchor for monetary policy, we have opted for an explicit inflation target, with publicly announced inflation target bands and a joint commitment by the government and the central bank to work toward long-run price stability. The latter is regarded as the most important, and perhaps only,

contribution that monetary policy can make to output growth and improved economic performance.

As an open economy, sensitive to movements in world commodity prices, Canada has valued the insulation and automatic adjustment features of a flexible exchange rate, as well as the monetary policy independence that it has provided. Common currencies offer potentially significant microeconomic benefits in the form of reduced uncertainty and lower transactions costs. But these must be weighed against the macroeconomic disadvantages associated with a fixed nominal exchange rate. The policy assignment and institutional arrangements in Norway seem to be predicated on a fundamental suspicion of financial markets and an aversion to relative price movements.

Some recommendations

Three major policy recommendations can be drawn from the previous analysis. First, Norway should consider moving to a flexible exchange rate system. Second, monetary policy should be directed towards price stability with clearly established inflation targets and a transparent framework for policy implementation. Third, fiscal policy should be set on a sustainable medium-term track and shifted away from fine-tuning and other short-term assignments.

I realize that there is nothing very novel or innovative in any of these prescriptions. That does not mean they are wrong (although they may seem rather doctrinaire and obvious). I suspect, however, that nothing that I have said would come as a surprise to the monetary authorities at Norges Bank nor meet with any violent disagreement. The concerns and policy prescriptions that I have identified, are also noted (or at least hinted at) in Qvigstad and Nicolaisen's text, and, in my view, are well founded. While I am not sure that they would be greeted with the same enthusiasm by the Norwegian government, this is a difference in attitude that is shared with many other countries.

I would like to thank the BIS for inviting me to participate in this conference and to the Norwegian authorities for indulging me. I will end where I began, congratulating our Norwegian colleagues for the fine performance of their economy – despite the challenges mentioned earlier – and wishing them all the best in the period ahead.

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Monetary policy in Sweden since 1992

Claes Berg and Richard Gröttheim*

Introduction

This paper deals mainly with the floating exchange rate regime that was introduced in November 1992 after the collapse of the fixed exchange rate regime. During the last decades of the fixed exchange rate regime, rising wages accompanied by an accommodating exchange rate policy contributed to high inflation. In the late 1980s the Swedish economy became overheated. Given the fixed exchange rate regime, monetary policy was tied to the mast. At the same time, loose fiscal policy, deregulation of the financial markets and a tax system that encouraged debt-financed consumption spurred aggregate demand and increased asset prices. Inflation rose sharply. The household saving ratio became negative and unemployment fell as far as to 1.4% in 1989.

After 1990 a quickly deepening recession set in. The combination of an international recession, a reformed tax system which encouraged net savings, abolished investment allowances and falling asset prices contributed to the severity of the downturn. There was a rapid decrease in economic activity and employment. Inflation fell from 10% in 1990 to 2% in 1992. In the meantime the overvalued krona led to devaluation expectations. As a result after-tax real interest rates rose rapidly which contributed to the recession. Moreover, after the collapse of asset prices large parts of the Swedish banking system experienced perhaps the worst crisis of this century. The immediate effect of the decision to allow the krona to float in November 1992 was a depreciation of about 10% of the effective exchange rate.

The purpose of this paper is to review the Swedish experiences with conducting monetary policy with a flexible exchange rate regime and inflation targeting. The paper is organised as follows. Section 1 discusses different choices when formulating objectives and rules for monetary

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policy. It also describes the monetary policy framework in Sweden. Section 2 focuses on economic developments and the responses of monetary policy; it is divided into three subsections, based on phases of the monetary policy stance: November 1992–July 1994, August 1994–December 1995 and January 1996–March 1997 while a fourth subsection discusses the communication of monetary policy intentions to the market. Section 3 addresses some current issues regarding monetary policy; the last section concludes.

1. Objectives and implementation of monetary policy

This section is divided in two parts. The first discusses different objectives for monetary policy and the arguments supporting the introduction of the Riksbank's inflation target. The second part describes the conduct of monetary policy in Sweden, i.e. the implementation of policy, inflation forecasts and the instruments used to achieve the final objective.

The transition to a flexible exchange rate regime in November 1992 implied new conditions for monetary policy. In a fixed exchange rate regime with price stability as the objective, the intermediate target for monetary policy is the exchange rate. The central bank has to bring the cross-border flow of foreign currency into balance to support the fixed exchange rate. Imbalances in this flow force the central bank to adjust the level of interest rates (or counteract the flows by short-run currency interventions). In a floating exchange rate regime monetary policy may adopt some other intermediate target as an anchor or focus directly on the ultimate objective of low and stable inflation.

In 1992 the credibility of fiscal and monetary policy was low. Sweden experienced the worst recession since the 1930s. The large Government debt and budget deficit, together with a high degree of international capital mobility, made Sweden extremely vulnerable to financial crises. Hence it was important to improve the credibility of monetary policy. Against this background the Riksbank formulated a new policy framework.

The inflation target

In January 1993, the Governing Board of the Riksbank announced an inflation target that would apply from 1995. The target was to limit the

twelve-month increase in the consumer price index to 2%, with a tolerance interval of plus and minus one percentage point. There were several reasons for specifying a lead time of two years. Monetary policy began to operate in a different environment from that of the fixed exchange rate regime. The Riksbank also needed more experience and knowledge for a full understanding of the new situation. Furthermore, monetary policy achieves its full effect on inflation with a lag of one to two years. Finally it was not desirable to entirely counteract the effects of the krona's initial depreciation, despite inflationary pressures from import prices. Before the target became operative, monetary policy focused on preventing the underlying rate of inflation[1] from rising.

In 1992, inflation in Sweden had fallen to historically very low rates of about two per cent (measured as the twelve-month change in the CPI). By early 1993, when the inflation target was adopted, inflation had risen. This was mainly the result of increasing import prices after the sharp depreciation of the krona and higher indirect taxes. Payroll taxes were also lowered in 1993, which to some extent dampened the effects of the weaker exchange rate. Underlying inflation was judged to be about two per cent. Thus, the chances of meeting a target that was relatively ambitious by the standards of Sweden's past inflation performance were considered good.

Final versus intermediate targets

The Riksbank decided to use an explicit final objective instead of some explicit intermediate objective such as a monetary aggregate. A money-supply target presupposes a stable relationship between money supply and macroeconomic variables including nominal GDP or inflation. Such a relationship does not always exist. Furthermore, there is a conflict between different types of monetary aggregates. Narrow monetary aggregates tend to be easier to control but may be only weakly correlated with the final objective, while broader aggregates are more difficult to control but have a higher correlation with the final objective.[2] In addition, if price stability remains the final objective, the central bank's inflation forecast may be a better intermediate target than money supply. In theory, under certain conditions, the inflation forecast becomes an ideal intermediate

[1] The initial effects of the depreciation are excluded from the measures of underlying inflation used by the Riksbank.

[2] Andersson and Berg (1995).

target, in that it is the current variable most correlated with the goal and is easier to control than the goal.[3] Inflation targeting is more efficient, in the sense of bringing lower inflation variability, than money growth targeting. Even in the exceptional case when money supply contains all current information about inflation, monetary policy becomes less direct and less transparent compared with an inflation target. In practice, however, differences between inflation and monetary targeting are smaller than would appear on the surface as the final objective of monetary policy is price stability.

An inflation target also provides an opportunity to assess ex post the performance of monetary policy by comparing actual inflation with the inflation target. In addition, inflation targeting provides an efficient monitoring of monetary policy by the public if the central bank publishes and allows public scrutiny of its inflation projections. Inflation expectations relative to the inflation target may also be interpreted as indicators of the credibility of monetary policy.[4]

Headline or underlying inflation

The Swedish inflation target is expressed in terms of the consumer price index (headline inflation). The CPI has several advantages for this purpose; it is familiar to the public, is published on a monthly basis without long lags and is seldom subject to revisions. Compared to an underlying inflation target, a headline inflation target makes monetary policy more transparent.

Initially, a measure of underlying inflation as the target was seen as an alternative. However, besides the disadvantage that measures of underlying inflation are less familiar to the public, underlying inflation is difficult to measure accurately. Furthermore, it is hard to estimate the effects of indirect taxes and subsidies on underlying inflation. Usually underlying inflation is adjusted for the full effect of a change in indirect taxes and subsidies. However, the actual impact of changes in taxes and subsidies varies over time.

On the other hand, an important limitation of headline inflation is its susceptibility to specific one-off disturbances that are unrelated to the inflationary process. Various measures of underlying inflation are therefore used as important indicators of current inflation pressures in the

[3] Svensson (1996).
[4] Svensson (1996).

economy. Such measures exclude some sub-component price series that are felt to distort the headline inflation index. Usually mortgage interest costs are eliminated in order to prevent perverse monetary policy reactions. Other exclusions in measures of underlying inflation are energy, food and import prices. The reason for omitting these components is to obtain a measure that corresponds to the prices that monetary policy may control. Measures of underlying inflation may also be used to explain why headline inflation is outside the interval of the inflation target due to unforeseen circumstances, such as sudden changes in oil prices.

Monetary policy in practice

The monetary policy framework in Sweden contains four elements:

1. The inflation target;
2. The Riksbank's inflation forecast;
3. The operational targets, i.e. the repo rate, borrowing rate and lending rate;
4. The instruments directly controlled by the Riksbank, i.e. the portfolio and the terms of credit facilities. The portfolio consists of interest bearing securities in local currency used to manage liquidity in the banking system (along with the terms of credit facilities) and foreign exchange reserves, which are used for interventions.

The inflation target

Monetary policy affects aggregate demand and inflation with a lag of about 1–2 years in Sweden.[5] Hence, the first step for monetary policy is to make a forecast of inflation 1–2 years ahead. The Riksbank makes forecasts about inflation four times a year and monetary policy scenarios at least eight times a year.

The forecast is made conditional on the current state of the monetary policy instruments and is based on all other information considered relevant. The Riksbank uses a range of indicators as inputs in the forecast. The indicators contain information about inflation for different time horizons. Different price measures – CPI, underlying inflation, GDP-deflator, etc. – monitor immediate inflationary pressures. Near-time inflation indicators are output gaps, capacity utilisation, and prevailing unemployment. For a time horizon up to a year, wages, import prices and exchange rate

[5] See Hansson (1993).

movements appear to be important inflation indicators. For a time horizon of one to two years monetary aggregates, medium-term interest rates and surveys of inflation expectations are monitored. For periods of more than two years, the main indicators consist of interest rates, forward interest rates and econometric projections. Given the information from these indicators, the Riksbank can make forecasts of the path for future inflation. The next step is to determine a path for the instruments, a monetary policy scenario, so that the forecast matches the target at a one-to-two-year horizon. Thus, the inflation forecast can be interpreted as an intermediate target.[6] The instruments affect the demand in the economy through the transmission mechanism. This includes interest rate effects, other asset price effects, exchange rate effects, and the so-called credit channel.[7]

As actual inflation is influenced by factors outside the control of monetary policy, it will differ from the inflation target. For instance, with a control lag of two years, unforeseen occurrences within that period affect inflation but are outside the control of the central bank. Forecast errors also cause discrepancies between the inflation target and actual inflation. Furthermore it is not always desirable to bring the inflation rate towards the target as fast as the control lag permits. For instance, supply-oriented disturbance introduces a conflict between output and price stability. A monetary response to retain price stability would lead to further destabilisation of output. Likewise, changes in indirect taxes, which have one-off effects on the CPI, may destabilise output if monetary policy counteracts the fiscal measure. Thus, a policy that tries to return inflation immediately to the target might introduce excessive output variability. Variations in the inflation forecast may be accommodated within the tolerance interval of the inflation target, ex ante, but only if the fiscal measure is known well in advance or is small. Normally, changes in taxes and subsidies would be absorbed within the target range. However, in the event of major changes, for instance in connection with a tax reform, there has to be latitude to allow the effects to pass through into prices, even to the point of exceeding the inflation target. Obviously, the direct effects on the inflation rate will be temporary, since these effects will fall out of the twelve-month rates of increase a year later. A gradual adjustment of inflation and the inflation forecast thus requires that monetary policy is

[6] See Svensson (1996).
[7] See Hörngren (1995).

credible. It is important, however, that such events are prevented from affecting inflationary expectations and thereby producing lasting effects on the rate of inflation. The Riksbank has clarified that it will conduct monetary policy to this end.

Monetary tactics

The next step in the framework of monetary policy is to implement the policy. Monetary tactics concern the first phase in the transmission mechanism – the Riksbank's interaction with the financial market – and include the choice of instruments, how to use the instruments to reach operational targets and principles for communication with the market.

Monetary instruments

The new flexible exchange rate regime and the introduction of the inflation target altered the conditions for interest rate management by the Riksbank. Without any explicit intermediate target, monetary policy is in a position to act directly on demand and inflation expectations and thereby on inflationary pressures. Hence, there is a greater need for nuances in monetary policy signalling and for possibilities of flexible adjustments of interest rates. Sweden is a small open economy with deregulated and integrated financial markets. Together with Sweden's inflation history this has accentuated the need for a more flexible interest management system – a system that influences money market interest rates as intended, without putting inflation credibility at risk. Furthermore, the introduction of an explicit inflation target especially raised the need for tools signalling long-term monetary policy intentions so as to attain transparency.

In the light of these considerations, the Riksbank introduced a new interest management system in June 1994. In the earlier system, the interest rate on lending and deposit facilities took the form of an ascending scale, whereby a bank's marginal cost increased with the amount borrowed from the Riksbank. The highest step at which a bank borrowed was known as the marginal rate. The system restricted the desired signalling flexibility by not admitting interest rate adjustments smaller than 0.25 percentage points and by the complete focus on the marginal rate.

The new system consists of one deposit and one lending facility, with corresponding deposit and lending rates used by the Governing Board of

the Riksbank mainly to signal monetary policy in the somewhat longer run. The deposit and lending rates form a "corridor" in which the repo rate – the Riksbank's primary operational target and signalling rate – is set by the Governor in accordance with monetary policy guidelines established by the Governing Board. The combination of an interest corridor signalling the future direction and speed of interest rate adjustments and a repo rate provides a flexible system for monetary implementation.

The repo rate is the rate at which, as a means of managing the liquidity of the banking system, securities with a maturity of one week are bought or sold by the Riksbank under repurchase agreements. The fixed repo rate may be interpreted as the Riksbank's target for the overnight rate in the interbank market. The repo rate can also be variable and set by tender, but this procedure was only used on a few occasions in the spring of 1995.

In February 1995, the Riksbank used a variable repo rate for the first time on the grounds that a variable repo rate was thought to provide more flexibility for the instrument rate to be adjusted in smaller steps according to changes relevant to monetary policy. Another reason was the assessment that market expectations of monetary policy were in line with the Riksbank's intentions. The krona was weak at the time and the market expected short-term interest rates to rise. The problem was that the bids did not only mirror monetary policy expectations, but rather the fact that the overnight rate had been lower than the repo rate for some time due to a liquidity surplus (not absorbed by the Riksbank) in the banking system as a whole.[8] Judging from the bids, some market participants expected this to prevail and the bids came in low. The Riksbank's response was to disregard low interest rate bids. The last time the Riksbank used a variable repo rate – in March – the opposite problem occurred. The Riksbank had guided liquidity in the banking system to a deficit, which resulted in an overnight rate above the repo rate. Again, overnight market considerations affected the bids. The interest bids came in high – which also reflected an expected monetary tightening as the krona had weakened during February – and the Riksbank had to disregard high interest rate bids to prevent a very high repo rate from being established. Still, the highest bid accepted by the Riksbank was not quite in line

[8] In the spring of 1995, the Riksbank did not fine-tune liquidity in the interbank market, thus allowing the overnight rate to fluctuate according to market conditions. The target rate was rather market rates with the same maturity as the repo rate, at that time primarily two weeks.

with the monetary policy intentions and was well above market expectations. During this period the credibility of fiscal policy was insufficient and international financial markets were characterised by unrest. Consequently, variable repos were not suitable during this period. All in all, market reactions caused volatility at the short end of the yield curve, partly due to the uncertainty of the Riksbank's intentions.

With hindsight, variable repo rates cannot be used to provide a clear signal of the Riksbank's intentions. Therefore, for variable repos to function well, a stable environment with sufficient confidence in economic policy and a strong link between the repo rate and the overnight rate are necessary. On the other hand, there are other means, for example overnight forward rate curves, that yield information about market expectations. In the light of these experiences, the Riksbank has used a fixed repo rate since March 1995.

During the repo period, the banking system has only two alternatives: use the Riksbank's facilities to borrow (deposit) any liquidity deficit (surplus) or adjust the demand for bank notes.[9] As demand for bank notes is insensitive to interest rate changes in the short run, an unexpected shift in demand for borrowed reserves immediately places the banking system in the borrowing (deposit) facility. Hence, as the banks' marginal cost is affected, the overnight rate rises (falls) inside the interest corridor (Figure 1).

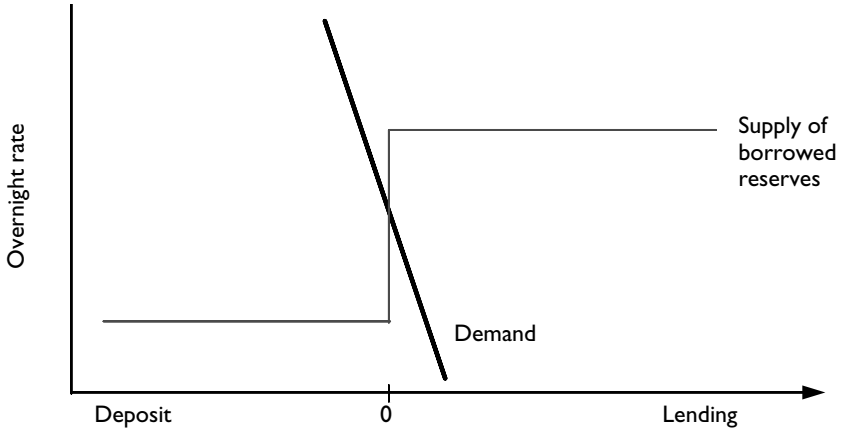
Currently, the Riksbank fine-tunes liquidity in order to neutralise changes in the banks' need to utilise the borrowing (deposit) facility during the repo period.[10] The Riksbank intervenes in the interbank market to fine-tune the overnight rate close to the repo rate.[11] The Riksbank made these moves towards clearer signalling mainly to avoid

[9] The reserve requirement was set to zero as of April 1994. This was a natural step towards a more market conform monetary policy as other monetary policy instruments provide more flexibility without distorting competition. A reserve requirement based on the average over a stipulated period (as in some EU countries) provides the banking system with a third alternative to manage short liquidity positions. The banks are free to use the reserves during the period, for example to meet overnight liquidity shortages, as long as the reserve requirement is met on average over the period. This might help to avoid undesirable fluctuations in the overnight rate and reduces the need for frequent market interventions.

[10] The Swedish interbank market is dominated by a few large banks, which simplifies the Riksbank's estimates of the banking systems' net position in the standing facilities over the coming week. Liquidity positions can easily be monitored on a continuous basis. Hence, fine-tuning operations in the deposit market present no problem to the Riksbank.

[11] To provide the banks with an incentive to bid in the weekly repos the Riksbank fine-tunes liquidity using the repo rate plus/minus 10 basis points.

Figure 1
The interest rate corridor



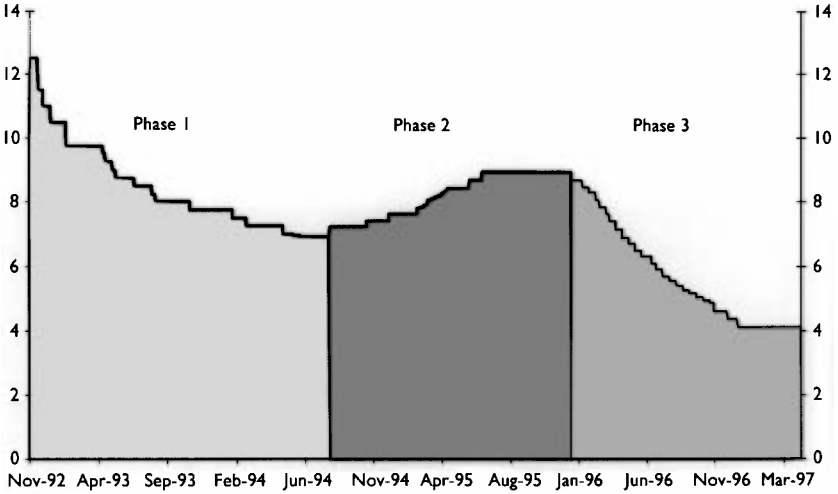
financial market participants mistakenly interpret fluctuations in the overnight rate during the life of the repo as monetary policy signals.[12] The fine-tuning implies that the banking system as a whole encounters a marginal net borrowing cost that equals the repo rate, with the result the overnight rate is established on the same level. By managing the overnight rate the Riksbank exerts an essential influence on the short and medium-term rates in the money market. In efficient markets these rates are mainly governed by the expected overnight rate. Furthermore, comparing market's expectations of the future overnight rate with monetary policy intentions provides important information about expectations of monetary policy.

2. Economic development and monetary policy – three phases

The purpose of this section is to describe the Riksbank's monetary policy formulation in the light of the important developments in the real economy as well as in the financial environment that occurred following the transition to a flexible exchange rate regime in November 1992. The

[12] Caused by a shift in liquidity, for instance due to changes in the foreign exchange reserves during the life of the repo.

Figure 2
Riksbank instrumental rate
In per cent



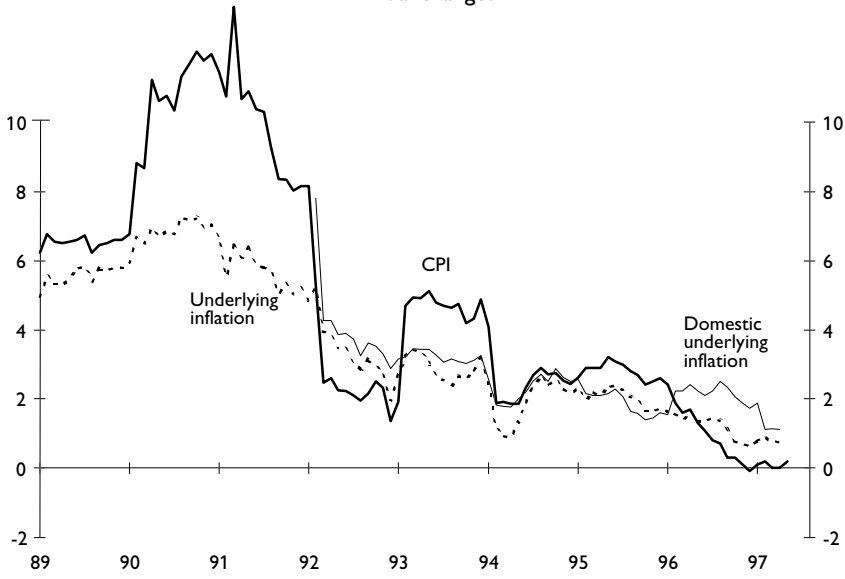
section is divided into four subsections related to differences in monetary policy and economic development (Figure 2): (i) export-led recovery and easing of monetary policy: November 1992–summer 1994; (ii) increasing capacity utilisation and a tightening of monetary policy: August 1994–December 1995; and (iii) new conditions for monetary policy: January 1996–spring 1997 (monetary easing). Each phase begins with a description of important considerations behind the monetary policy formulation, followed by a short review of the real economic and financial developments. The fourth subsection discusses the role of market communication during these three phases.

(i) Export-led recovery and easing of monetary policy: November 1992–summer 1994

After an immediate depreciation of about 10% in 1992, the krona continued to weaken during the beginning of 1993. An upward movement in the long bond rate in January suggested that long-term inflation expectations were rising. In January and February the Riksbank intervened in the foreign exchange market for the first time during the floating exchange rate regime in an attempt to counteract the inflationary effects

Figure 3
Capacity utilisation
In per cent

Figure 4
CPI and underlying inflation
Annual changes



of the weakening of the krona. The interventions in the course of 1993 totalled about SKr 55 billion. The exchange rate was also affected by Swedish firms, reducing their foreign currency exposure. Expectations of a further depreciation and the structural need for debt reduction in the private sector led to massive outflows of capital as the private sector rapidly reduced foreign debt. The government borrowing requirement was partly financed by borrowing in foreign currency. For 1993 these loans totalled about SKr 80 billion. In this way, part of the private sector's earlier exposure to exchange rate risks was taken over by the Government. Some of the increased borrowing was also used to build up the foreign exchange reserves.

Dual situation in the economy

From November 1992 to June 1994 the Riksbank lowered the interest rate more than 5½ percentage points to 6.92%. Growing signs of a dual economy were evident in Sweden during that period. The Swedish competitive position strengthened markedly, not only due to the depreciation of the krona. In 1992 payroll charges were reduced by 4.3 percentage points.[13] Increased productivity and low wage increases also contributed to the improvement in the competitive position. Interestingly, productivity started to increase in 1991 and especially in 1992, i.e. before the deprecation of the krona. This is in contrast to the situation in the eighties, when productivity started to grow more than one year after the devaluation in 1982.

Despite the recovery in industrial production for exports, investment in manufacturing continued to fall during 1993 for the fourth consecutive year. Consumption, private as well as public, was weak and the household saving ratio remained high (Figure 5). Inflation rose in the beginning of 1993, mainly due to increased indirect taxes and, to some extent, rising import prices. Weak domestic demand was one of the reasons why the depreciation did not have a greater impact on consumer prices. It was against the background of low economic activity, debt consolidation and increased private saving that the Riksbank considered it possible to reduce the interest rate, without fuelling uncertainty and a weaker exchange rate.

[13] Two crises packages were presented jointly by the Government and the Social Democrat opposition during the autumn of 1992 in order to defend the fixed exchange rate. The first package included proposals for reducing the budget deficit by more than SKr 40 billion. The second package was a fully financed proposal to cut payroll charges.

Figure 5
Household saving ratio*
In per cent

* Net saving in relation to disposable income.
Source: Statistics Sweden.

The tactics during the monetary easing in 1993 and early 1994 were to lower the marginal rate gradually. The Riksbank's view was that fast and sizeable adjustments of the marginal interest rate might cause inflation expectations to rise, especially in the light of Sweden's history of inflation and weak budget discipline, and thus cause long bond rates to rise. An exception was the quite large cut – 75 basis points – of the marginal rate in February 1993, which might serve as an example of the signalling effect of a sizeable step (even though long bond rates did not rise). Short-term market rates fell markedly, indicating that the financial market was expecting the Riksbank to cut rates more aggressively, and the krona weakened. This led the Riksbank to intervene in the money market. Short rates moved back up while long rates fell and the krona strengthened.

A problem facing the Riksbank was that the monetary easing might contribute to further depreciation of the krona and thus aggravate the dual situation in the Swedish economy, even though the depreciation of the krona mainly reflected increased risk premia as uncertainty about long-term fiscal stability rose. The central government budget deficit in relation to GDP totalled –15.2% in 1993 and public sector gross debt

amounted to 76.0%.[14] Even though actual inflation was in line with the Riksbank's intentions, the serious imbalances in public sector finances, along with Sweden's inflation history, aroused fears of increasing inflation expectations. Hence, there was a risk that the Riksbank would fail to meet its inflation target. The Riksbank, therefore, stressed the need for a forceful budget consolidation, especially considering the high gross debt ratio, both historically and internationally. The fiscal problems affected the exchange rate and by December 1993 the krona had depreciated by nearly 25% in effective terms since November 1992.

During the first half of 1993, the domestic debate on monetary policy was intense. Several commentators urged the Riksbank to pursue a more expansionary monetary policy than it did. The monetary policy implemented in Finland and the United Kingdom at the time was seen to be more in line with what a depressed domestic economy like the Swedish needed. However, in terms of a monetary conditions index, weighting together the stimulative effects from both the real interest rate and the real exchange rate, policy had already turned expansionary. Thus, while monetary conditions in the United Kingdom and Finland between September 1992 and June 1993 became 5 and 10 percentage points more expansionary, respectively, they became 12 percentage points more expansionary in Sweden.[15] Another difference, however, between Sweden and Finland and the United Kingdom was the stance of fiscal policy in 1993. While the structural general balance in Sweden was calculated to be –11% of GDP, the structural deficit was –0.2% of GDP in Finland and –5% of GDP in United Kingdom, according to the OECD.[16] One observer, who supported the Riksbank's policy during the spring of 1993, concluded later: "With hindsight, experience and credibility, all of which were obviously lacking (for very different reasons!), it is possible that the best policy would have been more expansion during the spring of 1993 and, less expansion during the fall of 1993 and spring of 1994. However, without credibility, the Riksbank's freedom of movement was less, and a more expansionary policy during the spring of 1993 might have been

[14] Source: National Institute of Economic Research.

[15] For Sweden, the change in the monetary conditions index refers to the period between November 1992 (when the krona started to float) and June 1993. The monetary conditions for all countries use relative weights of 3 to 1 for real short-term interest rates and the real effective exchange rate. Between the move to flexible exchange rates and June 1993, the exchange rate (TCW) depreciated 9, 7 and 16%, respectively, in the United Kingdom, Finland and Sweden.

[16] OECD *Economic Outlook*, December 1993.

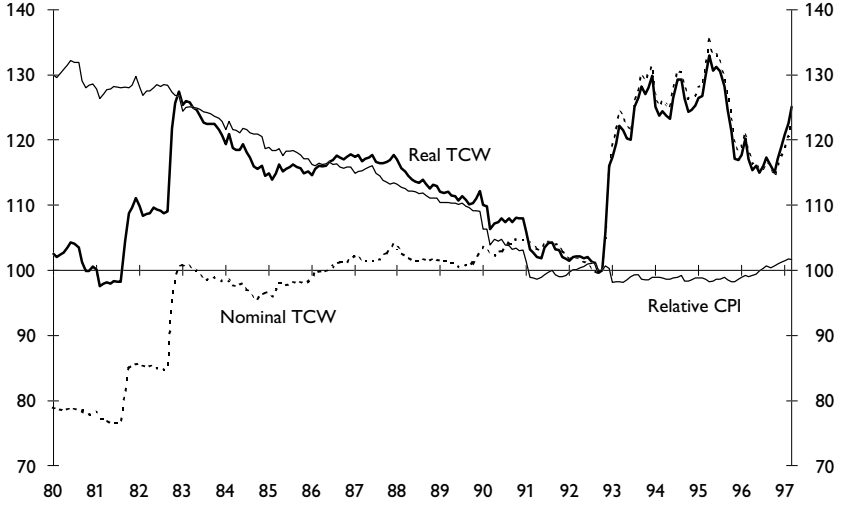
interpreted as the beginning of a new era of high inflation, hence tending to increased inflation expectations, and starting to increase actual inflation."[17]

Excessive depreciation

Part of the real depreciation in 1993 can be seen as an adjustment process towards long run equilibrium after the real appreciation during the 1980s and early 1990s (Figure 6). But the real depreciation seems to have been excessive, especially as the competitive situation for Swedish firms reached historically high levels. By the end of 1993 the improvement in relative unit labour costs in a common currency amounted to between 8 and 10% compared with eleven years earlier after the competitive devaluation of the krona in 1982. Hence, the real depreciation seemed to have more than compensated for the earlier real appreciation.

But part of the depreciation was related to low credibility and fears of a regime shift reflecting imbalances in public sector finances. There was

Figure 6
Real exchange rate, relative CPI and nominal exchange rate
Index, October 1992 = 100



[17] Svensson (1995).

still a long way to go in bringing long-term inflation expectations down, even though the transition from high to low inflation in the economy went very fast.[18]

Furthermore, the real depreciation of the krona can to some extent be related to the confidence – in the late 1980s and early 1990s – in the fixed exchange rate regime, even though the real appreciation and other indicators showed signs of serious problems in the Swedish economy. For example, to be profitable, the increase in foreign debt by Swedish firms, partly explained by interest arbitrage opportunities, was heavily dependent on the credibility of the fixed exchange rate regime. In 1993, Swedish firms amortised SKr 98 billion, or 6.7% of GDP, on foreign debt. The major factor behind the Swedish companies' foreign currency debt in 1992 was the persistent current account deficits during the 1980s and early 1990s – the result of an overheated economy with structural wage formation problems – which had to be financed.

The Swedish private sector had to finance the current account deficits on its own as the rule, valid from 1984 to 1992, that the government should not increase its borrowing in foreign currency prevented any public financing. The rule aimed to strengthen the commitment to the fixed exchange rate regime.[19] Hence, given that the government did not finance the current account deficit, the interest rate differences had to be high enough to stimulate inflows of private sector capital.

The speculative bubble

Foreign investors influenced the interest rate markedly during 1993 and 1994.[20] They increased their holdings of Swedish long-term bonds by SKr 133 billion (9.2% of GDP) from November 1992 to January 1994, mainly in order to speculate in falling long bond rates in the short term.[21] A large part of these acquisitions of Swedish long bonds was repo financed,[22] which protected the investors against the currency expo-

[18] We are not referring to long-term inflation propensity in the economy, but to the short-term evidence.

[19] Hörngren and Westman-Mårtensson (1991).

[20] Some of the facts discussed in this section were not evident to policymakers in the autumn of 1993 and early 1994.

[21] Sweden was not the only country with speculative trade during 1993 and the beginning of 1994. Large speculative funds invested heavily in countries like Italy and Spain on expectations of falling long bond rates.

[22] Short-term borrowing using the security as collateral.

sure.[23] By January 1994, foreign investors had built up a repo stock of SKr 70 billion (4.6% of GDP).[24] Speculation in falling long bond rates might have been triggered by the fall in international interest rates, an expected monetary easing in Sweden and – to some extent – falling inflation expectations[25] in the short to medium term.

Probably most important was the high initial level of interest rates, which was due to Sweden's history of inflation and weak budget discipline. Traditionally high interest rates implied a large potential drop in long bond rates as a response to changes in economic conditions, like the fall in international interest rates. Together with short investment horizons and repo financed holdings, this presented a large potential profit for the investors. Furthermore, the recession, with few signs of inflation and indications of falling inflation expectations, might have led investors to expect monetary easing. Given no inflation risks in the short run, the easing of monetary policy might have contributed to the fall in long bond rates. The reason being that monetary easing lowers the cost of financing the holding of long bonds, thereby increasing demand for long bonds and causing long bond rates to fall (all else equal). Hence, the speculative demand for long bonds, which was probably accentuated by a tendency of herd behaviour, was an important factor behind the fall in long bond rates from 10% in the beginning of 1993 to 7% by year-end, a level (at the time) not seen since the 1960s.

Short investment horizons and high leverage made investors very sensitive to changes in long bond rates. As a consequence, when world interest rates rose after the monetary tightening by the US Federal Reserve Board in February 1994, the reaction was to sell Swedish long bonds quickly, causing Swedish long interest rates to rise significantly.

Thus, the fall in long bond rates in 1993, and especially the fall by 130 basis points in the 10-year bond rate differential vis-à-vis Germany, was probably to a large extent the result of short-term speculation. In this

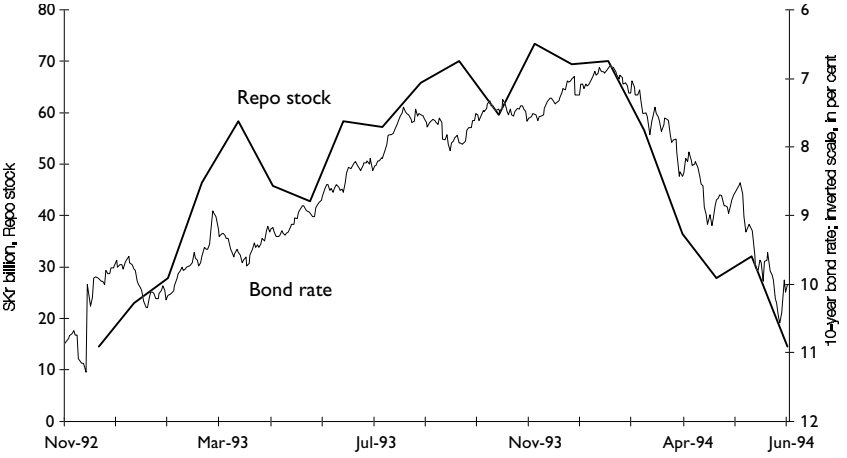
[23] To some extent this might explain why the krona remained relatively stable during the international turmoil in the spring 1994 when both long bond rates and the long bond rate differential vis-à-vis Germany rose sharply.

[24] Foreign investors' total interest rate exposures were even higher than the repo statistics account for. The investors also used interest derivatives (swaps and futures) to obtain speculative interest rate exposures in Sweden.

[25] As indicated by Aragon Securities' survey among investors in the Swedish bond market and the downward shift in implicit forward rate curves. Given unchanged real interest rates (and adjusted risk premia) this implies falling inflation expectations. But at the same time the steepenings of implicit forward rate curves during 1993 implied increasing inflation expectations in the long term.

Figure 7

Long bond rate and foreign investors' repo financed holdings of government bonds



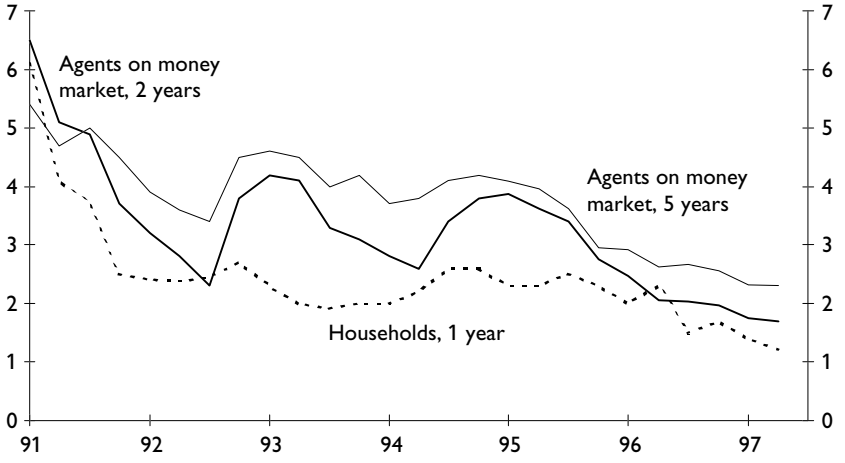
way, the speculation in Swedish securities had implications both for the appropriate interpretation of the long bond rate differential vis-à-vis Germany as an indicator of long-term credibility and for the response of long bond rates to the hike in international interest rates in February 1994. One conclusion is that, long-term interest rates, in periods with financial unrest, may be blurred indicators for monetary policy.

(ii) Increasing capacity utilisation and tightening of monetary policy: August 1994 – December 1995

During the spring and summer of 1994 inflation pressure increased. The annual change in the CPI rose to 3.3% in April and was followed by a further increase in prices of imported goods. Inflation expectations two years ahead rose from 2.6 to 3.4% between May and August (Figure 8). In the meantime industrial capacity utilisation rose above 80%, comparable to the level during the late 1980s (Figure 3).

This partly reflected the low investment level in the preceding years, with negative implications for the expansion of production capacity. Furthermore, the exchange rate continued to weaken. The rise in inflation pressure in 1994 also made it clear that price formation was still

Figure 8
Inflation expectations
In per cent



Sources: Statistics Sweden and Aragon Securities.

not in line with a low inflation economy. Therefore, in August 1994 the Riksbank started to raise the repo rate.

In the second half of 1994 the output gap narrowed (Figure 9). The Riksbank's assessment was that the output gap would become positive at the end of 1994. At the time the assessment was made only from the output gap calculated with the Whittaker-Henderson filter, as opposed to the current use of different measures of the output gap.[26] Industrial production had risen so rapidly that it exceeded the potential level by more than 5%.[27] The dual situation in the economy was clear from a comparison with the non-industrial output gap, which in the second quarter of 1994 was still about −2%. Increased production capacity presupposed investment on a considerably larger scale than indicated by

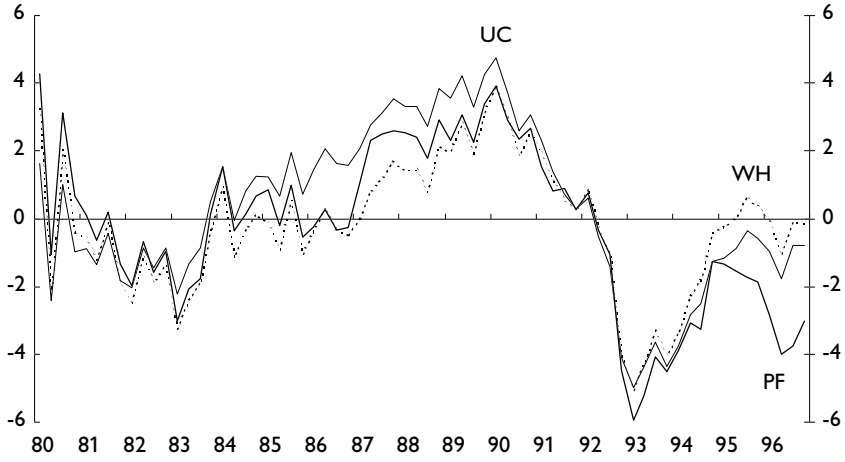
[26] Since 1996 the Riksbank uses three measures of the output gap. The W-H filter is based on a projection of actual GDP using the National Institute's forecasts. The PF method is based on a estimate of 6.5% for equilibrium unemployment in 1995 and 1996 in Giorno et al. (1995). The Unobserved Component method is based on the use of relationships between observable variables such as inflation, output and unemployment and unobservable variables such as potential output and the NAIRU.

[27] Calculated with the filter technique mentioned above and reported in the *Inflation Report* in October 1994.

Figure 9

The output gap calculated with three alternatives*

In per cent



* The Whittaker-Henderson filter (WH), the Unobserved Component method (UC) and the Production Function Approach (PF).

the statistics at the time. Total and industrial investment ratios were considerably below the average in the eighties. Inflation had been subdued by weak domestic demand since 1992 and upward pressures on prices were expected when the output gap was closing.

The internal conditional inflation forecast for 1995, based on unchanged interest rates and exchange rates, had risen from 2.9% in January 1994 to 3.1% in April and then further to 3.8% in August 1994.

The export-led recovery continued in 1995. Besides the expansion of exports, rising industrial investment also contributed to strong GDP growth. Inflation expectations remained above the inflation target, despite the tightened monetary conditions in 1994 and 1995. One reason for this was probably an increased regime shift premium (Figure 13), partly due to uncertainties regarding fiscal consolidation. In addition, wage increases in 1995 were high and averaged 6.1%.

Market overreactions

From August 1994 up to July 1995 the Riksbank increased the repo rate by 2 percentage points to 8.91. The fast and unforeseen inflation

developments during the summer explain the markets' overreaction to the initial repo rate increase to 7.2%, especially as the preceding inflation report, released in June 1994, downplayed the risk of increased inflation. Observers and market participants were largely surprised, given the message in the June report, and the fact that the move to increase interest rate was taken less than 40 days before general elections to the Swedish parliament were being held. The overnight forward rate curve, within a horizon of a few months, reached levels of 9–10%. However, after a few months, interest rate expectations stabilised along a path that was more in line with the Riksbank's intentions.

The repo rate hike in August 1994 was followed by a short period of unrest in the financial markets, which was reflected by high volatility in bond rates and exchange rates. However, the situation settled down soon and the krona strengthened in September and October. The long bond rate differential vis-à-vis Germany fell by more than 0.5 percentage points, partly due to the fact that much of the government's fiscal consolidation proposal, presented on 5th November, had been anticipated or leaked. In November there was also a referendum on whether Sweden would join the European Union or not, which resulted in a yes. Interest rates and the exchange rate moved little, suggesting that also the outcome of the referendum was largely anticipated.

Inflation surprises

In part, the fast pick-up in inflation during the summer of 1994 came as a surprise to observers of the Swedish economy. When the Riksbank started to increase interest rates in 1994, many commentators objected, arguing that no inflationary pressures were evident. Nine months later it was clear that the Riksbank's assessment in August had been correct. In retrospect, it is obvious that it is difficult to fully capture the overall inflation propensity in an economy during periods of major imbalances. Most of the increases in the repo rate during 1994 and 1995 took the form of quite sizeable steps of about 20–25 basis points. For a period in the spring of 1995, the increases came in smaller steps and at shorter intervals. The change in tactics coincided with unrest in financial markets, the use of a variable repo rate and the search for a somewhat more flexible monetary policy implementation.

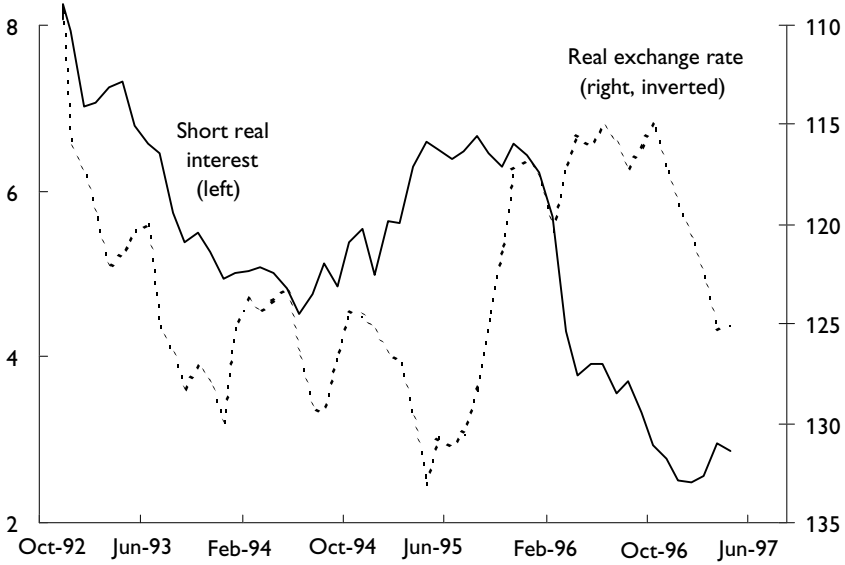
After the last increase in the repo rate, the Riksbank announced that it considered the krona undervalued and did not exclude currency

interventions to reinforce a positive trend in the exchange rate. This announcement appears to have helped draw attention to the improvements that had occurred in conditions for the Swedish economy. One, maybe the most important, improvement was Sweden's adherence to EU and the political support in the Riksdag (Sweden's parliament) for the convergence program and a consolidation of public finances. Another improvement was the alleviation of the dual situation in the Swedish economy. Current and expected domestic demand seemed more stable compared to the situation in 1993 and 1994 and forecasts for public finances gradually turned better.

A reminder that credibility was fragile and insufficient was the effects of the financial turmoil in the spring of 1995, which was due to the crises in Mexico and the failure of Barings. The krona depreciated sharply and long bond rates rose, as did the long bond differential vis-à-vis Germany, in line with high-yielding countries like Italy and Spain. The pattern that high-yielding countries are vulnerable in times of turmoil in the international financial market still included Sweden, and was partly reflected in the high exchange and interest-rate volatility. The fragility was aggravated by the fact that the consolidation of public finances still had a long way to go, which was also pointed out in the OECD report on the Swedish economy. This made Sweden's economy sensitive to international unrest both in terms of the effect on Swedish bond rates as investors sought *safe havens* and the effect of a higher bond rate/weaker krona on the cost of servicing Government debt. During the unrest in the spring of 1995 monetary policy faced transparency problems. Despite the fact that the Riksbank continued to raise the repo rate, monetary conditions could not be controlled as the weakening of the krona caused the real exchange rate to depreciate (Figure 10).

Between September and November 1995, the krona appreciated about 10% and the long bond rate fell by 1½ percentage points. The development had much to do with government finances. In November, when the semi-annual monitoring of the convergence programme was undertaken, the Government considered that the general government debt ratio would be stabilised already in 1998. The semi-annual monitoring arrangement provided a follow-up to the measures undertaken. Hence, the credibility of a sustainable budget consolidation improved. Moreover, the credibility effects of the tightening of monetary policy in August 1994 were becoming more evident. The Riksbank's decision to raise the repo

Figure 10
Real three-month interest rate and real effective exchange rate
In per cent and index, October 1992 = 100



rate in August 1994 showed that monetary policy was pre-emptive and that long-term credibility considerations were in focus. Monetary policy had been tested in action for the first time during the new flexible exchange rate regime. The monetary tightening in August 1994 was a very important measure by the Riksbank to make the inflation target credible. Inflation expectations, according to surveys, fell significantly. The twelve-month rate of inflation was below the upper interval of the inflation target from June 1995 onwards, and the Riksbank gradually revised the inflation forecast towards the end of 1995. In 1995 inflation was 2.8%.

By the end of 1995, the Riksbank's monetary policy stance was being criticised as being too tight and lagging behind, in view of the inflation outlook and the decline in European interest rates. However, credibility considerations were a crucial restriction on monetary policy. After the tightening period had ended in the summer of 1995, the Riksbank stayed on hold. Apart from expected inflation considerations, the experiences

were that financial market assessments included both Sweden's inflationary history and a notion that the Riksbank's monetary policy had to be "tested in action" for some time to be considered credible. Considering the fragility of the recently acquired credibility and the arduous process of establishing it, the Riksbank chose to be cautious. This policy paid off. From the transition to a tight monetary policy in July 1994 to the end of 1995, the krona strengthened by 9.4% effectively and the long bond interest rate differential vis-à-vis Germany fell by 1.8 percentage points.

(iii) New conditions for monetary policy: January 1996 – spring 1997

These improvements also changed the conditions for monetary policy. Economic activity slowed during the second half of 1995, mainly due to the recession in continental Europe. In January 1996, the Riksbank concluded the time was right to start lowering the repo rate. In a Press Release on 9th January it was said that "inflationary pressure in the economy has eased. There is therefore an increased probability that in the coming years the rate of inflation will be in line with the price stability target." The internal main scenario conditional inflation forecast for 1996 and 1997 was somewhat above 2% in terms of headline CPI, with indirect taxes assumed to contribute around 0.2–0.4 percentage points to the annual increase in CPI. However, this internal forecast was based on a growth assumption on the high side for 1996 (around 2%) and it became increasingly clear that domestic and international demand was getting weaker than expected. Therefore, the internal discussion focused on the probabilities for alternative growth and inflation scenarios, giving more weight to a scenario in which the economy would grow at less than its potential rate in 1996.

The actual outcome for GDP growth in 1996 was 1.1%, with contributions to GDP growth stemming mainly from the continued increase in net exports accompanied by strengthened private consumption. However, this expansion of aggregated demand was countered by stock adjustment in industry and declining public consumption, which was related to the consolidation of public finances.[28]

[28] The central government deficit shrank to 3.6% of GDP in 1996 from 7.7% in 1995. Data (out-turn) according to the Maastricht definition are available only for 1995 and 1996. The Government forecast for 1997 is a further reduction of the budget deficit to 2.1%, i.e. below the Maastricht criteria of 3.0% of GDP.

In the March 1996 inflation report, the Riksbank's view was that inflationary pressures were falling and that further easing of monetary policy was possible. It was also noted that "inflation expectations, as measured in surveys and in other ways, have eased down. The expected inflation is not yet on a level with the target but the downward revisions have been continuous and expected inflation is now inside the tolerance interval. In addition, international economic activity has weakened, thereby contributing to decreased inflationary pressure in the export sector. At the same time, domestic demand appears to have been slacker than envisaged earlier. All this has reduced the risks of inflation in the Swedish economy." The appreciation of the krona and international slowdown subdued Swedish growth. There were also signs that the economy had become less inflation prone in other respects as well. "In that case", it was noted in the March inflation report, "for a given demand situation the economy will generate lower inflation than before."

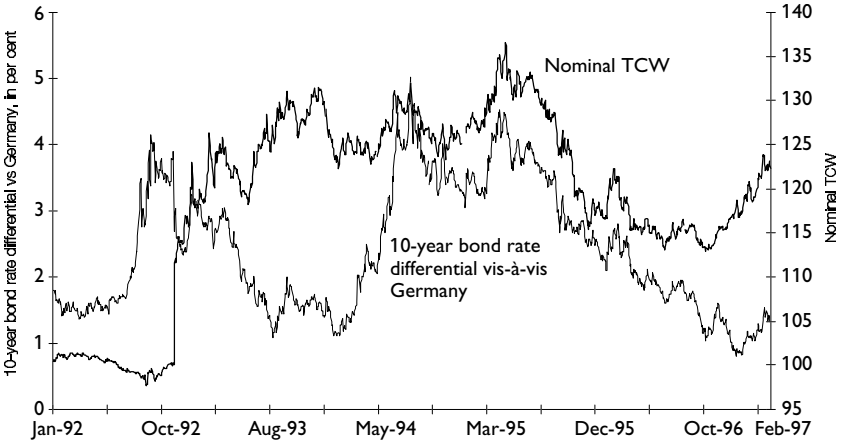
Policy transparency

This time the lowering of the repo rate began with relatively large steps, 20–25 basis points, at fairly regular intervals. The assessment of how far the repo rate would be able to be reduced was revised gradually as new and favourable information on inflationary pressures flowed in. The interest rate corridor was adjusted and more repo cuts followed in somewhat smaller steps, 10–15 basis points. In this process the Riksbank used the adjustments of the interest rate corridor as a tool to signal the future direction of the repo rate and the speed of adjustments. In the last three months of 1996 the cuts in the repo rate were made in larger steps once a month. Altogether the Riksbank lowered the repo rate from 8.91% in January 1996 to 4.10% in December. Generally the actions taken seem to have been intelligible. During 1996 the market's assessments of the speed and direction of the repo rate, according to overnight forward rate curves, were in line with those of the Riksbank; hence monetary policy appears to have been transparent.

Despite the easing of monetary policy during 1996, which caused the (overall) short interest rate differential to decrease, the krona strengthened and the long bond rates fell markedly. Credibility improvements, both fiscal and monetary, thus seemed to have been predominant. With actual and expected inflation in line with the inflation target, long bond rates could benefit both from lower short interest rates and credibility

Figure 11

Long bond interest rate differential vis-à-vis Germany and the effective krona exchange rate



effects on inflation expectations and the risk premia. The long bond interest rate differential vis-à-vis Germany fell markedly, reaching 0.9 percentage points by year end. The Swedish developments at the time mainly reflected improvements in fundamentals, although they took place against a background of stable international financial markets.

From October 1996 to May 1997 the krona's effective exchange rate weakened by 7.5%. It is difficult to single out a particular factor behind this recent weakening. A combination of cyclical factors, credibility effects and short-run market reactions seems to have had an influence.

First, *cyclical* factors, may have been at work. Countries in a phase of stronger activity may have cause to tighten the monetary stance, which normally leads to an appreciation of the domestic currency. The monetary stance in the United States and the United Kingdom was relatively tight compared with many other European countries. This contributed to a marked appreciation of the dollar and sterling against other European currencies, including the krona. The strengthening of the dollar and sterling accounted for approximately half of the krona's weakening since October 1996.

Second, the exchange rate may reflect *credibility* effects. For instance, the weakening of the krona against the Deutsche mark was accompanied

by a rising long-term (forward) interest rate differential against Germany. This probably had to do with uncertainty at the time both about the EMU process, which has been particularly liable to elicit effects in countries with a history of high inflation and problems with government finance, and about the future direction of domestic economic policy, partly connected with the persistently high level of unemployment.

Third, in addition to cyclical factors and credibility, the exchange rate may be affected by temporary supply and demand conditions in the exchange market.

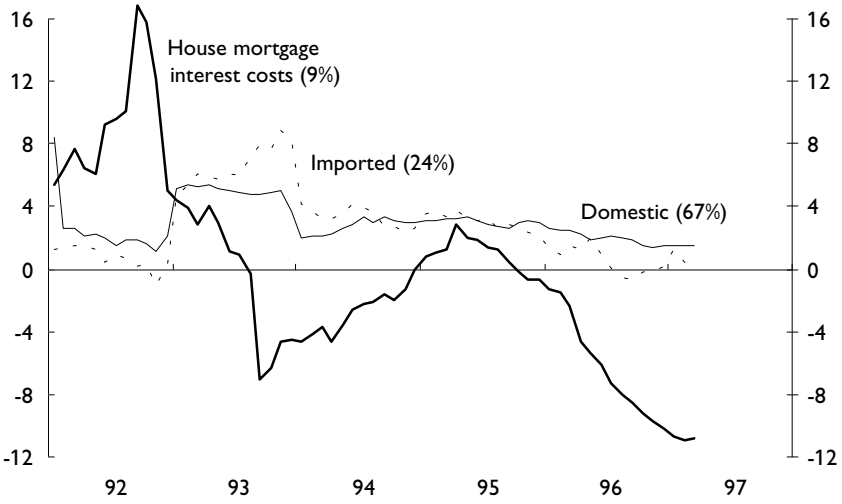
For example, prior to spring 1995, Swedish insurance companies were restricted to allocating their capital domestically. When the restriction was lifted, insurance companies acquired SKr 48.3 billion of foreign interest bearing securities during 1996. Thus, portfolio adjustments took place even before the krona started to depreciate, implying that the positive credibility assessments were large enough to compensate for both these portfolio adjustments and the decrease in the short interest differential up to October. Therefore, some credibility factor, e.g. a clearer EMU attitude and/or increased political risk (1998 being an election year), seemed to have triggered the weakening of the krona. The amplitude of the portfolio-adjustment effect on the exchange rate might have been fuelled by high volatility and "noise-trade" arguments.[29]

Credibility subdues inflation

Inflation decreased sharply in 1996 and averaged 0.8%, which is below the lower tolerance interval of the inflation target. Early this year the twelve-month change in the CPI was close to zero. There were several reasons for this low inflation. First, all measures of the output gap indicate that inflationary pressures from the demand side were lower in 1996 than in 1995. The output gap by the end of 1996 was judged to have been around −2%. Second, in early 1997 inflation expectations were still falling. Third, the low rate of inflation stems in part from transitory effects, as the fall in the long bond rates together with the easing of monetary policy decreased house mortgage costs sharply (Figure 12). This decline was more rapid than expected, as households opted to repay fixed-interest loans in advance in order to obtain new loans at lower interest rates. The

[29] Trades influenced by non-fundamental information interpreted as signalling future price movements.

Figure 12
Components of the CPI



Note: The figures in parenthesis are the component's CPI weight in 1997.
Source: Statistics Sweden.

contribution to CPI from mortgage costs was −0.6% on average during 1996. The development of consumer prices for mainly imported goods contributed to the average inflation rate by merely 0.1% in 1996 (the CPI weight is 24%). Fourth, there are indications that price formation in general has changed as a result of increased confidence in the policy of price stability and better competitive conditions.[30] Prices have, for example, been more subdued than expected for several categories of services. A number of transport markets have been deregulated in recent years and local authorities are using competitive tenders to a growing extent for the procurement of transport services, e.g. public transport. Another category is car repairs, where costs for material and labour have fallen in connection with price adjustments to a more competitive market. Besides, lowered VAT on food decreased prices on domestic food by 6.3%.

[30] Borg and Croneborg (1997).

(iv) Market communication

To make monetary policy transparent, the Riksbank communicates with the market and the public through speeches, inflation reports and other publications. The inflation report is the most important policy document and is published four times a year. The purpose of the report is to provide a basis for monetary policy decisions and make the Riksbank's deliberations known to a wider public. The inflation reports contain an assessment of inflation and monetary policy as well as a brief account of the Riksbank's forecast.

The presentation of the outlook for inflation has improved since the first inflation report was published in October 1993. In the first reports, statements regarding future inflation were quite general. In the report published in March 1994 it was, for example, stated that "indicators for inflation expectations one to two years ahead show some downward revision since our report last October and imply that the Riksbank's inflation target is now expected to be met in 1995." In the report published in October 1994 it was said that "the expectation of firms and investors now exceed the inflation target for 1995."

In order to improve transparency and public understanding of monetary policy, the publication of the central bank's own inflation forecast can play an important role. However, there is also a need to give a very clear presentation of the actual inflationary pressures and evaluate past forecasts thoroughly. As the inflation forecast is made conditional on various underlying assumptions, it may be complemented by the presentation of alternative scenarios.[31] In reality monetary decisions are not only based on point estimates of inflation but also on a distribution of possible outcomes.

More exact figures from the Riksbank's own forecast were introduced in the inflation report in November 1995 in which it was stated: "the Riksbank now foresees that inflation will be between 2.5 and 3% during 1996."

A dilemma when publishing forecasts of inflation is that they normally are based on the assumption of unchanged monetary policy. When the first projection was published in November 1995, the underlying assumptions regarding exchange rates and interest rates were also

[31] It is also possible to present the relative likelihood of possible outcomes around the central projection as in the *Inflation Report* published by the Bank of England.

communicated to the market. The assessment was based on the average level of interest and exchange rates during the last two weeks.

In the March 1996 and later reports, inflation projections were based on more explicit scenarios or forecasts for the economy, e.g. indicating expected GDP-growth and the like. Also the assumption of an implicit path for future exchange rates was included. In the June 1997 report this was communicated in the following way: "this inflation assessment starts from some appreciation of the nominal effective (TCW) exchange rate from the level of 122, which means that the rate is around 2.5% weaker than in the March version of the main scenario." The reason for not publishing an exact path for exchange rates is that such a path easily could be misinterpreted as an explicit policy target. Under floating exchange rates and with an inflation target the exchange rate is only one (important) indicator of future inflation.

As the inflation forecasts are conditional on unchanged interest rates and an implicit exchange rate path, there is also a need to explain to the general public and market participants that the Riksbank's forecasts should not be evaluated against actual inflation outcomes in the same way as unconditional forecasts. One way to explain the conditional nature of the assessment in the inflation report is to rely on several alternative projections around the central forecast. In the inflation report in June 1996 risk scenarios around the central projection were introduced. Typically such risk scenarios assume alternative (implicit) paths for exchange rates and/or aggregate demand.

Other important channels for monetary policy communication, besides the inflation reports, are the speeches by the Governor and Deputy Governors; in 1996 they gave more than 20 speeches. In addition the Governor and Deputy Governors appear in hearings in the Standing Committee on Finance in Parliament.

Important policy issues are often clarified in such speeches. In December 1994, the Governor, Mr. Bäckström, for example discussed the role of the Swedish inflation target and clarified that the target refers to the rate of inflation in an annual perspective: "It is naturally the intention that inflation will be continuously kept at a low and stable level around 2%. But monetary policy cannot manage monthly changes in the CPI. So neither can the policy be evaluated on a monthly basis. At the same time, the policy must continuously incorporate new information."[32] In May

[32] Bäckström (1994).

1997, the Deputy Governor, Mr. Heikensten, discussed and clarified the role of the exchange rate in the conduct of Swedish monetary policy.

Working papers and articles in the quarterly review are also important in communicating analysis and forecast models to the market.

All information in inflation reports, speeches and published papers helps the financial market to understand the Riksbank's intentions. The Riksbank has studied the impact of inflation reports and speeches on the financial market.[33] One conclusion was that the speeches by the Governor and the Deputy Governors influenced short term interest rates in the intended way. Another conclusion was that the financial market anticipated changes in the repo rate to a large extent.

3. Three current issues

This section deals with current issues relevant to the Swedish economy and monetary policy. The purpose is to deepen the discussion of three aspects. First, in the light of experience and developing theory there is a discussion of the pros and cons of CPI as an inflation target. Second, the financial market's assessment of Swedish developments has proved to be very sensitive to signs of a return to the history of inflation and weak budget discipline. Therefore, a theoretical framework to the problem of the so-called regime shift premia is presented. Third, proposals aiming to increase the independence of the Riksbank supported by a substantial parliamentary majority have been presented in 1997.

CPI — the ideal index?

The Swedish inflation target is expressed as the change in the official consumer price index. The advantages of the CPI are well understood: it is widely familiar, published monthly with a short time lag, and rarely subject to revision. Using the CPI eases communication with the general public and politicians and has educational value. However, problems arise if the index is constructed in such a way that it does not correctly gauge inflationary pressures (Figure 4).

Price indices may have different purposes and uses which influences the way they are calculated. The CPI can be used as a compensation

[33] Lindberg et al. (1996).

index, i.e. as a basis for the calculation of compensatory payments to different groups. This means that political decisions enter into the choice of goods and services to include in the index. In practice this means that imputed prices may be included as well as administratively determined charges and fees. The CPI is meant to measure the price changes for total private consumption in the domestic market. A drawback is that the CPI obviously contains prices that are outside the control of the Riksbank (indirect taxes and subsidies) and prices that have perverse effects on monetary policy (mortgage interest costs). Another potential problem with the use of a conventional price index is that transitory price movements in the market prices of particular goods may mask a different development of the general price level. There are commodities that historically have given rise to such one-off effects on the price level, for example oil and food products.

Considerations like these provide an argument for eliminating the first-order effects of transitory price movements from the index and focusing on an underlying rate of inflation. A problem with this approach is that these price movements often are unexpected and cannot be identified in advance. It is also difficult, even with hindsight, to identify the first-order effects of a given change in subsidies or indirect taxes or of other price shocks.

Given these difficulties and the overriding need to re-establish credibility by being clear and transparent, the Riksbank continues to use the CPI as the official measure of inflation for the purpose of monetary policy. In the inflation reports, however, calculations of several different measures of underlying inflation are presented. In Figure 4, underlying inflation excludes the effects of changes in indirect taxes and subsidies and in imputed interest costs for owner-occupied homes. Domestic underlying inflation excludes, in addition, prices of imported components.

The problem with transitory price shocks is that they tend to give rise to sudden and unexpected price changes (whereas demand shocks tend to influence the price level only gradually). As a result, the central bank often has little time to react to supply shocks. And even if there is time to react, the attempts to eliminate the first-round effects on the price level would reinforce the negative effects on demand and output of the initial shock.

In terms of practical policy, the Riksbank has indicated that since occasional changes in indirect taxes and subsidies usually have limited effects

on the price level, it should be possible to accommodate them within the tolerance interval.

However, the Riksbank has also noted that there are price effects that cannot be accommodated within the band and cannot be fully contained with monetary policy measures. Attempts to do so would have destabilising effects on the economy. Thus, in the event of major unforeseen disturbances, as well as when indirect taxes and subsidies are altered in conjunction with a major reform of the tax and transfer system, scope must be provided for price effects. Temporary deviations from the targeted rate of inflation may accordingly occur, particularly in view of the fact that price stability does not refer to isolated monthly figures. However, any secondary effects should be contained so that inflation is quickly returned to a rate that is consistent with the target.

The above examples suggest that the Riksbank is dealing with the problem of price shocks through what has been referred to as "caveats". However, these caveats have not been specified in advance in any systematic fashion but are applied more or less ad hoc. Consequently, the price shocks and the resulting variability of the CPI do present the Riksbank with an educational problem and do put a considerable burden on the presentation in its inflation reports.

The CPI has varied significantly more than the various measures of underlying inflation that the Riksbank produces. One example is 1996, when interest rates were reduced rapidly. The CPI then fell much more than the underlying inflation, due to a reduction of the interest costs for housing.

The problem of temporary influences can be managed in different ways:

1. One possibility is to clearly *specify* in advance which *deviations* from the CPI are acceptable. This is the method used in New Zealand. It could lead to greater transparency. On the other hand, it would be less clear exactly how the valid objective is defined. In addition, it is difficult to foresee all the corrections warranted and to quantify their exact price effects. Finally, it is a problem that corrections of this kind are so highly dependent on the central bank's own assessments, which can influence credibility negatively.
2. A closely related alternative is to use a measure of the *underlying inflation* as the target. Compared to the first alternative, it has the advantage of giving a clear definition of the objective. It would,

however, lead to difficulties similar to those of the first alternative with respect to problems of defining and quantifying the effects of various disturbances.

3. Another possibility is to *supplement the CPI by* one or several measures of *underlying inflation*. In Canada, the objective is expressed in terms of the CPI whereas a measure of the underlying inflation – which describes the process of inflation better – is the operative target. In the long run, the final goal is reached since it is clearly linked to the operative target. A "softer" variant on the same theme is to clarify how policy is influenced by underlying inflation, since it often gives a clearer picture of the process of inflation.

It is important to note that the large changes which occurred in the repo rate and thus in the interest costs of housing in recent years were linked to the transition from the high inflation regime of the seventies and eighties to a regime of price stability. A continued confidence in the low inflation regime would imply that such large changes in the interest rate component are less likely in the future.

The Swedish CPI has a long and fairly distinguished history. It is available monthly since 1954, when a major revision of the then existing index was conducted. The calculation methods and sampling procedures are subject to rolling revisions and new goods are introduced continuously. The currently fashionable issue of a possible bias in the CPI appears not to be a problem in Sweden. No estimate of the total bias is available but it is clearly small and certainly much smaller than in, for example, the United States.

In March this year, the European Union began to publish Harmonised Indices of Consumer Prices (HICPs) for EU member states. These harmonised indices will be used for the assessment of inflation convergence in the union. They are not, however, intended to replace existing national consumer price indices. It will take some years before HICP harmonisation is complete. It remains, for example, to decide on the treatment of capital costs for owner-occupiers, the coverage of the index and the revisions of weights. In principle, the HICPs are to be pure inflation indices.

At present the HICP is not a candidate as a target variable for monetary policy in Sweden. As the work of harmonisation is still in progress, it is not clear just how the index will be calculated in the coming years. It will also be some time before a time series for the new index is available

that is long enough to be suitable for monetary policy analyses. However, HICP will be included in future inflation reports as an important indicator of inflation as well as for international comparisons.

Regime shift premia

As mentioned above, Sweden seems to be vulnerable in times of international financial unrest. In this section we give a short introduction to the meaning of regime shift premia in the term structure and how these may affect the relationship between forward interest rates and inflation expectations.

If investors fear that the economy will switch to a high inflation regime there will be a regime shift premium for holding bonds. Fluctuating regime shift premia may be one explanation why forward interest rates have varied more than inflation expectations obtained from surveys. Surveys only partly incorporate regime shift expectations. Forward interest rates normally also reflect investors' expectations about future monetary policy actions (changes in the short-term real interest rate), which tend to amplify the effect on forward rates that fluctuating inflation expectations give rise to.

Forward rates are often used as indicators of expectations of future economic conditions since, in contrast to spot rates, they contain information about a future period that is not affected by average expectations up to that period. The regime shift premia in forward interest rates can be seen as a compensation investors demand if they fear that the current price stability objective may be given up. The size of the regime shift premium depends on the probability assigned by investors of a shift to a high inflation regime. It is likely that such probability assessments in turn depend on the political support for the target, the size and development of the public debt, the degree of central bank independence and the past record of inflation. By controlling for the regime shift premia in forward interest rates, the central bank may obtain a better indicator of market expectations of future short term interest rates, inflation rates and currency depreciation.

To estimate the regime shift premia a model for the excess forward return is used.[34] The excess forward return, defined as the difference between the forward rate and the future short term rate, contains:

[34] For more details see Dillén and Hopkins (1997).

1. a traditional term premium;
2. a credibility factor quantified as the long forward rate differential relative to Germany;
3. a sensitivity factor (showing the credibility effects on the forward rate curve for different horizons);
4. a constant;
5. an error term.

Adding the second and third factor gives the regime shift premium. The long-term (10 year) forward rate spread between Sweden and Germany is used as an approximation to the credibility factor. Thus, the long-term forward rate differential can be seen as a quantitative measure of the degree of credibility of a low inflation policy. The other factors are estimated. In Figure 13 the regime shift premium since 1993 is depicted.

Analysing inflation expectations from surveys together with the forward interest rates and the regime shift premium makes it possible to answer several questions:

1. Whether changes in the forward interest rates arise from changes in inflation expectations within the inflation target or from expectations about a regime shift to higher inflation.
2. To what extent changes in forward interest rates reflect expected monetary policy actions.
3. Whether credibility aspects (regime shift premia) are reflected in surveys.

To obtain inflation expectations, surveys of financial investors' expectations of average inflation two years ahead are used.[35] These expectations should normally be a quite good proxy for the expected 1-year inflation rate, i.e. the expected rate of consumer price changes 1 year into the future.

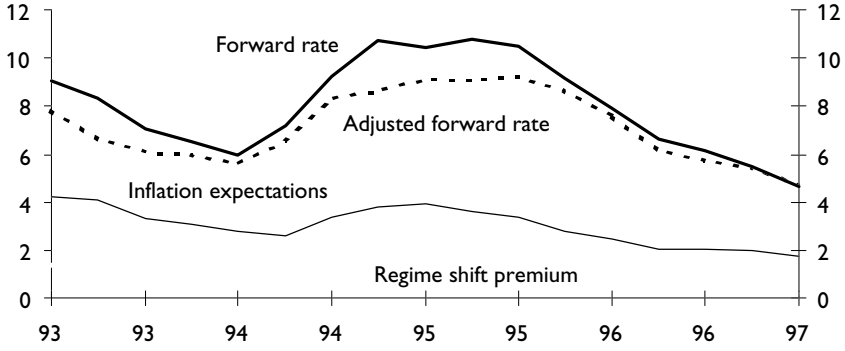
It is not a priori obvious to what extent surveys incorporate regime shift expectations. If participants in surveys report their inflation expectations in a mathematical sense, they should fully reflect anticipations of regime shifts. However, if participants report the most probable outcome of future inflation, then it is likely that regime shift expectations are incorporated to a very limited extent, provided a regime shift is considered unlikely. The forward interest rate is decomposed into a regime shift

[35] Aragon Securities, since 1991, measures quarterly the average expected two year Swedish inflation of the largest Swedish and foreign investors on the Swedish bond market.

premium and a term adjusted for the regime shift premium. The latter term should then reflect the expected future short term interest rate and the normal component of expectations of the future inflation rate (expectations within the regime). Since the real forward interest rate reflects investors' expectations of the future monetary stance we adjust for the estimated term premium as well.

As seen from Figure 13, the adjusted forward interest rate has been more volatile than inflation expectations. This indicates that expectations of monetary policy are reflected in the forward rate. The policy conclusion is that forward interest rates contain information about inflation expectations but it is important to take expectations of monetary policy into account, since they have a reinforcing effect.

Figure 13
Swedish 12-month forward rate and inflation expectations
In per cent



Source: Aragon Securities.

The finding that inflation expectations extracted from forward rates are positively correlated with investors' inflation expectations suggests that the possibility of a regime shift to some extent is accounted for in the surveys. If this is true, then the policy implication is that one should be careful when it comes to the interpretation of inflation expectations obtained from surveys since they not only reflect expectations within the (low inflation) regime but also fears that the current price stability objective is given up.

When the present legislation regarding the Riksbank went into force in 1989, steps towards a more independent central bank were taken. The chairman of the board of the Riksbank is no longer nominated by the government, nor does the term of office for the Governor coincide with the term of the parliament. In 1993, several proposals to strengthen price stability as a goal for monetary policy and increase the independence of the Riksbank, were put forward by the Riksbank Commission (SOU 1993:20). An institutional reform of the Riksbank requires a change of the constitution, hence a decision in two consecutive parliaments. Therefore, broad agreement among major political parties is necessary before such a reform can be enacted.

The institutional setup of Swedish monetary policy after the introduction of the inflation target in 1993 is discussed by Svensson (1995), who criticised the fact that there is no legislated goal for Swedish monetary policy and that the current inflation target was announced unilaterally by the Riksbank's governing board.

In 1997, a Commission (SOU 1997:10) proposed legislative changes needed to transfer the responsibility for exchange rate policy decisions from the Central Bank to the Government. The Board of the Riksbank reacted to these proposals by stating that they "would be liable to undermine the credibility of monetary policy and thereby the Riksbank's ability to fulfil the objective of safeguarding the value of money." In a world with deregulated financial markets and free capital flows, it is inevitable that markets for money and currencies are directly interlinked and so are monetary and exchange rate policies.

A working group of the Riksdag has recently proposed a number of changes in the role and powers of the Riksbank (DS 1997:50). The proposals of the working group regarding the responsibility of exchange rate policy is more in line with the comments made by the Board of the Riksbank than with the proposals in the Commission Report (SOU 1997:10). The proposals aim to increase the independence of the Riksbank and, more specifically, to ensure compliance with the Maastricht Treaty and the statute of the ESCB. The proposals have the support of five of the political parties in the Riksdag and, accordingly, of a substantial parliamentary majority. The proposals that involve changes in the Constitution are expected to take effect from 1st January 1999.

The main proposals are as follows:

1. The primary objective of monetary policy will be to maintain price stability, and this objective is to be laid down in the law. (The present inflation targeting strategy was adopted unilaterally by the Riksbank in 1993.) The quantification of the objective will be left to the Riksbank. As long as the primary objective of price stability is not endangered, the Riksbank will also be expected to support the objectives of general economic policies.
2. With regard to exchange rate policy, the Government will have the authority to decide, after consultation with the Riksbank, on the choice of exchange rate regime. The Riksbank will have responsibility for the implementation of the exchange rate regime adopted by the Government. This means, for example, that the Riksbank will decide on the central rate and the band width in a fixed exchange rate system and on the practical application of policies in a floating rate system. According to the Riksbank Act, such decisions should be taken by the Riksbank after consultation with the Government.
3. The management structure of the Riksbank will be changed. Under the present system, the Governing Board, which is appointed by the Riksdag, has responsibility for operational matters in monetary and exchange rate policies. Although this system has worked well in the past, it is thought to be in violation of the requirement of central bank independence formulated in the Maastricht Treaty. The responsibility for monetary and exchange rate policies will instead be transferred to a new body, an Executive Board. The Executive Board will have six full-time members of which one will be chairman and Governor of the Riksbank. Their term of office will be six years and they will be replaced on a rolling basis. The Governing Board will retain general, supervisory functions and will appoint the members of the Executive Board.
4. It will not be possible to separate a member of the Executive Board from his position unless he no longer fulfils the conditions required for the performance of his duties or if he has been guilty of serious misconduct. This provision will be included in the Swedish Constitution.
5. Also having Constitutional status will be a provision to the effect that no public authority will be allowed to issue instructions to the Riksbank in matters relating to monetary policy. A corresponding

provision will be included in the Riksbank Act: no member of the Executive Board will be allowed to seek or accept instructions on monetary policy matters.

6. A few proposals aiming to ensure transparency and Riksbank accountability are also included in the report of the working group.

Concluding remarks

In November 1992 the Riksbank had to deal with a very delicate situation. The transition to a flexible exchange rate regime and the severe economic situation changed the conditions for monetary policy dramatically. Sweden experienced the deepest recession since the 1930s, public finances were subject to severe problems, and unemployment reached historically high levels. The credibility record from the 1970s and 1980s was weak and implied an arduous process ahead to bring inflation expectations down in line with long term price stability. In the light of Sweden's history, financial market assessments made us very sensitive to international and national unrest. It was against this background that the Riksbank had to formulate a new monetary policy aiming for long-term price stability.

Despite extreme imbalances in the Swedish economy in the early 1990s, economic policy, of which the Riksbank's monetary policy has been an important part, has succeeded in reducing long-term inflation expectations into line with the inflation target. Since the beginning of the 1990s Sweden has experienced a quite rapid transition from a high inflation to a low inflation economy. The difficult process of bringing down inflation expectations has taken far more time and effort. There are a few credibility improvements that have been of crucial importance. First, the political support for the consolidation of public finances – formalised in the convergence programme – has substantially increased confidence in long-term fiscal stability. Second, the Riksbank's decision to raise the repo rate in August 1994 showed that monetary policy was pre-emptive and that long term credibility considerations were in focus. These credibility improvements made it possible to ease monetary policy during 1996 without putting inflation expectations at risk. Despite the fundamental improvements in the Swedish economy since 1992, unemployment is still a severe problem. Structural unemployment, however, can not

be brought down by stimulating aggregate demand. Reforming wage formation, as well as other structural aspects in the labour market, are indeed still necessary in this respect.

The Riksbank's view is that monetary policy needs transparency to gain support and understanding for policy considerations. On several occasions Sweden has experienced severe effects of unrest in financial markets. During these occasions the Riksbank has lost control over monetary conditions in the short run, which made transparency more difficult. The financial market's assessments of the Swedish economy seem to be asymmetric in terms of evaluating new information against the past history. There is a risk premium in Sweden related to the risk that new information implies a return to an inflationary regime. The recent weakening of the krona, despite good fundamentals, might serve as an example.

The international aspects are becoming more important. On the one hand, the globalisation and deregulation of capital markets discipline economic policy makers. Along with the endeavour to consolidate public finances, this has positive implications for monetary policy. On the other hand, internationalisation has made it more difficult to interpret interest rates and exchange rates. It has become harder to distinguish short-term effects from long-term, credibility-related, effects. The fall in the long bond differential versus Germany in 1993 and the sharp rise after the international interest hike in February 1994 are examples.

The main surprise to the Riksbank since 1992 has been the unanticipated, large transitory effects on headline inflation due to increased credibility of economic policy. The Riksbank has had some problems in explaining monetary policy considerations, as headline inflation in an annual perspective almost reached the upper tolerance interval in 1995 and the lower tolerance interval in 1996. Underlying inflation – as an important indicator of long-term inflationary pressure in the economy – has become increasingly important to explain monetary policy considerations.

Giving the objective of price stability statutory force, as proposed by a working group representing a substantial parliamentary majority, will strengthen the objective's credibility.

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Comments on "Monetary policy in Sweden since 1992"

Andreas Fischer

Inflation targets in Sweden: an outsider's view

The paper by Berg and Gröttheim (1997), which is similar in spirit to Anderson and Berg (1995) and Svensson (1995), concentrates primarily on the Riksbank's targetry framework since the transition to a floating exchange rate regime. Overall, I am sympathetic to the Riksbank strategy and therefore my concerns address somewhat peripheral issues.

1. Setting up the targetry framework

The experiences of countries with inflation targets have shown that transparent communication is important for a successful policy. I will try to argue that the Riksbank's experience in setting up its targetry framework encountered a few hiccups. The first concerns announcing the targetry framework. The Riksbank's initial policy statement on inflation targets made no mention of possible caveats, bandwidth, or intermediate target path before 1995. These features of the targetry framework were explained later. The commitment to the targetry framework was further undermined by the same day's announcement that the Riksbank "set the inflation target to cover the time that the krona continues to float, but wants to a return to a fixed exchange rate when conditions allow".[1] This left the impression that the Riksbank was pursuing multiple goals or at least favoured a policy of the past.

The endorsement of a policy strategy is important for its success. Unlike the New Zealand, Canada and the United Kingdom, the Riksbank's policy of inflation targeting did not receive the immediate endorsement of the Swedish government. This had consequences for the budget

[1] See "Swedish central bank sets target for inflation", *Financial Times Weekend*, 16th/17th January 1993.

and government wage formation, making the job of the Riksbank more difficult.[2]

A further hiccup regards the purpose of the Riksbank's Inflation Report that was not well defined at the outset. The report is designed to comment and reflect on the past, current and future policy stance with respect to the final goal of price stability. The first inflation reports by the Riksbank were prepared and signed by the Economics Department. It was not clear to the outsider whether the Governor was responsible for the document and whether the report served as a basis for the Governing Board's discussion of monetary policy. This confusion has been corrected recently in that the Governor stands behind the report.

The paper does not address these initial problems and their implications. However, it is not surprising that the Riksbank underwent a "learning by doing" process. The in-house philosophy was always one of exchange rate targeting and, as in the cases of Spain and Finland, it is difficult to break immediately free from the fixed-currency shell. Whether these problems heightened the regime shift premia is an open question. Individually the problems may appear to be small; however, collectively they can create hurdles for the Riksbank in getting its message across.

2. The role of inflation forecasts as an intermediate target

Claes and Gröttheim (1997) raise the issue fostered by Svensson (1996) that the central bank's forecast can be viewed as an intermediate target. The primary merits of Svensson's approach are the capability of outsiders to monitor short-run developments, to provide a consistency check for the Bank, and to encourage debate and interaction between the central bank and the public. The paper, like Svensson is not very explicit as to how the forecast is to be constructed and the underlying assumptions needed for their use. Basically, I see two strategies involved:

1 Strategy 1 involves two steps. An inflation projection, stemming from a reduced-form or an indicator model, is made for period $t+k$. If inflation rises above or below the target range, the next step requires a change in the policy instrument. The instrument response may follow

[2] Svensson (1995) mentions that the government budget used a forecast of 3% rather than the Bank's projected rate of 2%. See the *Riksbank Inflation Report*, March 1997, for comments on wage development in recent years.

an instrument rule with the inflation forecast. However, central banks tend to use judgment or simple rules of thumb to set the policy instrument. Under this strategy the central banker's model is not necessarily identifiable to the public.

2 Strategy 2 involves inflation forecasts from a structural model. The inflation expectations process includes the policy instrument, which is also dictated by an instrument rule observable to the public. Again, if the inflation forecast falls outside the target range, the instrument rule requires a change in policy. The next step is to resimulate the model with an adjusted policy instrument. This is done till the structural model's inflation forecast falls within the target range.

Bernanke and Woodford (1997) argue for various reasons that strategy 2 is the desired strategy to follow. The inflation forecasts from a structural model allow for "story telling", which central bankers need in order to sway the public when changing their policy instruments. This mechanistic approach to monetary policy is transparent, allowing outsiders to monitor short-run developments with respect to the long-run target.

Yet caution needs to be cast regarding the validity of inflation forecasts under these two strategies. Strategy 2 is partly an illusion. The economics profession has been unable to come up with simple models that are structurally invariant to regime shifts and are able to produce valid forecasts. This is not to say that strategy 1 offers better results. Cecchetti (1995) has recently shown that a range of simple indicator and reduced-form models are unable to produce satisfactory inflation forecasts. My intention here is to inject a word of caution with respect to inflation forecasts as an intermediate target; a feature lacking in Svensson (1996). Inflation forecasts are important as a consistency check, however their use in setting monetary instruments is a difficult task.

3. Some worries for the future

I would like to briefly comment on the issues raised in Section 3. The authors first call into question whether the CPI is the ideal index in terms of correctly gauging inflationary pressures. While I do not want to express my preference for a specific index, I would like to highlight the problem from a different perspective. New Zealand, Canada, Sweden and

Spain define their inflation targets with respect to the CPI, yet Sweden and Spain are unique among inflation targeters in that they do not allow for caveats and they do not set policy based on an underlying rate of inflation. This may not pose problems for Spain, since it has an intermediate exchange rate target as an anchor and its CPI inflation behaves smoothly. This is not the case for Sweden; the CPI inflation rate is highly variable even under the period of inflation targeting. As in many countries the CPI is heavily influenced by changes in indirect taxes and mortgage interest rates that are outside the control of the Riksbank. These factors along with other supply shocks can create perverse price movements that mask the evolution of the general price level.

Wage developments in Sweden pose a threat to the programme of inflation targets. The fact that wage formation in the government, export and domestic sectors are running high and parallel to each other suggests that the Riksbank has not conveyed its message. Here, one has to wonder if the timeliness of the indirect taxes in 1993, the introduction of an intermediate inflation target path (as in the case of New Zealand or Canada), or a policy of undershooting the target in eliminating any upside risks would have been helpful in mitigating labour's expectations.

The paper offers a good discussion of the regime shift premium and how that premium may affect the interaction between interest rates and inflation expectations. Figure 13 of Berg and Gröttheim shows that survey inflation expectations are highly correlated with the regime shift premium. It experienced a rise in 1994–95 and has fallen considerably during the latter half of 1996. The explanation given by the authors for the evolution of the regime shift premium is Sweden's vulnerability to international financial unrest stemming from its structural imbalances (external debt, wage formation, etc.). Because sufficient inroads have not been taken to correct these imbalances, a rising regime shift premium lurches in the dark – waiting for the next financial shock.

An alternative explanation for the rise in the regime shift premium in 1994–95 concerns the initial problems mentioned above and the general disbelief that the Riksbank would achieve its announced target. The premium in this case reflects the credibility factors, which are directly related to the Bank's performance. As a consequence, future shocks should not result in a sharp rise in the premium if credibility improves. Personally, I believe the premium reflects both features of central bank credibility and external balances, implying that it is difficult to separate the two.

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Macroeconomic developments in the Nordic countries

Palle Andersen*

Introduction: "Snapshots" of the present situation

"At the beginning of 1997, the prospects for the Danish economy are in several respects the most favourable for some time … the economic upswing is gaining momentum, in a historical perspective wage and price increases are moderate, the current account is in surplus and the government budget can be expected to be balanced in 1997."

Danmarks Nationalbank *Annual Report,* 1997.

"… estimates for growth in domestic demand and employment for 1997 have once again been adjusted upwards, primarily reflecting three factors: … the government budget for 1997 resulted in a slightly more expansionary fiscal policy; … petroleum investment appears to be higher …; and private consumption is stronger than projected … due to *… the sharp fall in interest rates in conjunction with marked wage growth."*

Norges Bank *Economic Bulletin*, 1997, 1.

"Die isländische Wirtschaft steht in voller Blüte; als treibende Kraft wirkt der private Konsum, ein Umstand, welcher dem Finanzminister des Landes Sorgen bereite … Die Tugend des Sparens sei in der Tradition des Landes weniger verankert als anderswo … auf jene Verbesserung der wirtschaftlichen Bedingungen reagieren die Isländer umgehend mit einer Steigerung ihrer private Ausgaben"

Neue Zürcher Zeitung, end-July 1996.

"Unemployment is Finland's greatest problem. The failure to reach the goal of halving unemployment (by 1999) is symptomatic of the poor functioning of

* The views expressed in this note are those of the author and are not necessarily shared by the BIS. I wish to thank S. Arthur, P. Hainaut and G. Schnabel for expert statistical and graphical assistance and S. Gerlach for comments on an earlier version of the note.

the labour market and slow growth in demand … Significant reasons for the mass unemployment are still the high taxation and insufficient wage flexibility."

The Research Institute of the Finnish Economy (ETLA) *The Finnish Economy*, 4/1996.

"Since the beginning of 1996, the total unemployment rate has moved up … the level of about 12% is 0.7 percentage points high than a year earlier … The rise in unit labour costs has accelerated during the first three quarters of 1996. This mainly reflects the higher increase in wage costs but it also has to do with weaker productivity growth".

Sveriges Riksbank *Inflation Report,* December 1996.

Contrary to the common notion of the Nordic countries as forming a homogenous group, these "snapshots" of the present conjuncture suggest a highly diverse picture. The diversity does not only reflect cyclical influences and the current stance of policies but can also be attributed to underlying factors, including the heritage of macroeconomic imbalances and the timing and nature of the corrective measures taken.

This paper attempts to identify these underlying factors and how they have affected economic developments in the 1990s. In doing so, it covers a rather broad range of issues, including differences in the initial conditions as well as the shocks to which the Nordic economies were exposed as this decade unfolded. The bulk of the paper (Sections 3 and 4) is focused on developments in labour markets where the changes since the 1980s have been most dramatic. This discussion is preceded by a brief account of recent macroeconomic developments (Section 1) and of the initial conditions at the start of this decade (Section 2). The last Section offers a few concluding observations.

1. Recent macroeconomic trends

The output and employment performance of the Nordic countries has diverged significantly since 1992 (Tables 1 and 2). While during the previous 10 years the range of output growth was only 1.9–2.6%, it has widened to 1.0–3.8% since 1992 and there is a clear "split" between Denmark and Norway, on the one hand, and Sweden and Finland, on the other, with Iceland occupying an intermediate position. This split is even

Table 1

Basic indicators

Latest available figures

Countries	Per capita GDP[1]	Employment by sector[2]			Foreign trade[3]	Gross saving[4]	Broad money/ GDP[5]	
		Primary	Industry	Services			1981	1992
Denmark . . .	21,530	5.1	26.8	68.1	27.5	17.6	35.9	43.7
Norway . . .	22,670	5.2	23.4	71.5	27.5	21.9	53.1	69.8
Iceland	21,940	9.4	26.1	65.2	25.2	15.8	28.0	38.7
Finland	17,785	7.1	27.6	65.3	28.7	19.8	41.8	57.5
Sweden	18,675	2.9	26.0	70.9	30.2	16.6	60.0	47.4
Memo:								
United States .	*26,435*	*2.8*	*23.9*	*73.3*	*9.5*	*15.9*	*72.1*	*67.4*
Germany . . .	*20,500*	*3.3*	*37.6*	*59.1*	*20.8*	*21.3*	*49.5*	*54.0*

[1] In current (US dollar) prices and PPPs. [2] As a percentage of total employment. [3] Average of exports and imports as a percentage of GDP. [4] Gross national saving as a percentage of GDP. [5] In percentages.

Sources: OECD *Main Economic Indicators,* OECD *Labour Force Statistics,* IMF *International Financial Statistics* and national data.

Table 2

Developments in output, employment and unemployment

Average annual rates, in percentages

Countries	1981–91		1992–96		1981		1992		1996	
	GDP	Emp	GDP	Emp	Gap	Un	Gap	Un	Gap	Un
Denmark . . .	2.0	0.3	2.1	0.1	−3.1	9.2	−3.5	11.2	−0.9	8.8
Norway . . .	2.6	0.4	3.8	1.1	0.9	2.0	−4.4	5.9	0.6	4.9
Iceland	2.6	1.5	1.6	0.3	5.5	0.4	−3.0	3.0	−1.0	4.3
Finland	2.2	0.1	1.5	−2.2	0.1	4.9	−7.8	13.1	−2.3	16.3
Sweden . . .	1.7	0.4	0.8	−2.0	−1.1	2.5	−1.0	5.3	−1.2	8.0
Memo:										
United States .	*2.4*	*1.5*	*2.6*	*1.5*	*−1.1*	*7.6*	*−0.9*	*7.5*	*−0.3*	*5.4*
Germany . . .	*2.3**	*0.5**	*1.5*	*−1.1*	*−0.4*	*4.5*	*2.7*	*7.7*	*−1.4*	*10.3*

Notes: GDP: percentage change of GDP in constant prices; Emp: percentage change of total employment; Gap: ratio of actual to potential GDP, in percentages (a positive sign = excess demand); and Un: unemployment as a percentage of the labour force.

* 1981–90, western Germany only.

Sources: OECD *Economic Outlook*, June 1997 and author's estimates.

more pronounced for labour market developments. Denmark and Norway experienced rising unemployment in the 1980s but during this decade unemployment has fallen, in the latter mainly due to rapid demand growth and in the former as the result of various labour market measures which reduced participation rates as well. Finland, Iceland and Sweden also saw rising unemployment during the 1980s. However, in contrast to developments in Norway and Denmark, unemployment has continued rising, even though the output gaps have been reduced in Finland and Iceland.

2. Sources of divergence

How can these divergences and, in particular, the marked slowdowns in Finland, Sweden and Iceland after 1992 be explained? Were they caused by nominal shocks related to changes in monetary policy or were real shocks the main "culprit"? From the companion paper on monetary policy in the Nordic countries it is evident that there have been major differences in the stance of monetary policies, and the targets and strategies of monetary policy were also changed after 1992. On the other hand, according to Holden (1996) domestic nominal shocks have not been particularly important in the Nordic countries; instead, he attributes fluctuations in the real economy and, in particular, in labour markets to real shocks, allied with insufficient self-regulating mechanisms. The fact that the Nordic countries are small and open economies would also point to real shocks as the main driving force. However, since most of them attempt to stabilise nominal exchange rates and have removed restrictions on capital flows, external nominal shocks may also have played a role.

In the following I attempt to find some preliminary answers to these questions. I start with nominal shocks and monetary policy and then turn to external shocks. Section 3 analyses labour market developments and the extent to which the observed changes can be attributed to cyclical or structural forces.

2.1 Nominal shocks and monetary policy

Developments in aggregate demand, as measured by the output gaps, can, in part, be related to changes in monetary conditions, although in no case

is the relationship very close (Graphs 1a–1c). For instance, real short and long-term interest rates have been positive in Iceland this decade and the change from negative to positive real interest rates was accompanied by a marked slowdown in the rate of growth of real money supply and a widening of the output gap. Similarly, in Finland, higher real interest rates can be associated with slower monetary growth and a wider output gap while for the other countries, the influence of changes in monetary policy is more difficult to identify. In the case of Denmark, changes in real money does have a significant effect on output developments, but neither real interest rates nor the growth of monetary aggregates this decade have been significantly different from developments in earlier periods. In Norway, too, monetary conditions have been relatively stable, whereas, in Sweden, real interest rates increased substantially after 1992, but the real effect of this move seems to have been modest.

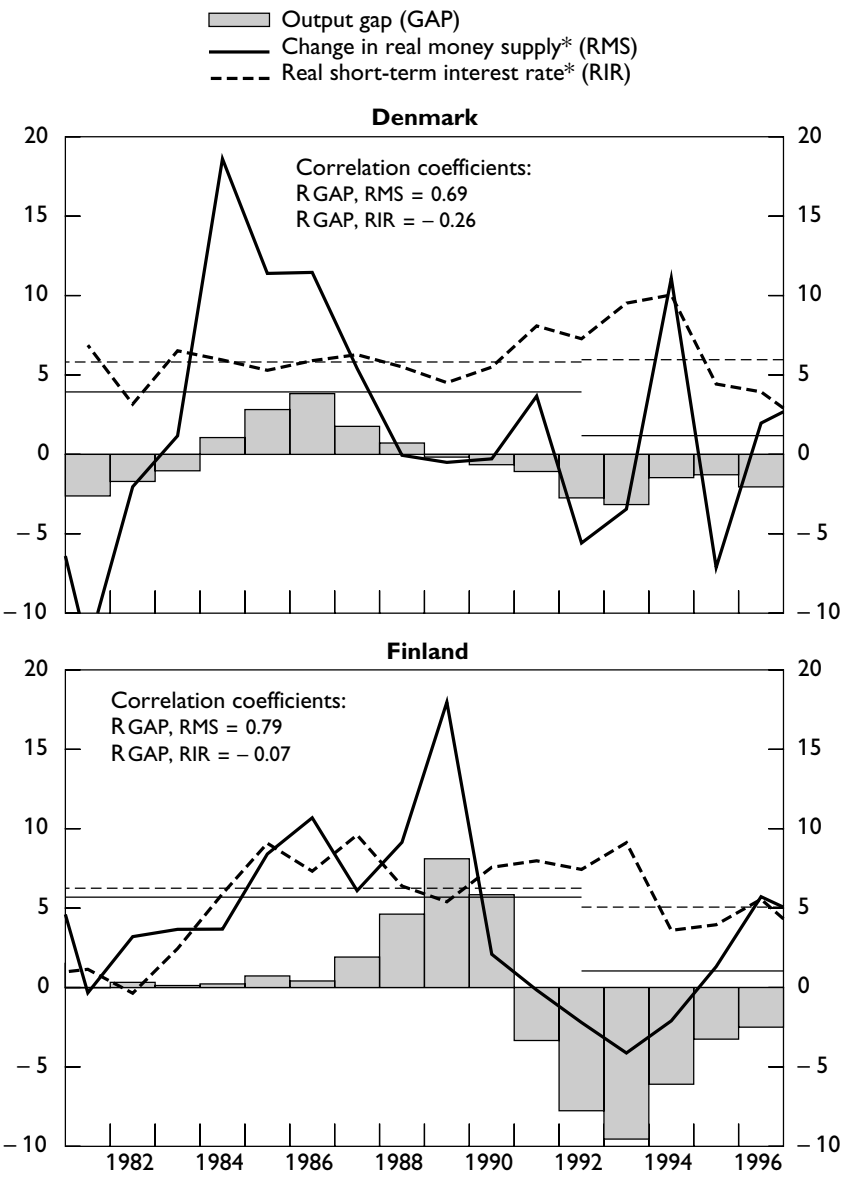
However, changes in real interest rates and in the growth of monetary aggregates by no means exhaust the potential influence of financial variables. In fact, one of the most striking development in the Nordic countries has been the large swings in household saving which, in turn, can be related to deregulation of financial markets and asset price cycles (Graph 2 and Table 3).[1] In Finland, Norway and Sweden, household saving was negative in the second half of the 1980s as households incurred large debts against the backdrop of booming asset prices and the removal of credit and interest rate restrictions. Subsequently, as interest rates were raised to "brake" the excessive demand growth and asset prices collapsed, households started to reduce their debts. As a result, in all three countries, though most notably in Sweden, sluggish consumption growth has, until recently, been a main reason for the slow growth of GDP.

In Denmark, the deregulation of financial markets was much more gradual and the asset price cycle less pronounced than in Finland, Norway and Sweden. Nonetheless, Denmark, too, has seen a marked increase in household saving until 1995–96, when rising house prices and more favourable conditions for financing or refinancing mortgage debts led to stronger consumption growth. In Iceland, household saving seems to have been influenced by the removal of credit constraints as well as by changes in inflation and in anti-inflationary policies. Household saving fell to an all

[1] These developments as well as other initial imbalances are also discussed as background to the setting of monetary policies in the companion paper on monetary policy.

Graph 1a

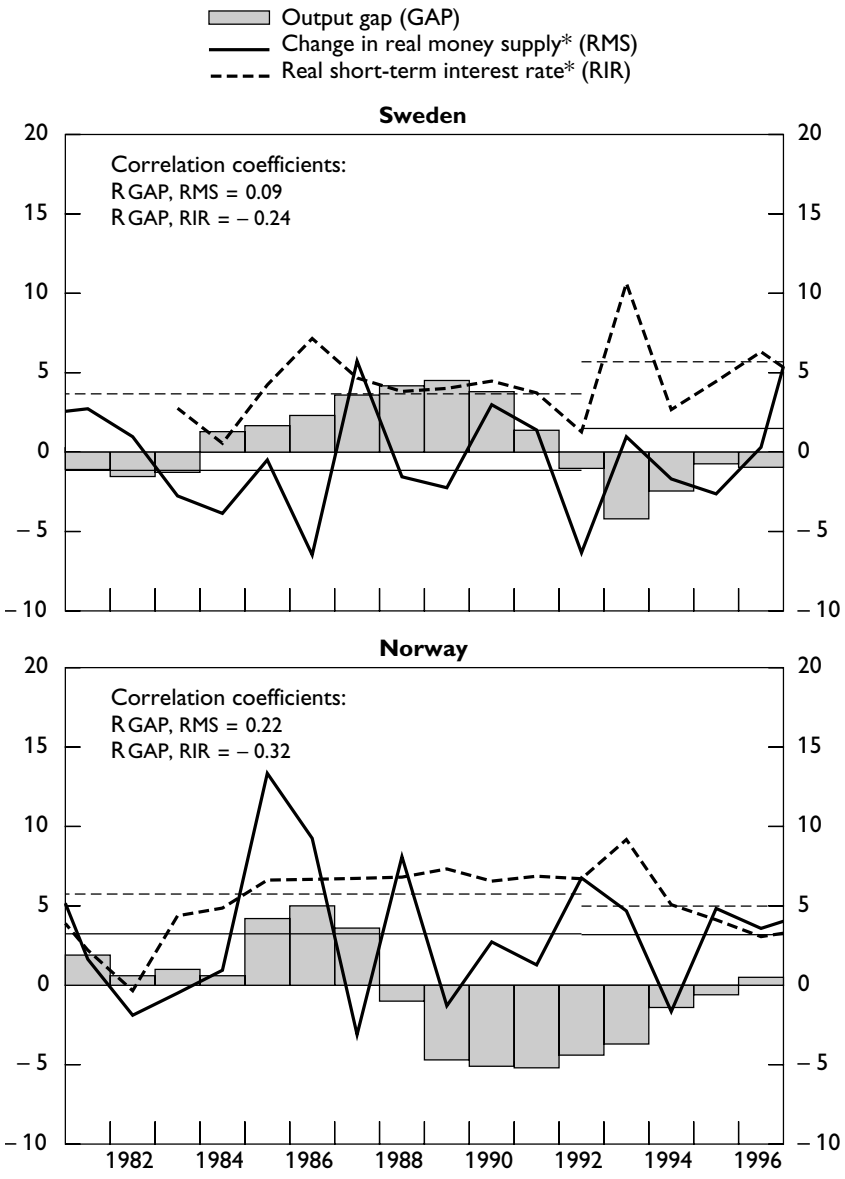
Economic indicators



* Lagged one year. The thin lines represent the averages over the periods 1981–91 and 1992–96.

Graph 1b

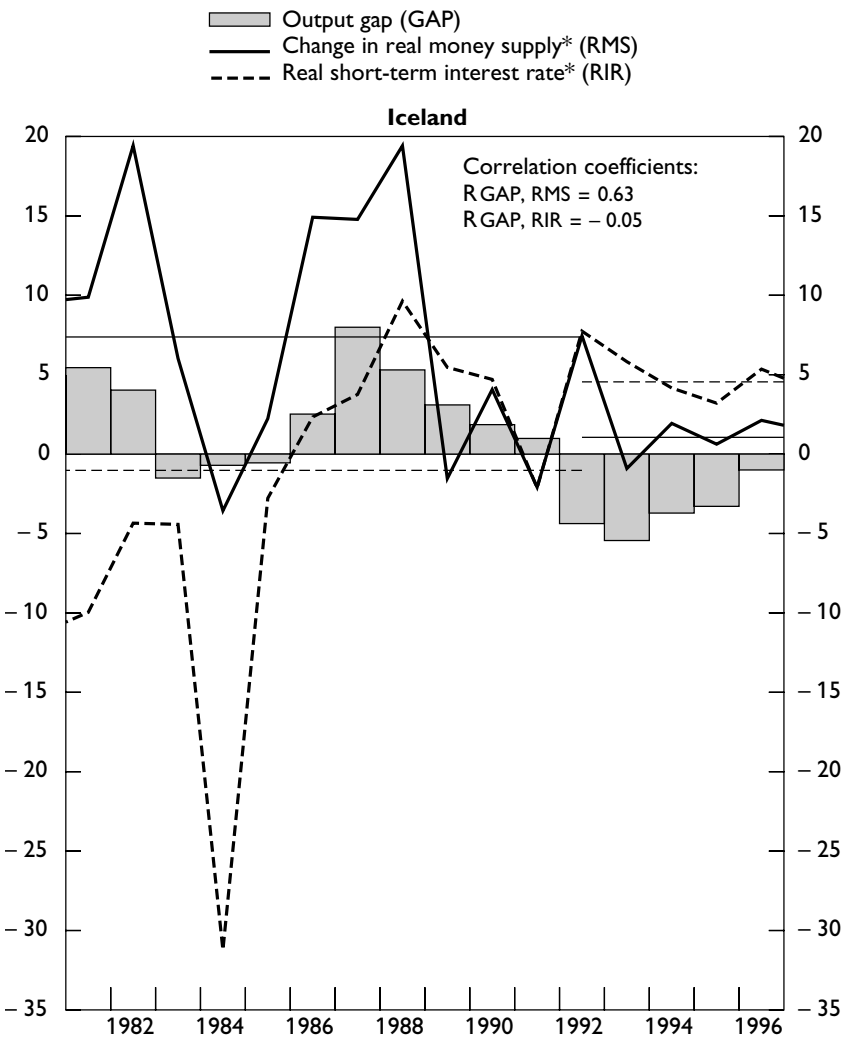
Economic indicators



* Lagged one year. The thin lines represent the averages over the periods 1981–91 and 1992–96.

Graph 1c

Economic indicators

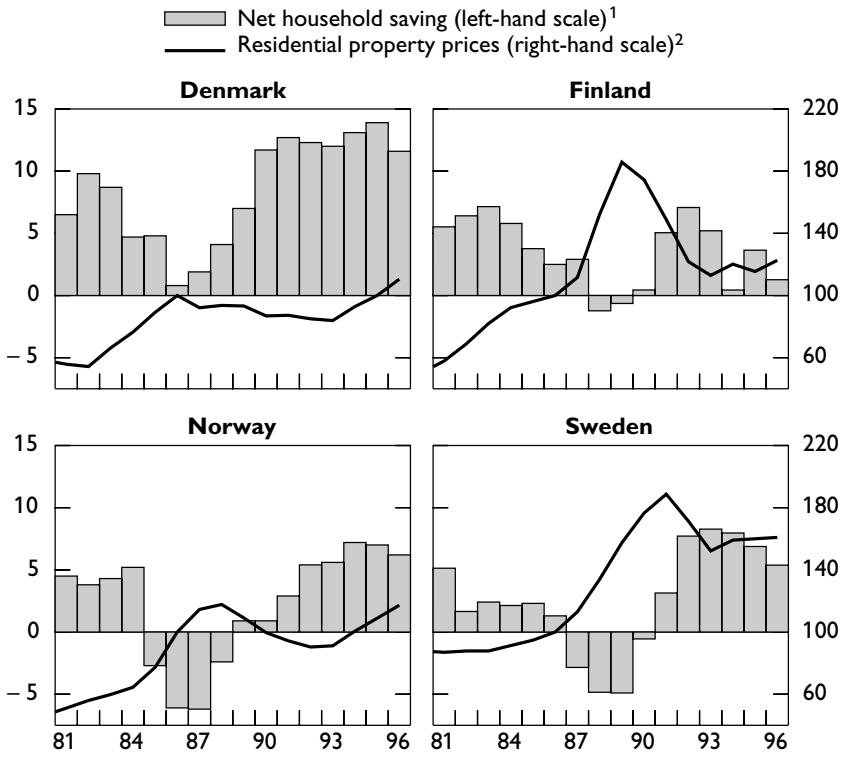


* Lagged one year. The thin lines represent the averages over the periods 1981–91 and 1992–96.

time low when inflation peaked in 1983, but then recovered significantly. It fell again, during the subsequent demand boom but seems to have recovered slightly following the implementation of firmer monetary

Graph 2

Saving rates and property prices



[1] As a percentage of household disposable income. [2] Index, 1986 = 100.

policies after 1992. Household indebtedness has also increased substantially following financial liberalisation and greater access to mortgage financing; however, house prices have been relatively stable.

Changes in the external balance may also be used in assessing recent developments, though mainly as an indicator of the need for policies to correct unsustainable imbalances. Iceland, Finland and Sweden entered this decade with rather large external imbalances which were mainly attributable to fiscal deficits though private saving was also low (Table 3). Taking account of revenues from the oil sector, Norway's external balance was also relatively weak in 1992, whereas Denmark, thanks to a marked strengthening of both private and public saving, had seen a

Table 3

Financial developments, selected indicators

In percentages of GDP*

Countries	1981				1992				1996			
	S/Y	F/Y	Bp/Y	Nx	S/Y	F/Y	Bp/Y	Nx	S/Y	F/Y	Bp/Y	Nx
Denmark	12.4	−6.9	−3.2	93.7	17.7	−2.9	3.3	102.7	17.3	−1.5	1.1	111.3
Norway	29.4	4.4	3.4	117.9	21.0	−1.8	3.5	101.2	30.2	5.9	7.4	102.4
Iceland	21.5	1.3	−4.2	872.8	14.3	−2.8	−3.0	99.3	15.3	−1.7	−2.0	88.3
Finland	24.9	3.5	−1.0	98.1	12.1	−5.8	−4.6	87.6	19.1	−2.6	3.5	91.0
Sweden	15.6	−5.3	−2.6	127.1	13.4	−7.8	−3.5	101.4	17.0	−3.5	2.4	90.0

Notes: S/Y: gross national saving; F/Y: general government financial balance; Bp/Y: balance on current external account; Nx: nominal effective exchange rate.

* For Nx, index, 1991 = 100.

Sources: OECD *Economic Outlook*, June 1997 and author's estimates.

remarkable shift from a perennial external deficit to a large surplus. The divergent needs for corrections were, undoubtedly, another important reason for the different performances during the 1990s, with large cuts in domestic absorption in Finland and Sweden, contrasting sharply with a relatively more relaxed policy stance in Denmark and Norway. Iceland, again, occupies an intermediate position. Influenced by the 1992–93 recession, the current external account moved into surplus in 1993; however, partly due to the need for further fiscal consolidation, it weakened substantially during the economic recovery in 1996.

2.2 External shocks

Despite the importance of foreign trade and the view of many analysts that the setbacks in the 1990s can mainly be explained by external demand shocks, the evidence in Table 4 provides little support to this hypothesis. While Denmark's terms of trade have deteriorated this decade, this was more than offset by more rapid export growth; in the case of Norway, export growth was stable while the terms of trade improved. Even for Finland and Sweden, it is hard to find firm evidence that external shocks were the main cause of the large output gaps. In Sweden, average annual export growth has accelerated by 5 percentage points compared with the 1980s and this has more than offset the deterioration in the terms of trade. For Finland, the acceleration in export growth has been even more pronounced against largely the same terms of trade deterioration as in Sweden.[2] In fact, only in the case of Iceland have external factors had a negative effect on output performance.

Overall, it thus appears that external shocks have not been a principal cause of the divergent performances since 1992; it rather seems, that different needs to correct internal imbalances were the main cause. Indeed, reflecting the "duality" in the two economies where the slowdown this decade was most pronounced, Finland and Sweden, the contribution of net exports to output growth since the trough in 1991 has averaged respectively 2½ and 1½% per year. In contrast, tight policies, combined with low household and business confidence, have meant that

[2] It could be argued that the sub-periods used for Finland are misleading as the breakdown in trade with the former USSR occurred in 1990–91. However, redefining the periods as 1981–89 and 1990–96 only changes the export growth figures to respectively 2.4 and 6.5%. Moreover, while the output gap widened by almost 18 percentage points during 1988–93, the cumulative deterioration in the terms of trade and the 1991 fall in exports directly explain only 3¼ points.

Table 4

External shocks, mean and volatility

Countries	1981–92						1992–96					
	Exports		Terms of trade		Exchange rate		Exports		Terms of trade		Exchange rate	
	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ
Denmark	5.1	2.50	−1.0	2.10	0.9	5.50	2.9	3.30	0.2	1.25	3.8	2.90
Norway	4.4	5.50	−1.5	8.95	0.7	2.15	8.8	3.65	−0.2	5.90	1.8	3.15
Iceland	1.8	6.30	0.3	2.90	−18.8	12.50	4.3	6.05	−2.1	2.55	−1.6	2.75
Finland	1.5	3.25	0.9	2.35	0.5	4.00	10.3	4.80	0.5	2.55	−2.3	14.10
Sweden	3.5	3.20	0.6	2.70	− 0.4	5.75	8.5	4.85	−0.7	2.40	−5.3	13.50
Memo:												
United States . .	*5.5*	*6.70*	*0.8*	*2.35*	*− 1.6*	*8.10*	*7.5*	*3.00*	*0.4*	*0.65*	*0.1*	*3.45*
Germany	*5.4*	*4.20*	*0.7*	*4.25*	*1.1*	*5.30*	*2.5*	*5.25*	*1.0*	*1.15*	*2.4*	*4.10*

Notes: Exports: goods and services, volumes. Terms of trade: ratio between export and import prices. Exchange rate: real effective exchange rate in terms of unit labour costs. μ denotes average annual changes and σ the standard deviation of annual changes.

Sources: National data and BIS data bank.

final domestic demand growth has reduced output in the two countries by respectively 1 and ½% per year. Denmark, on the other hand, entered this decade with relatively modest imbalances, as the process of financial deregulation had been gradual and the corrections of fiscal and external imbalances were well under way. Norway did go through a severe asset price cycle and experienced serious problems in its financial sector, but these shocks occurred in the mid-1980s and their corrections were largely completed by the early 1990s. Iceland entered this decade in deep recession owing to the 1992 terms-of-trade and export shock. Moreover, a relatively tight monetary policy kept domestic demand growth low until last year. However, Iceland has only just started to correct the fiscal and external imbalances and, because of relatively little export diversification, it remains sensitive to external shocks.

3. Labour market developments and their causes

3.1 Cyclical vs. structural forces

Given the large changes in labour market conditions since the beginning of this decade, it is natural ask whether they reflect cyclical or structural forces? In other words, has higher unemployment been due to increases in the structural rate of unemployment (or the NAIRU[3]) or to deviations from a structural rate which could be constant or gradually rising?

3.1.1 The NAIRU as a guide to policies

In a recent discussion of whether the NAIRU is a useful concept for policy-makers and analysts, Stiglitz (1997) applied three criteria: (1) Do deviations of actual unemployment from the NAIRU provide a robust way

[3] In the following, I treat the NAIRU and the structural rate as identical concepts. This is not strictly correct and one useful way of distinguishing between the two (see OECD (1996)) is to start from the following version of the Phillips curve:

(i) $dp_t = dp_{t-1} - \alpha\ (Un_t - Un^*) - \beta\ dUn + z$

where p is the price level (in logs), Un the actual rate of unemployment, Un^* the structural rate of unemployment and z forces affecting the rate of inflation independently of the cycle. For various reasons the rate of unemployment consistent with a stable rate of inflation (the NAIRU) may not be identical to Un^* and by setting $z = 0$ and $dp_t = dp_{t-1}$, the NAIRU can be derived by solving (i) for Un_t:

(ii) $\text{NAIRU} = (\alpha/(\alpha + \beta))\ Un^* + (\beta/(\alpha + \beta))\ Un_{t-1}$.

Thus for α and $\beta > 0$, the NAIRU will be a weighted average of the structural and the lagged rate of unemployment, with the weight of the latter depending on "speed limit" effects as measured by β.

to predict changes in the rate of inflation? (2) Can economists explain why the NAIRU has changed over time? (3) Is the NAIRU a useful way to frame policy discussions in the sense that the Phillips curve is sufficiently robust?

On all three criteria he found the NAIRU concept useful for the United States,[4] whereas for the Nordic countries they are much harder to satisfy. First, because the Nordic countries are small and open economies, inflation will not only depend on labour market conditions but also on external supply shocks, in particular exchange rate changes and terms-of-trade shifts. In fact, external price shocks have, on several occasions, dominated the labour market effects on price inflation. The second criterion is even harder to meet, not only for the Nordic countries but for Europe in general, as it has proved empirically impossible to say whether the marked rise in unemployment since the early 1980s is due to:

- a high degree of persistence as actual unemployment only very slowly returns to the structural rate after shocks;[5]
- various structural changes which have gradually raised the structural rate;
- unchanged structural forces which, however, have far more serious repercussions in the 1980s and 1990s owing to changes in the general macroeconomic environment.[6]

3.1.2 The NAIRU: tentative estimates for the Nordic countries

Against this background, it is not surprising that the Nordic and other European countries also fail the third test. Nonetheless, I attempted to separate structural from cyclical changes, using various simple methods that have been proposed in the literature. First, I estimated the augmented Okun-equation proposed by Gylfason (1997) by regressing the rate of unemployment on the output gap and either a linear or a quadratic

[4] Other authors in the same issue of the *Journal of Economic Perspectives* were much more sceptical.

[5] Persistence itself may reflect the influence of various structural and institutional factors and for some countries it cannot be excluded that inflation depends entirely on *changes* in unemployment (i.e. pure hysteresis) and that the structural rate is a random walk.

[6] For instance, widespread employment protection may be innocuous as long as unemployment is low and stable, but once unemployment increases and becomes less stable, such measures may seriously affect countries' ability to adapt to changes. Similarly, lack of product market competition may do only little damage in a stable environment but, in conditions of large external shocks, lack of competition will seriously impede adjustment and raise unemployment.

Table 5

Structural unemployment, comparative estimates

In percentages

Countries	1986				1990				1996			
	U_1^*	U_2^*	U_3^*	OECD	U_1^*	U_2^*	U_3^*	OECD	U_1^*	U_2^*	U_3^*	OECD
Denmark	9.9	10.9	6.6	8.6	10.2	11.4	7.4	9.6	9.1	8.2	6.5	9.0
Norway	3.7	1.1	2.5	3.1	4.1	4.2	2.5	4.2	4.3	4.1	2.5	4.8
Iceland	1.3	9.5	n.d.	1.0	2.0	6.1	n.d.	2.4	4.2	7.1	n.d.	3.8
Finland	6.4	8.8	11.5	5.5	8.0	13.0	9.6	8.0	13.1	6.6	10.8	15.4
Sweden	3.2	4.1	n.d.	2.1	4.0	6.4	n.d.	3.2	6.9	4.2	n.d.	6.6

Notes: U_1^* derived from Annex Table 1 by setting *gap* = 0. U_2^* derived from Annex Table 2 by setting the balance on the current account (*Bop*) = 0 (3.5 for Norway due to the oil sector) and solving for *Un*. U_3^* derived from Annex Table 3 by arbitrarily assuming that, in equilibrium, the real consumption wage increases by half the rate of productivity growth (with the latter calculated as the average annual change during, respectively, 1980–85, 1985–90 and 1990–96) and solving for *Un*. OECD is taken from OECD (1997). n.d.: "not defined".

trend and then calculated structural unemployment by eliminating the output gap (Annex Table 1).[7] Secondly, I applied an idea proposed by Holden (1996) who defines the structural rate as the rate of unemployment consistent with external equilibrium (Annex Table 2). Thirdly, I used wage adjustment equations and derived the structural rate by assuming that changes in real wages had to equal the rate of labour productivity growth (Annex Table 3). In Table 5, these estimates are compared with those presented in OECD (1997).

3.1.3 NAIRU and the output gap

The measures of the structural rate obtained by the first approach (U^*_1) are rather close to the OECD estimates of the NAIRU, even though the methods applied are entirely different. According to the results, labour market slack, in all the Nordic countries, has increased relative to output slack, implying that more rapid demand growth will not be sufficient to reduce unemployment to previous levels. There are, however, some differences.[8] In Denmark and Norway, a non-linear trend was identified, which is much steeper for Denmark than for Norway and implies that structural unemployment started to fall after 1990 in Denmark and only somewhat later in Norway. For the other countries it appears that the rise in unemployment is best explained by a linear trend combined with intercept shifts. Although an intercept shift is a very crude way of identifying the influence of policies, it is, nonetheless, interesting to note that both Finland and Sweden experienced an upward shift following the breakdown of the fixed exchange rate regime and the implementation of policies to correct earlier financial imbalances. By contrast, in the case of Iceland, a downward shift seems to have accompanied the implementation of a less accommodating monetary policy in the early 1980s.

[7] Gylfason (1997) assumes that the actual efficiency of an economy is proportional to the "optimal efficiency" by a factor = $(1 - \alpha r(dUn)$, where α is the coefficient with respect to labour in a Cobb-Douglas production, *dUn* is the change in the rate of unemployment and *r* is a measure of labour market rigidities. On this assumption, actual unemployment can be estimated from the equation:

$Un = Un^* - r\ dUn + \beta\ gap$, where *gap* = log ratio of actual to potential GDP.

However, when estimating this equation, I always obtained a positive coefficient for *dUn* and when attempting to capture rigidities by including one and two-year lagged values for *Un* instead of *dUn*, the coefficient on *gap* was either insignificant or of the wrong sign. Consequently, I implemented the equation as described above.

[8] It might also be noted that the cyclical sensitivity of unemployment seems to be highest in Finland, followed by Denmark and Sweden. Due to the high degree of unemployment persistence found in all countries, differences in the cyclical sensitivity may have influenced the structural measures given in Annex Table 1.

3.1.4 NAIRU and external equilibrium

When structural unemployment is defined as the unemployment rate consistent with external equilibrium, the estimated rates are both volatile and rather different from the OECD data. Although the structural measures (U^*_2) derived from balance of payment figures seem excessive in some cases and could be too heavily influenced by specific features or events of the three years shown, they do provide some policy relevant information. For instance, in the case of Iceland, where the deficit on the current balance of payments has averaged 3½% for the last 20 years, domestic absorption obviously has to be considerably lower (and the rate of unemployment correspondingly higher) if external equilibrium is to be achieved. Similarly, for Finland and Sweden, domestic absorption was too high following the boom in the 1980s whereas for Denmark the high structural rate in 1990 mainly reflects the heavy foreign debt burden and the relatively high interest rate of that year.

With respect to the influence of exchange rate changes (Annex Table 2), the estimates for Finland, Norway and Sweden generate a reduced-form "trade off" between the real effective exchange rate and the structural rate of unemployment.[9] Based on these reduced forms, the structural unemployment rate derived for Norway in 1986 may understate the "true" rate as the exchange rate was rather low; otherwise Norway's real effective exchange rate has been comparatively stable. For Finland and Sweden, the structural unemployment rates for 1996 are probably also understated. The real effective exchange rates are respectively 30 and 20% below their 1990-values and it seems rather implausible that unemployment could fall to respectively 6½ and 4¼% without higher wage inflation and a real appreciation. Moreover, the substantial improvement in companies' net financial position, which in both countries has contributed to the strengthening of the current external account, can to a large extent be attributed to a large decline in the investment/GDP ratio. If unemployment in the two countries were to be reduced as shown in Annex Table 2, these investment declines would probably be reversed as a significant rise in employment is likely to require a supporting increase in the capital stock.

[9] For Iceland, on the other hand, the exchange rate effect seems to be dominated by the terms-of-trade effect and, for Denmark, only *changes* in the exchange rate are significant.

3.1.5 NAIRU and wage inflation

The wage equations (Annex Table 3) produced the least robust and plausible estimates. Given the definition of structural equilibrium, the equations were initially specified with product prices among the explanatory variables but this only produced sensible results for Denmark. Second, the coefficients for productivity growth are not very well determined and, allied with the fact that productivity growth is not exogenous but increases in periods of strong cyclical recoveries (as in Norway in 1996) or by the closing down of the least competitive firms (Denmark in the 1990s), the derived structural rates are subject to a large margin of error. Third, for Iceland and Sweden, hysteresis could not be rejected once the homogeneity conditions were imposed.[10]

When averaging the structural measures (Table 6), it appears that Norway entered the 1990s with labour market slack which was progressively reduced over the next six years. The Danish labour market seems to have been broadly in balance at the beginning of this decade but developed some slack in the course of the 1990s. In the other countries, by

Table 6
Structural and actual unemployment, average estimates
In percentages

Countries	1990		1996	
	Average[1]	Actual[2]	Average[1]	Actual[2]
Denmark	9.6	9.5	8.2	8.9
Norway	3.7	5.2	3.9	4.2
Iceland	3.5	1.8	5.0	4.3
Finland	9.6	3.5	11.5	16.4
Sweden	3.4	1.6	5.9	7.9

[1] Unweighted averages of structural estimates given in Table 5. [2] Actual rates of unemployment.

[10] This conclusion, however, is contestable. When testing the time series properties of unemployment, the null hypothesis of hysteresis cannot be rejected for *any* of the Nordic countries (see Annex Table 6) or for Germany. It could, however, be argued, that because of the high degree of persistence of unemployment, the sample period (1960–96 for most countries) may be too short for a unit root test. For example, when doing a similar tests for the United States, France and the United Kingdom based on sample periods of 100–150 years, Bianchi and Zoega (1997) find that the unemployment series for the three countries are stationary around infrequently changing means.

contrast, strong growth during the second half of the 1980s had led to overheating and excess demand had to be substantially reduced this decade; in fact, Iceland may have to reduce labour demand even further if the current account deficit is to be eliminated.

3.2 Broader measures of labour market rigidities

Given the conceptual as well as statistical problems in deriving sensible measures of the NAIRUs, it might be more fruitful to adopt the approach suggested by Henry and Snower (1996) and look at "intermediate" models containing a broad range of rigidities.[11] When labour markets do not adapt or adapt too slowly, it is not sufficient to look at the wage formation process alone, since the underlying causes may be located in output markets or in firms' hiring practices. Hence, to supplement the information discussed above price and employment equations were also estimated (see Annex Tables 4 and 5), with the principal parameters of this broader framework summarised in Table 7.[12]

As the table shows, wages in Norway are highly responsive to the level of unemployment, whereas consumer prices do not respond to slack in the product market; nominal rigidities also seem much higher in output markets than in labour markets. Moreover, while employment responds fully to output changes in the long run, the adjustment is rather slow.[13] In contrast, employers in Denmark respond quickly to output changes[14] and consumer prices are also quite sensitive to the level of output slack, notwithstanding a relatively high degree of nominal price rigidity. The cyclical sensitivity of wages is about half as large as in Norway and also well below that found for Germany. In several respects, Finland represents an intermediate case. Nominal wage rigidities are higher than in

[11] See also Franks (1997) who argues that because the adjustment lags in the labour market frequently exceed the average time between shocks as well as the length of the average cycle, shocks will feed back on each other and generate persistence far beyond what one expect from natural rate models.

[12] In a "right-to-manage-model", firms simultaneously determine both prices and employment, so that the price and employment equations are really "two sides of the same coin". However, as noted by Bean (1994), this equivalence is rarely satisfied in practice and in the following I have regarded the price and employment relations as independent equations.

[13] Norway and Sweden are the only countries for which the elasticity of employment with respect to output is unity in the long run. This might reflect the policy of using public sector employment to absorb labour market slack; a policy still used in Norway and, in the case of Sweden, for much of the period of estimation.

[14] As discussed below, this may reflect the relatively liberal lay-off rules.

Table 7

Wage, price and employment rigidities, selected measures

Countries	Wage equation[1]			Price equation[2]			Employment equation[3]			Total		
	β	α	η	δ	μ	ω	λ	π	σ	ρ	Real[4]	Nom[5]
Denmark	−1.03	0.00	0.29	0.23	0.29	0.14	0.57	0.65	−0.37	0.00	1.34	0.14
Norway	−2.13	0.00	0.23	0.00	0.40	0.17	0.43	0.49	−0.10	0.48	0.95	−0.14
Iceland	−6.89	1.00	0.27	0.23	0.30	0.51	0.19	0.49	−0.11	0.00	0.83	0.54
Finland	−4.36	0.70	0.36	0.09	0.15	0.22	0.63	0.69	−0.11	0.00	0.99	0.01
Sweden	−4.71	1.00	0.67	0.05	0.36	0.13	0.51	0.45	−0.18	0.52	0.68	−0.70
Memo:												
United States . .	*−1.98*	*0.00*	*0.29*	*0.24*	*0.56*	*0.04*	*0.40*	*0.74*	*−0.44*	*0.23*	*1.68*	*0.08*
Germany	*−4.00*	*0.67*	*0.19*	*0.24*	*0.17*	*0.07*	*0.76*	*0.68*	*−0.21*	*0.34*	*1.30*	*−0.29*

[1] The parameters are obtained from the estimates in Annex Table 3: $dw = \phi + \varphi\ dpc + (1 - \varphi - \eta)\ dpc_{-1} + \eta\ dw_{-1} + \beta\ Un + \beta\alpha\ Un_{-1} + \kappa\ dq$, where dw = percentage change in compensation per employee; dpc = percentage change in consumer prices; Un = rate of unemployment in logs and dq = rate of productivity growth, total economy. β or $1/\beta$ can be interpreted as measuring the "real" rigidity or (flexibility), with a large value (in absolute terms) indicating that wages are flexible. α measures the degree of labour market hysteresis while the "nominal" rigidity is captured by η. [2] The parameters are obtained from the estimates in Annex Table 4: $dpc = \nu + \delta_1\ gap + \delta_2\ gap_{-1} + \mu\ dulc + \lambda\ dpc_{-1} + \omega\ dpm$,, where gap = output gap, $dulc$ = changes in unit labour costs (for the United States changes in compensation per employee) and dpm = changes in import prices. Corresponding to the wage equation, δ can be interpreted as a measure of the "real" rigidity (or flexibility) while λ measures the "nominal" rigidity. I found no evidence of hysteresis in output markets. [3] The parameters are obtained from the estimates in Annex Table 5: $dem = \xi + \pi_1\ dy + \pi_2\ dy_{-1} + \sigma_1\ drw + \sigma_2\ drw_{-1} + \rho\ dem_{-1}$, where dem = changes in employment, dy = change in real output (GDP) and drw = changes in real labour costs. The parameters π and σ can be interpreted as measures of "real" employment rigidities while ρ indicates the nominal rigidity or the speed of adjustment. [4] Defined as: $-\beta + \delta + \pi - \sigma$. [5] Defined as: $1 - (\eta + \lambda + \rho)$.

Denmark and Norway and there is also a rather high degree of hysteresis in the labour market, though significantly less than in Iceland and Sweden. Employment seems highly sensitive to changes in output whereas the coefficient with respect to real labour costs is relatively low.[15] The responsiveness of consumer prices in Finland is rather sluggish as changes in the output gap have little impact and the nominal rigidity is high.

As already mentioned, complete hysteresis could not be rejected for Iceland and Sweden and Swedish wages also seem to be nominally rigid. In addition, consumer prices in Sweden respond slowly and very little to changes in output slack and while the long-run employment elasticity with respect to output is close to unity the speed of adjustment is as low as in Norway. In Iceland, by contrast, consumer prices and employment are sensitive to changes in output and the output gap and the lags are short.

When aggregating the various rigidity indicators (see the last two columns of Table 7), it appears that Denmark has the highest degree of real flexibility among the Nordic countries (about equal to that of Germany but well below that of the United States) and mainly because of the responsiveness of employment to changes in output and real wage costs.[16] Norway and Finland share second place, while Sweden seems to have the lowest real flexibility, though, in part, this reflects the assumption of labour market hysteresis. Sweden also obtains the lowest rating with respect to aggregate nominal flexibility,[17] with about equal contributions from all three equations. On this measure, Iceland gets the highest rating as employment adjusts instantaneously and price adjustments are also subject to a very short lag. Denmark takes second place despite rather slow price adjustments while Finland and Norway are further back, Finland mainly because of slow price adjustments but Norway also due to long lags in the adjustment of employment.

[15] In fact, significant coefficients for real labour costs were only obtained for Denmark and Sweden.

[16] Because real wage flexibility (β) is estimated with respect to the log of unemployment, the estimated coefficients have been divided by the rate of unemployment in 1992.

[17] This measure should perhaps rather be interpreted as a broad indicator of the speed of adjustment. According to our estimates, the United States does not get a particularly low ranking even though the United States is often characterised as combining a high degree of real flexibility with a low degree of nominal flexibility. It could be argued, however, that the rather high coefficient with respect to lagged price changes in the wage equation should also be included in assessing nominal flexibility and on this broader measure the ranking of the United States would be significantly lower.

3.3 Changes in employment by explanatory factor

As a final piece of "analytical input", I have applied the estimated employment equations in "explaining" employment changes this decade (Table 8). Finland obviously suffered the steepest employment decline as output largely stagnated for the period as a whole and firms cut back labour to maintain competitiveness. Despite some moderation of the growth of real consumption wages in Finland, real wage costs advanced by a cumulative 17%, suggesting that even in conditions of very high unemployment, real wage restraint is difficult to generate in a period of decelerating or very low price inflation. It may, of course, be argued that employment could have been maintained, if only the self-regulating mechanisms had been stronger. However, even assuming that the elasticity of employment with respect to real labour costs is unity and taking output growth as given, real labour costs would have had to fall by 12½% to prevent firms from cutting back their labour force to preserve competitiveness.[18]

Output also stagnated in Sweden and even though cutbacks (as measured by the trend term) were less pronounced than in Finland, employment fell by a cumulative 11%. The residual error is, however, rather high suggesting that the equation is poorly specified. The latter applies even more Iceland, whereas the figures shown for Norway and Denmark are more satisfactory. Norway is the only Nordic country

Table 8
Cumulative changes in employment by "causal" factor
1990–96

Countries	Output[1]	Real wages[1]	Trend	Rest[2]	Employment
Denmark	8.4 (13.5)	−4.1 (11.0)	− 4.0	−1.7	− 2.0
Norway	10.3 (31.8)	−0.6 (7.9)	− 7.4	1.0	3.8
Iceland	4.4 (11.0)	−0.8 (20.4)	–	−3.9	− 0.3
Finland	0.8 (7.6)	−1.7 (16.7)	−12.5	−2.7	−16.1
Sweden	0.0 (5.2)	−2.9 (11.3)	− 4.3	−3.7	−10.9

[1] Figures in brackets indicate actual changes in, respectively, output and real wages.
[2] Unexplained residual.

[18] If I take the estimated real wage elasticity of 0.1, real wages, or the nominal exchange rate, would have had to fall by an implausible 125% (!!).

which has managed to increase employment this decade which is partly attributable to relatively expansionary macro-policies and rapid output growth. However, it also reflects the successful use of incomes policy (the "Solidarity Pact") to generate support for real wage restraint. Denmark, by contrast, has witnessed rather rapid real wage growth which, via the relatively high real wage elasticity of labour demand, has offset about half of the output-induced employment gains.

The following section attempts to relate these various analytical measures to general labour market features in the Nordic countries and to the policies pursued. The aim is not to provide a detailed description of the Nordic labour markets or of all the policy changes that have recently been implemented.[19] Rather the section will focus on some distinctive features which may help to explain developments in the 1990s.

4. Labour markets: main features and policies

For most of the post-war period full employment has been the overriding goal of economic policies in the Nordic countries. In many respects it still is in Norway, while Denmark had to lower the priority of achieving this goal in the short run from the early 1980s and Finland, Iceland and Sweden ten years later. The "operative framework" can be analysed in terms of the Rehn-Meidner model, which was initially designed for Sweden to reconcile full employment with low inflation, while facilitating sectoral changes and promoting overall growth. The model, which has also played some role in the other countries, consists of three basic elements (Henrekson et al. (1997)):

(i) restrictive fiscal and monetary policies to ensure low inflation;
(ii) a solidaristic wage policy, defined as equal pay for equal work regardless of productivity and profit developments;
(iii) an active labour market policy aimed at moving those who became unemployed due to the solidaristic wage policy as well as the restrictive macro-policies to a new job.[20]

[19] Recent policy changes are discussed in the latest OECD *Country Surveys*.

[20] When the author visited the Labour Market Board on his first OECD mission to Sweden in early 1974, the director described his principal function as "*taking each unemployed person by the hand and guiding him/her to a new job*". Despite the first oil price shock, unemployment in Sweden declined from 2.5% in 1973 to only 1.6% in 1975.

This framework worked relatively well in the 1950s and 1960s. However, during the more turbulent 1970s and 1980s major imbalances and inconsistencies emerged, with severe consequences for macroeconomic stability. In many ways, the problems faced in the 1990s can be linked to these imbalances and their underlying causes.

4.1 Solidaristic wage policy, unemployment and real wage flexibility

Labour markets in the Nordic countries are characterised by a high degree of organisation of both workers and employers and wage bargaining is usually centralised.[21] Even if supplementary sectoral or industry-based agreements have tended to capture differences in labour market pressures through wage drift, this set-up has been conducive to maintaining a very equal earnings distribution (Table 9). However, by also generating a low degree of relative wage flexibility, the solidaristic policy seems to have reduced the countries' ability to adapt to both adverse shocks and lower rates of inflation and thus raised the overall rate of unemployment compared with what it otherwise would have been.

Particularly in recent years, when the countries have succeeded in reducing inflation to, or even below, the OECD average, several analysts have pointed to an apparent decline in real wage flexibility (Gudmundsson (1994) and OECD country surveys). It appears, however, that the root of the problem are the solidaristic wage policies and the resultant lack of relative wage flexibility rather than the behaviour of aggregate real wages. Precisely in periods when both inflation and productivity growth are low and/or when distinct dualistic features have emerged in some of the economies, the number of firms which need to cut nominal wages to remain competitive will tend to rise and if nominal wage cuts are inconsistent with policies regarding equity, unemployment has to increase to maintain low price inflation.[22] Because the least efficient firms are likely to be closed down, average real wage growth may even increase, giving the

[21] Although not part of the Rehn-Meidner model and rarely used in Sweden, tri-lateral agreements, with government tax concessions or interest rate and exchange rate commitments, have been frequent in Finland, Iceland and Norway. When faced with particularly difficult adjustment problems, governments in all the Nordic countries have also resorted to decrees.

[22] While none of the Nordic countries have a statutory minimum wage, settlements frequently include relatively high minimum wages for the overall economy as well as for specific sectors and groups.

Table 9

Selected labour market characteristics

Countries	Long-run unemployment[1]	Labour costs[2]	Net replacement rate[3]	Dispersion of earnings[4]		Part-time workers[5]	Hours worked[6]	Temporary workers[7]	Employment protection[8]	Activity rate[9]	Public employment
	1996	1996	1994	1980s	1990s	1996	1996	1994	1995	1996	1996
Denmark	26.5	82 (25)	95	2.14	2.17	21.5	1,525	12.0	4	74.7	30.8
Norway	14.0	84 (49)	75	2.06	1.98	26.5	1,410	8.0	8	76.8	30.5
Iceland	19.2	77 (n.a.)	n.a.	n.a.	n.a.	27.9	1,970	n.a.	n.a.	84.8	19.3
Finland	35.9	79 (82)	89	2.46	2.38	8.0	1,790	13.5	9–10	62.2	23.6
Sweden	17.1	79 (71)	89	2.04	2.13	23.6	1,554	13.5	11	72.7	31.8
Memo:											
United States . . .	*9.5*	*56 (38)*	*60*	*3.25*	*4.35*	*18.3*	*1,951*	*2.2*	*1*	*75.0*	*15.4*
Germany	*48.3*	*100 (82)*	*77*	*2.69*	*2.32*	*16.3*	*1,560*	*10.3*	*9–10*	*64.0*	*15.5*

[1] Persons unemployed for more than 12 months as a percentage of total unemployment. [2] Total labour costs per hour in manufacturing (for Iceland, compensation per employee in private sector), indices, western Germany = 100; figures in brackets indicate the percentage ratio of non-wage labour to wages. [3] Marginal tax rates facing unemployed single-earner household, at two-thirds of the average production worker's level of earnings and calculated after tax and social benefits, including housing benefits. [4] Ratio of upper limit of earnings in 9th decile to upper limit of earnings in 1st decile. [5] Part-time workers as a percentage of total employment. [6] Average annual hours worked per person employed. [7] Workers on temporary contracts as a percentage of total employment. [8] Summary rankings (lowest rank = lowest degree of protection). [9] Employment as a percentage of population of working age. [10] Government employment as a percentage of total employment.

Sources: OECD *Economic Outlook*, June 1997, OECD *Employment Outlook*, July 1997, OECD *Country Surveys* and Institute of the German Economy *IW-trends*, 2/1997.

impression that aggregate real wages have become less sensitive to unemployment.[23]

This impression of a recent rise in real wage rigidities also appears from changes in profit shares and rates of return for the business sectors (Graph 3). For instance, while most of the countries have witnessed a trend rise in profits since 1980 (in several cases reversing an earlier steep decline), Finland and Sweden experienced a partial reversal of this trend in the early 1990s when the rise in unemployment was most pronounced. Moreover, over the last couple of years, when price inflation was reduced to unprecedented low rates, profit shares declined in Denmark, Norway and Sweden. Similarly, in Iceland, the profit margins narrowed in the second half of the 1980s when price inflation fell sharply and, even after a slight recovery this decade, they have remained below the earlier peak.[24]

It is more difficult to say whether the solidaristic wage policy has also contributed to the historically high rates of price inflation in the Nordic countries. However, it cannot be excluded that it lead to higher nominal wage increases due to "leapfrogging". Typically, centralised settlements have tended to equalise the earnings distribution by boosting wages of low-income workers. Subsequently, supplementary sectoral agreements and wage drift widened the distribution of earnings due to excess demand for skilled workers and differential sectoral rates of productivity gains. In the following central agreements, claims for restoration of the previous distribution were then made and usually validated by the authorities.

It is also difficult to say whether the solidaristic wage policy will "survive" recent moves towards a more decentralised bargaining structure. Especially in conditions where the exposed sector grows more

[23] To some extent, such reactions may also explain the seemingly conflicting persistence measures for respectively unemployment and the rate of inflation. For instance, based on cross-country estimates of the following equation:

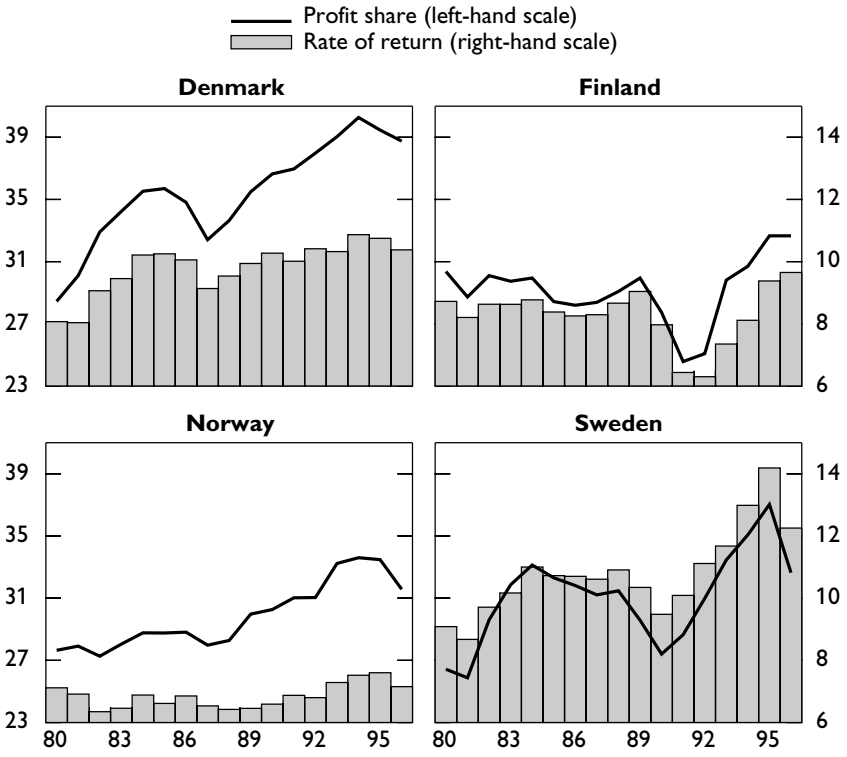
$Un - Un_{-1} = \alpha + \beta\ gap + \chi\ disp + \epsilon\ Un_{-1}$,

where *Un* is the rate of unemployment, *gap* the GDP gap, *disp* a measure of the sectoral dispersion of employment changes and persistence is defined as $1 + \epsilon$. OECD (1997) finds persistence rates of 0.65–1.00 for the Nordic countries (Iceland was not included in the analysis), compared with 0.15 for the United States and 0.60 for Germany. In contrast, by using country-specific estimates of inflation equations and measuring inflation persistence by the coefficient on the lagged rate of inflation, Anderton (1997) concludes that the Nordic countries (again excluding Iceland) have a relatively low degree of persistence. Moreover, the shift towards more anti-inflation policies in the 1980s seems merely to have reduced the average rate of inflation in the Nordic countries, whereas, according to Anderton's estimates, countries, such as the United States, the United Kingdom and Canada, have managed to reduce the persistence as well as the average rate of inflation. Needless to say, this issue needs further analysis.

[24] The peak in 1983–84 may have been due to a partial wage freeze as part of the disinflationary policy implemented in the early 1980s.

Graph 3

Profit shares and rates of return, business sector



rapidly than the sheltered domestic sector, a widening of earnings distributions might be expected. Nonetheless, both Denmark and Sweden have seen significant changes towards decentralisation without any measurable effects on the structure of relative wages; in Finland the decision to temporarily abandon a centralised agreement in 1993–94 to allow a wider sectoral dispersion of wage changes mainly boosted aggregate wage growth but left the distribution of earnings largely unchanged. In Norway, moves towards decentralisation are still being resisted on the grounds that sectoral wage settlements are incompatible with the current incomes policy framework and that, in the past, such settlements have led to higher inflation.

Because the Nordic countries were at "over-full employment" during most of the 1960s and 1970s, wage growth was excessive relative to major trading partners. Moreover, with accommodating rather than restrictive policies, the solidaristic wage policy did not, as had initially been assumed, encourage employment shifts from firms with low productivity to more profitable sectors. In fact, owing to a policy of stable nominal exchange rates, the fast-growing companies in the exposed sector progressively lost their international competitiveness.[25] As a result, a typical feature of the Nordic countries has been that the public sector ended up as "an employer of last resort" while private sector employment declined.[26] In some of the countries, the rise in public sector employment was reinforced by other measures, including regional policies resisting the closing down of unproductive enterprises. In addition, the comparatively high level of social and other services provided by the governments not only raised aggregate taxes but also tended to reduce labour mobility.

More recently, the need to consolidate fiscal balances has, except for Norway and perhaps also Iceland, forced the Nordic countries to discard earlier policies of compensating private-sector job losses by more public jobs. The countries now attempt to adapt to external shocks by trying to raise real wage flexibility or promote job creation in the private sector,[27] rather than by equalising demand and supply in the labour markets through public-sector job creation. For example, over the last five years

[25] A "sub-model" of the Rehn-Meidner model is the Scandinavian model of inflation, based on the assumption that nominal wage gains are determined by productivity growth and international price changes in the exposed sector. Through the solidaristic wage policy, wage growth in the exposed sector would also determine nominal wages in the sheltered sector. However, because employment was maintained at a too high level, the assumed chain of causality in the inflation model broke down. Thus the sheltered sectors (typically the building sector and, in some cases, also the public sector) have frequently been the wage leaders and through the solidaristic wage policy excessive wage increases and a gradual loss of international competitiveness were imposed on the exposed sectors.

[26] According to the growth-accounting model in Henrekson et al (1997), the contribution of labour to output growth in the non-government sector of Sweden was –½% per year during 1960–90; since 1990 private sector employment in Sweden has fallen further (Bäckström (1997)).

[27] In Sweden, however, the "downsizing" of the public sector and the promotion of job creation in the private sector still seem to be met with some reluctance or resistance. For instance, the Government's programme to halve unemployment by the year 2000 does not contain a single measure to promote private-sector employment growth. By contrast, the programme announced by Finland includes several such measures, in particular the creation of small to medium-sized firms.

Denmark, Finland and Sweden have cut public sector employment even as private employment was falling. In Norway, by contrast, public employment has continued to grow and the rather slow adjustment of employment as well as the low and statistically insignificant real wage elasticity (see Annex Table 5) could well result from the full employment policies still being pursued.

Due to the high government shares of output and employment, average and marginal tax rates are high in the Nordic countries. Even after recent tax reforms to reduce marginal rates, the disincentives faced by unemployed workers have remained high, notably when various subsidies are also taken into account (Table 9). How much this has influenced unemployment is difficult to say but it is worth recalling Agell's observation that even though labour supply elasticities with respect to the tax wedge are very low, they do become important when the marginal tax and subsidy wedges approach 90%.[28]

4.3 Employment protection and the insider-outsider model

The degree of employment protection and the implicit disincentives for employers to hire new workers differ quite markedly between the Nordic countries (Table 9). Denmark has the most liberal system, as employers face few constraints in laying off workers while unemployed workers are compensated by relatively high unemployment benefits for several years. Swedish employers have wide discretion in deciding when lay-offs are required and severance pay is voluntary. However, notice periods are long, the principle of "last-in-first-out" has to be adhered to and there is a one-year re-hire obligation. Moreover, because employers face very high penalties in case of "unfair dismissals", Sweden has a rather high protection rank.[29] These disincentives are likely to have increased the bargaining

[28] The high marginal rates not only reflect the tax and subsidy structures but are also the result of generous unemployment benefit systems with almost unlimited duration and liberal eligibility criteria.

[29] While I was unable to reproduce Gylfason's (1997) empirical estimates, I fully agree with his observation that (Gylfason (1997) pp. 19–20):

"the labour rigidity inherited from the 1970s did not become a binding constraint on the hiring and firing decisions of Swedish employers until the economy took a deep dive in the 1990s. In the 1970s and 1980s the malfunctioning of the Swedish labour market tended to be overlooked because the Government acted as an employer of last resort by expanding public-sector employment when demand for labour in the private sector declined and also because the Government devalued the currency more than once in an attempt to restore profitability to Swedish exports".

power of the employed (the "insiders") at the expense of the unemployed (the "outsiders") and may, thus, explain why output growth has created relatively few new jobs in recent years. The power of insiders could also be the reason that wage growth started to accelerate when the rate unemployment was still very high by past standards.[30] Norway is ranked with a median degree of protection while Finland is somewhat higher. As in Sweden, this may have played a role in the acceleration of wage growth in 1993–94 and might also, in part, explain why the moderation in 1992–93 as well as that expected for 1995–98 could only be achieved with the help of tax concessions.

4.4 Other factors and influences

Recent discussions of rigidities have mostly focused on labour markets, but an important source of such rigidities, even in labour markets, is often found in product markets. In particular, given technological progress and international competition, most industrial countries need to shift resources from the tradable to the non-tradable sectors, and the extent to which the latter are regulated will, therefore, importantly affect countries' ability to adapt. In this respect, the Nordic countries appear to have wide scope for improvement. For instance, when regressing relative price levels on per capita GDP, the OECD finds that relative prices in the Nordic countries are much higher than their relative income position would imply, with particularly large "excesses" for Denmark and Sweden.[31]

While a relatively high aggregate price level can have many sources and causes, lack of competition in the manufacturing sectors does not seem to be among them. On the contrary, judging by mark-up ratios (Table 10), most manufacturing industries in the Nordic countries appear to be competitive, notably (and naturally) the key export sectors. By contrast, the adaptability and absorptive capacity of the non-tradable sectors are constrained by a host of regulations and, in several cases, by

[30] As noted by Bäckström (1997), the number of hours worked rose by the equivalent of 135,000 jobs during the latest economic upswing in Sweden. However, only 85,000 new jobs were actually created as firms preferred to extend the number of working hours for those already employed. The acceleration in nominal and real wage growth in 1995 occurred when registered unemployment was still close to 8% and total unemployment almost 12%.

[31] On this basis, relative prices are also "too high" in Germany but rather low in the United States; see OECD, Economic Survey for Sweden, 1997.

Table 10

Mark-ups in selected industries

1980–92

Industry	Denmark	Norway	Finland	Sweden	*United States*	*Germany*
Textiles, apparel	1.15	1.13	1.17	1.13	*1.10*	*1.11*
Footwear, leather	1.21	1.15	1.11	1.12	*1.10*	*1.09*
Iron and steel	1.09	1.25	1.30	1.09	*1.10*	*1.18*
Wood, furniture	1.14	1.15	1.27	1.10	*1.14*	*1.15*
Chemicals, plastics	1.14	1.09	1.30	1.19	*1.16*	*1.29*
Non-metallics	1.25	1.25	1.39	1.12	*1.19*	*1.28*
Paper, printing	1.11	1.11	1.22	1.17	*1.17*	*1.19*
Medicine, drugs	1.42	1.26	1.42	1.26	*1.33*	*1.44*
Metal products	1.14	1.16	1.22	1.12	*1.10*	*1.20*
Radio and TV	1.10	1.16	1.59	1.30	*1.38*	*1.28*
Office equipment	1.44	1.45	1.92	1.17	*1.39*	*n.a.*
Motor vehicles	n.a.	1.19	1.17	1.12	*1.06*	*1.13*
*Average**	*1.20 (24)*	*1.18 (27)*	*1.27 (33)*	*1.16 (20)*	*1.16 (29)*	*1.25 (26)*

* Unweighted average; figures in brackets indicate the number of industries for which mark-up rates were estimated.

Source: Martins et al. (1996).

state monopolies.[32] However, because data for the services sector are less readily available than for manufacturing, it is difficult to get precise estimates of these rigidities; hence, the following discussion, based on Tables 11–12, should be interpreted as merely illustrative.

One striking feature of developments in the Nordic countries during the last 10 years is the marked fall in employment relative to output (Table 11). Labour shedding has been particularly pronounced in manufacturing and one obvious explanation is rationalisation, driven by increasing international competition and technological progress. Secondly, the effects of the property-related financial crises are clearly evident in Finland, Norway and Sweden, as employment in construction fell steeply and, in Finland, financial institutions have also cut employment.[33] The fall in construction came to a halt in 1994 in Norway and in 1995 in Sweden. In Finland, the slump in the construction continued until 1996 as did the decline in real house prices. Moreover, despite lower interest rates, "negative equity", together with tighter collateral requirements, many households in Finland have been forced to move to rented dwellings.

A third feature of the last decade has been that, in contrast to earlier years, the private services sectors were no longer able to absorb redundant workers from industry. Moreover, because of the need for fiscal consolidation, public employment has grown own only moderately or even fallen, so that total employment declined in Denmark, Finland and Sweden. Norway and Iceland, on the other hand, witnessed an expansion of total employment by continuing to rely on the public sector.[34] Total employment also grew in the United States but, in contrast to Norway and Iceland, this was mostly due to rapid employment growth in private services although public employment expanded as well. Developments in Germany are also worth noting as total employment fell due to cutbacks in industry but employment in private services increased.

[32] In the 1990s, all the countries have adopted new laws and regulations aimed at strengthening competition in output markets and public enterprises are being privatised. However, most of these measures are of a rather recent date and, given the long lags typical of supply-side policies, will mostly affect future developments. For details, see the latest OECD country surveys.

[33] Rather surprisingly, employment by Swedish financial institutions has continued to expand despite the banking crisis.

[34] As pointed out by the OECD, Norway may actually need a higher degree of flexibility in private services than the other countries, due to foreign revenue from the oil sector and associated upward pressures on the nominal and real exchange rate. So far, however, Norway has "escaped" this dilemma by keeping the exchange rate relatively stable and preventing excess labour supply via fiscal policy.

Table 11

Employment and output changes by sector

Cumulative percentage changes, 1985–95[1]

Sectors[2]	Denmark		Norway[3]		Iceland		Finland		Sweden		*United States*		*Germany*	
	Output	Empl.	Output	Empl.	Output	Empl.	Output	Empl.	Output	Empl.	*Output*	*Empl.*	*Output*	*Empl.*
Manufacturing	4.0	−6.1	0.8	−13.0	−4.0	−23.5	37.4	−25.2	12.9	−22.6	*20.3*	*−3.6*	*8.3*	*−15.0*
Construction	−4.1	0.0	6.9	−21.2	5.6	−10.0	−17.7	−33.3	−4.6	−21.3	*−2.2*	*10.2*	*23.3*	*19.5*
Trade and restaurants	14.1	1.5	16.3	0.6	11.8	− 1.2	− 1.7	−18.8	21.9	− 4.7	*24.2*	*14.2*	*33.2*	*15.0*
Transport and commun.	79.6	−0.7	46.5	− 5.7	25.2	− 0.5	43.9	−10.8	44.0	− 6.5	*39.1*	*18.9*	*50.5*	*− 0.8*
Finance	11.8	14.7	12.9	25.0	18.9	27.3	26.9	9.9	22.3	28.9	*22.2*	*34.3*	*43.5*	*20.5*
Financial institutions	5.9	3.2	n.a.	n.a.	20.1	6.8	− 8.9	−30.8	39.7	12.2	*25.8*	*12.5*	*51.8*	*n.a.*
Other services	17.2	10.2	9.9	6.4	18.3	14.0	6.8	−20.0	12.2	12.9	*22.1*	*38.5*	*n.a.*	*n.a.*
Private sector	22.2	−2.0	32.5	− 5.5	12.5	− 2.5	18.6	−21.7	16.2	− 6.0	*21.5*	*16.7*	*34.3*	*6.7*
Public sector	8.8	3.0	26.0	20.5	41.1	22.3	6.4	4.5	0.8	− 9.1	*10.8*	*11.7*	*11.3*	*− 2.4*
Total	19.4	−0.4	31.5	1.0	19.6	1.5	16.3	−16.6	12.5	− 7.1	*23.9*	*15.9*	*31.3*	*5.4*

[1] Exceptions: Denmark, employment in financial institutions, 1985–92; Iceland, sectoral output, 1985–93, total output and sectoral and total employment 1985–94; Sweden, 1985–94; and the United States, sectoral output 1985–93, total output and sectoral and total employment 1985–94. For Germany, 1985–91 refers to western Germany only. [2] Trade and restaurants: wholesale and retail trade, restaurants and hotels; Transport and commun.: transport, storage and communication; Finance: financial institutions, insurance, real estate and other business services; Financial institutions: bank and non-bank financial institutions; Other services: mostly community services. [3] Due to definitional changes, the figures for Norway are tentative.

Sources: OECD, *National Accounts*, Volume II, OECD, *Country Surveys*, various years and national data.

Table 12
Employment in wholesale and retail trade
Regression equations

Countries	Trend	d Cons.	d Em_{-1}	R^2	S.E.	Period	E-ratio	W-ratio
Denmark	−0.8	0.31	0.44	0.61	1.05	1968–95	0.19	0.95
Norway	−0.6	0.38	0.48	0.77	1.22	1964–94	0.23	0.72
Iceland	−0.0	0.33	0.41	0.50	2.95	1965–93	0.19	0.85
Finland	−1.9	0.76	0.27	0.62	2.30	1962–95	0.19	0.79
Sweden	−0.5[1]	0.39[2]	0.37	0.36	1.90	1975–94	0.21	0.87
Memo:								
United States . .	*−1.0*	*0.66*	*0.48*	*0.55*	*1.25*	*1962–93*	*0.26*	*0.60*
Germany	*−0.6*	*0.52*	*0.56*	*0.89*	*0.50*	*1979–95*	*0.20*	*0.60*

Notation: The employment equation is estimated on annual data and specified as: d log *Em* = α + d log *Cons* + d log Em_{-1}, where *Em* = employment in wholesale and retail trade, restaurants and hotels, *Cons* = private consumption in constant prices.

[1] Indicates that the coefficient is not statistically significant. [2] Lagged change in consumption; E-ratio is the ratio (1985) of employment in wholesale and retail trade to total private sector employment and W-ratio the ratio (1985) between compensation per employee in, respectively, wholesale and retail trade and manufacturing.

Whether the inability of private services, notably in Finland and Sweden, to absorb the redundant resources is attributable to the slump in domestic demand or to structural rigidities, is difficult to say. However, given their weight in total private employment, developments in wholesale and retail trade could be of particular interest in attempting to answer this question. One further striking feature of sectoral employment changes since 1985 is the almost 20% decline of employment in wholesale and retail trade in Finland. This, however cannot be attributed to lack of flexibility; on the contrary, an unusually large elasticity of employment with respect to private consumption, combined with the slump in the domestic economy in the 1990s, seems to have been the main influence.[35] An additional factor, which could also explain the

[35] According to the estimates in Table 12, the 11% decline in private consumption between 1989 and 1993 would account for about one-half of the overall decline in employment in wholesale and retail trade since 1985. While the estimated equation points to a relatively high degree of flexibility in Finland and explains the huge decline in the 1990s quite well, the very high correlation between consumption and employment may be spurious and excessively influenced by the steep decline of both variables in the early 1990s. The large negative trend term could also mean that certain asymmetries or threshold effects exist. Thus consumption has to grow by at least 2% per year, before employment reacts. Moreover, according to the OECD, product markets in general are regulated in Finland with disincentives for the establishment of small to medium-sized firms.

employment fall in other private services, is the fact that debt ratios for non-manufacturing firms and households have remained high compared with the early to mid-1980s. In contrast, debt ratios in the manufacturing sector have been substantially reduced.

The story for Sweden, where employment in wholesale and retail trade has also declined, is a different one although, as in Finland, compensation per employees has declined relative to manufacturing since 1985. The rather low and slow response to changes in private consumption (Table 12) is suggestive of a non-competitive market and the poor performance of this sector is not so much the result of the 4% decline in consumption between 1989 and 1993 but rather of the low response to the 18% rise in consumption during the 1980s. The estimates for Denmark and Iceland, combined with relatively high wage costs in the wholesale and retail trade sector, are also indicative of regulated and non-competitive markets, whereas the consumption elasticity is somewhat higher and the relatively wage level considerably lower in the case of Norway. However, for all the Nordic countries the employment performance of wholesale and retail trade has been significantly weaker than that of the United States where relative wage costs are much lower. Germany has also performed substantially better than the Nordic countries in this respect, even though wholesale and retail trade is usually regarded as severely constrained by regulations.[36]

Concluding observations

In his introduction to an earlier volume on wage formation and macroeconomic policy in the Nordic countries, Calmfors (1990) summarised the then existing prominent issues as follows (pp. 11–12):

"Developments in the Nordic countries from the late seventies onwards can best be seen as a prolonged attempt to adjust the real wage trend to lower productivity growth and to improve international competitiveness. On the whole these attempts proved successful in the late seventies and early eighties but

[36] Even though German wages in wholesale and retail trade are high by international standards, they are low relative to those of manufacturing and consistent with the ratios of output per man-hour in the two sectors.

higher money wage growth than abroad now threatens these achievements again".

To some extent wage adjustment has remained the key issue in the 1990s except that the major shifts to which nominal wages have to adjust are no longer low productivity growth but low inflation and the absence of the public sector as an employer of last resort. The changes required to facilitate these adjustments are mainly two: more flexible relative wages and more competitive product markets, notably in the sheltered private services sector.

As noted in Section 3, several analysts have pointed to the apparent decline of real wage flexibility following the reduction of price inflation to the 2–3% range. It is tempting to attribute this to a high degree of nominal rigidity in wage setting, but there is little empirical evidence to support the view that nominal rigidities in the Nordic countries are higher than elsewhere.[37] In contrast, there is clear evidence that relative wages are less flexible than in most other countries and mainly due to the high priority attached to social equity. This priority seems to be shared by policy makers, trade unions and employers and will probably only change slowly. However, particularly in a period when rapid technological progress and increasing international competition imply a need for reallocating resources it is important that rigidities in wage setting do not resist or retard this process. Moreover, fast employment growth, unimpeded by rigidities, is frequently the most efficient and least costly way of maintaining social equity.

The need and the efforts made to reduce fiscal imbalances have, with the exception of Norway and Iceland, put an end to the earlier practice of equalising demand and supply in the labour market via adjustments in public sector employment. Since the exposed sector has to remain competitive, it is unlikely to become a major source of future jobs; in fact, further rationalisation efforts and downsizing are more likely. Consequently, it is crucial that the private services sector increases its capacity to create jobs and this, in turn, requires a more competitive environment. All the countries have recently adopted laws promoting competition but how effective these will be remains to be seen. Other reforms, notably in the area of employment protection, also need to be considered as underlined in recent OECD country surveys.

[37] On the contrary, Anderton (1997) found that the persistence of inflation is relatively low.

At a first glance, it might appear difficult (or even contradictory) to allow more scope for wider wage dispersions while, at the same time, lowering nominal wage claims; in fact, it cannot be excluded that, initially, policy-makers may be facing a trade-off. However, other countries have solved this problem and some of the solutions may also be applicable to the Nordic countries.[38]

What can monetary policy do to ease labour market and wage adjustments? Central banks can, for obvious reasons, not act as employers of last resort, nor can monetary policy do much to raise long-run output growth. However, precisely since the reconciliation of nominal wage claims and low price inflation is a *nominal* and not a *real* problem, Central banks can help the adjustment process by being transparent with respect to policy targets and the implementation of policies. As discussed in the companion paper, two of the Nordic countries have adopted low inflation as their principal targets while the others rely on fixed nominal exchange rates vis-à-vis the currencies of countries with low inflation as their nominal anchor. Thus trade unions and employers have received the message that low inflation is there to stay; what is still missing is that the private agents adjust their claims to the message.

[38] For instance, under the previous Accord in Australia, enterprise bargaining based on firm-specific productivity gains, was promoted while the general trade union organisation (ACTU) was held responsible for respecting the inflation target adopted by the Reserve Bank.

Annex

Annex Table 1

Structural unemployment: unemployment – output gap*

Countries	Gap	Trend	Trend^2	Dum	R^2	S.E.	DW
Denmark .	−0.54	1.52	−0.025	–	0.94	0.81	1.70
Norway . .	−0.31	0.49	−0.007	–	0.92	0.40	1.54
Iceland . . .	−0.17	0.18	–	−1.05	0.96	0.30	1.52
Finland . . .	−0.70	0.38	–	2.80	0.97	0.92	1.50
Sweden . .	−0.51	0.18	–	1.80	0.94	0.51	1.98

Notation: R^2 = coefficient of determination; S.E. = standard error of estimate; DW = Durbin-Watson statistic; all coefficients are significant (99%); intercept terms not shown.

* The estimated equations were specified as follows: $Un = \alpha + \beta\ Gap_{-1} + \chi\ Trend + \epsilon\ Trend^2 + \phi\ Dum$, where *Un* = rate of unemployment; *Gap* = GDP gap; *Trend* = linear trend; *Dum* = dummy variable: for Finland and Sweden, 1 for 1971–77 and 1991–96 and otherwise 0; for Iceland, 1 for 1983–92 and otherwise 0.

Annex Table 2

Structural unemployment: unemployment – external balance*

Countries	Un	Un_{-1}	Rex_{-1}	Int_{us}	dy_{oecd}	doil	Tot	R^2	S.E.	DW
Denmark .	1.25	−0.43	−0.13	−1.00	0.16	–	–	0.85	1.22	1.56
Norway . .	–	2.54	−0.20	–	0.27	0.48	–	0.84	2.07	1.60
Iceland . .	0.61	–	–	–	0.11	−0.10	0.12	0.48	1.24	1.42
Finland . .	–	0.36	−0.06	–	0.70	–	–	0.84	1.34	1.57
Sweden . .	–	0.43	−0.04	–	0.57	−0.03	–	0.81	0.93	1.97

* The estimated equations were specified as follows: $Bop = \alpha\ Un + \beta\ Un_{-1} + \chi\ Rex_{-1} + \epsilon\ Int_{us} + \phi\ dy_{oecd} + \gamma\ doil + \lambda\ Tot + \eta\ Dum$, where *Bop* = current balance of payments as a percentage of GDP; *Un* = rate of unemployment; *Rex* = real effective exchange rate, based on unit labour costs (for Denmark, current first difference); Int_{us} = US long-term interest rate; dy_{oecd} = percentage change in GDP, average for OECD countries (for Denmark, Norway and Iceland less percentage change in domestic demand); *doil* = percentage change in price of oil (for Norway and Iceland the level of oil prices); and *Tot* = terms of trade. Estimates for Finland also include dummy variable (–1 for 1981 and 1 for 1989–90 and otherwise 0) with a coefficient of −2.75. All coefficients are stastically significant (95 or 99%) and all equations were estimated with the intercept term suppressed.

Annex Table 3

Structural unemployment: wage equations[1]

Countries	dpc	dpc_{-1}	dw_{-1}	Un	Un_{-1}	dq	R^2	S.E.	DW	F-test
Denmark . .	0.62	–	0.15	–	−1.53	0.24	0.85	1.51	0.28	–
	0.71	–	0.29	–	−1.03	0.30	0.51	1.62	1.75	6.35*
Norway . . .	0.62	–	0.16	– 2.88	–	0.30	0.78	1.83	0.49	–
	0.77	–	0.23	– 2.13	–	0.45	0.47	1.87	1.85	2.44**
Iceland . . .	0.67	–	0.08	−11.40	8.19	0.62	0.87	7.27	−0.10	–
	0.73	–	0.27	– 6.89	6.89	1.15	0.49	7.75	2.12	3.69*
Finland . . .	0.92	−0.33	0.35	– 4.48	3.03	0.13	0.83	2.23	−0.03	–
	1.00	−0.36	0.36	– 4.36	3.05	0.17	0.47	2.17	2.16	0.32**
Sweden . . .	0.53	−0.28	0.42	– 4.47	3.16	–	0.67	1.88	0.00	–
	0.64	−0.31	0.67	– 4.71	4.71	–	0.51	2.01	2.04	2.77*
Memo:										
United States	*0.51*	*−0.23*	*0.31*	*– 2.18*	*–*	*0.45*	*0.84*	*0.80*	*−0.94*	
	0.51	*−0.20*	*0.29*	*– 1.98*	*–*	*0.43*	*0.59*	*0.79*	*2.09*	*2.25***
Germany[2] . .	*0.71*	*–*	*0.16*	*– 3.87*	*−2.40*	*0.26*	*0.85*	*1.64*	*0.70*	
. . . . .	*0.81*	*–*	*0.19*	*– 4.00*	*−2.69*	*0.31*	*0.87*	*1.62*	*1.91*	*0.35***

[1] Wage equations estimated as: $dw = \phi + \varphi\, dpc + (1 - \varphi - \eta)\, dpc_{-1} + \eta\, dw_{-1} + \beta\, Un + \beta\alpha\, Un_{-1} + \kappa\, dq$, where dw = percentage change in compensation per employee; dpc = percentage change in consumer prices; Un = rate of unemployment in logs and dq = rate of productivity growth, total economy. * Homogeneity condition rejected at 95%, but not at 99%. ** Homogeneity condition not rejected at either 95 or 99%. For equations including the lagged dependent variable, Durbin's h-statistic rather than the DW-statistic is shown. [2] Includes a dummy variable for 1991–92 (−0.5, 1).

Annex Table 4

Consumer price equations[1]

Countries	Gap	Gap_{-1}	dulc	dpc_{-1}	dpm	R^2	S.E.	DW	F-test
Denmark . .	0.23	–	0.23	0.44	0.17	0.94	0.99	0.98	–
	0.23	–	0.29	0.57	0.14	0.66	1.12	1.69	0.92**
Norway . . .	–	–	0.39	0.33	0.16	0.81	1.34	−1.11	–
	–	–	0.40	0.43	0.17	0.59	1.36	2.45	2.24**
Iceland . . .	0.25	–	0.29	0.18	0.51	0.95	4.18	−0.65	–
	0.23	–	0.30	0.19	0.51	0.91	4.11	2.22	0.14**
Finland . . .	–	0.14	0.15	0.50	0.21	0.97	0.89	0.77	–
	–	0.09	0.15	0.63	0.22	0.82	1.07	1.46	7.81*
Sweden . . .	–	0.13	0.31	0.41	0.13	0.76	1.67	−1.77	–
	–	0.05	0.37	0.50	0.13	0.59	1.69	2.58	1.97**
Memo:									
United States[2]	–	*0.21*	*0.41*	*0.37*	*0.06*	*0.95*	*0.54*	*−0.14*	
	–	*0.24*	*0.56*	*0.40*	*0.04*	*0.83*	*0.59*	*2.00*	*6.65***
Germany[3] . .	*0.22*	–	*0.15*	*0.62*	*0.08*	*0.85*	*0.71*	*1.00*	
	0.24	–	*0.17*	*0.76*	*0.07*	*0.60*	*0.75*	*1.57*	*4.05***

[1] Consumer prices equation estimated as: $dpc = \nu + \delta_1 Gap + \delta_2 Gap_{-1} + \mu\ dulc + \lambda\ dpc_{-1} + \omega\ dpm$, where *dpc* = changes in consumer prices, *Gap* = output gap, *dulc* = changes in unit labour costs (for the United States, changes in compensation per employee), *dpm* = changes in import prices. Lags of *dulc*, and *dpm* were also included but, except for the United States were not significant. * Homogeneity condition rejected at 95%, but not at 99%. ** Homogeneity condition not rejected at either 95 or 99%. For equations including the lagged dependent variable, Durbin's h-statistic rather than the DW-statistic is shown. [2] Coefficient with respect *dulc* is the sum of coefficients with respect the current and 2-year lagged changes in compensation per employee and that with respect to *dpm* the sum of coefficients with respect to current and 1-year lagged values. Equation also includes a dummy variable for the price and wage controls in the early 1970s. [3] Equation also includes a dummy variable for 1991–92 (–0.5, 1).

Annex Table 5

Employment adjustment equations*

Countries	dy	dy_{-1}	drw	drw_{-1}	dem_{-1}	R^2	S.E.	DW
Denmark . . .	0.36	0.29	−0.16	−0.20	0.00	0.68	0.75	1.90
Norway . . .	0.29	0.21	−0.07	−0.04	0.48	0.57	0.94	0.90
Iceland	0.49	–	−0.07	−0.03	0.00	0.39	1.63	2.03
Finland	0.30	0.39	−0.03	−0.08	0.00	0.67	1.36	1.17
Sweden	0.45	–	−0.18	–	0.52	0.55	1.10	0.65
Memo:								
United States .	*0.51*	*0.23*	*−0.25*	*−0.19*	*0.00*	*0.70*	*0.70*	*1.60*
Germany . . .	*0.45*	–	*−0.14*	–	*0.38*	*0.63*	*0.83*	*1.90*

* Employment adjustment equation estimated as: $dem = \xi + \pi_1\, dy + \pi_2\, dy_{-1} + \sigma_1\, drw + \sigma_2\, drw_{-1} + \rho\, dem_{-1}$, where *dem* = changes in employment, *dy* = change in real output (GDP), *drw* = changes in real labour costs. For equations including the lagged dependent variable, Durbin's h-statistic rather than the DW-statistic is shown.

Annex Table 6

Unemployment: testing hysteresis*

Annual data, 1962–96

Countries	Constant	Un_{-1}	Un_{-2}	R^2	H-stat.	F-test
Denmark . .	0.44	1.31	−0.36	0.94	0.54	1.82
Norway . . .	0.28	1.40	−0.49	0.91	2.28	2.94
Iceland	0.17	1.33	−0.44	0.86	0.75	1.78
Finland	0.63	1.66	−0.76	0.94	3.57	4.58
Sweden . . .	0.34	1.50	−0.59	0.90	0.89	1.52
Memo:						
United States .	*1.66*	*1.04*	*−0.32*	*0.65*	*3.18*	*6.63*
Germany . . .	*0.23*	*1.45*	*−0.46*	*0.96*	*2.82*	*0.25*

* Equation estimated as: $Un = \alpha + \beta\, Un_{-1} + \chi\, Un_{-2}$, where *Un* = rate of unemployment. The last column tests the hypothesis that $\beta + \chi = 1$; critical values for rejection: 4.15 (95%) and 7.50 (99%).

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Monetary policy issues in the Nordic countries after 1992

Stefan Gerlach*

Introduction

The turmoil in European foreign exchange markets in 1992–93 had a large impact on monetary policy in the Nordic countries. Following double-digit inflation in the early 1980s, monetary policy had, as elsewhere in Europe, increasingly been geared to reducing inflation to levels similar to those experienced in Germany. A central element of this strategy was a gradual hardening of the exchange rate regime. This hardening took two forms. First, policy-makers had sought to avoid devaluations of the Nordic currencies. Thus, Sweden and Denmark had maintained their exchange rate parities since 1982, and Norway since 1986. Before the devaluation in November 1991, which served as a precursor to the events of 1992, the Finnish markka had also remained stable for almost a decade, having last been devalued in 1982 (and revalued in 1989).[1] In Iceland, where inflation averaged 40% per year in the 1980s, the authorities had maintained the exchange rate parity since December 1989, which was the longest period of exchange rate stability experienced since the early 1970s. The second element was the shift from pegging to trade-weighted currency baskets to pegging to the ECU, which imposed a tighter constraint on policy. While Denmark was a founding member of the ERM and thus had pegged to the ECU for more than 10 years, Norway introduced unilateral pegs to the ECU in October 1991, followed by Sweden in May 1991 and Finland in June 1991. In Iceland policy-makers were also contemplating the introduction of a unilateral ECU peg.[2]

The events of 1992 changed all this. The storm first reached Finland,

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[1] In addition, the markka was also adjusted twice within the fluctuation margins in the 1980s. See Lehmussaari et al. (1994).

[2] See Gudmundsson (1994b), p. 137.

which abandoned its ECU peg and let the currency float in September 1992, followed by Sweden in November and Norway in December. In response to the worsening of the Icelandic competitiveness of these and other depreciations in Europe, the Icelandic króna was devalued in November 1992. A further devaluation was undertaken in June 1993 in response to the macroeconomic effects of an expected reduction in the fish catch. However, the central parity and the fluctuation band were maintained. While Denmark maintained its ECU parity, the band width was increased in the generalised broadening of the fluctuation margins in the ERM in August 1993.

While the Swedish krona, the Norwegian krone and the Finnish markka all were floated, the role of the exchange rate in the design of monetary policy soon came to differ sharply in the three countries. After a brief depreciation, the Norwegian krone stabilised in a narrow band immediately below its previous ECU parity, and policy was increasingly geared towards maintaining it at this level. In Sweden and Finland, after sharp depreciations of the krona and markka, the central banks adopted inflation targets in early 1993. The subsequent appreciation of the Finnish markka enabled the currency to join the ERM in October 1996. Thus, by the spring of 1997, the exchange rate once again played the role of nominal anchor for policy in Denmark, Iceland, Norway, and in Finland, where ERM membership is combined with a quantitative inflation target. Only in Sweden is policy geared directly to the ultimate goal of price stability through the use of a quantitative inflation target without the guidance of an intermediate objective.

This paper provides an overview of three factors that have had a fundamental impact on monetary policy in the Nordic countries since 1992: the state of macroeconomic conditions in the early 1990s, the changes in overall framework of monetary policy after 1992, and the shifts in credibility experienced since the exchange market turmoil. It is organised as follows. Section 1 reviews the *macroeconomic conditions* in the area in the early 1990s. The section argues that the size of the macroeconomic imbalances differed quite substantially between the Nordic countries, and that policy-makers' ability to withstand the speculative pressures against the exchange rates was much more limited in those countries in which the imbalances were more severe. The section also argues that the options open to policy-makers following the floating of the currencies depended on macroeconomic conditions.

Section 2 reviews changes in the *monetary policy framework* in the Nordic area after 1992. The section compares the inflation targets adopted in Sweden and Finland in 1993, and then turns to Norway, Iceland and Denmark. The section also compares some structural aspects of the Nordic countries with eleven other small and medium-sized economies. While there are some differences between them, the Nordic countries are on average somewhat less open than the other countries, their exports are less diversified, and they have experienced larger external shocks. Furthermore, output fluctuations in the Nordic area tend to be less correlated with cyclical fluctuations elsewhere. These factors illustrate the problems experienced by the authorities in conducting monetary and exchange rate policy in the early 1990s.

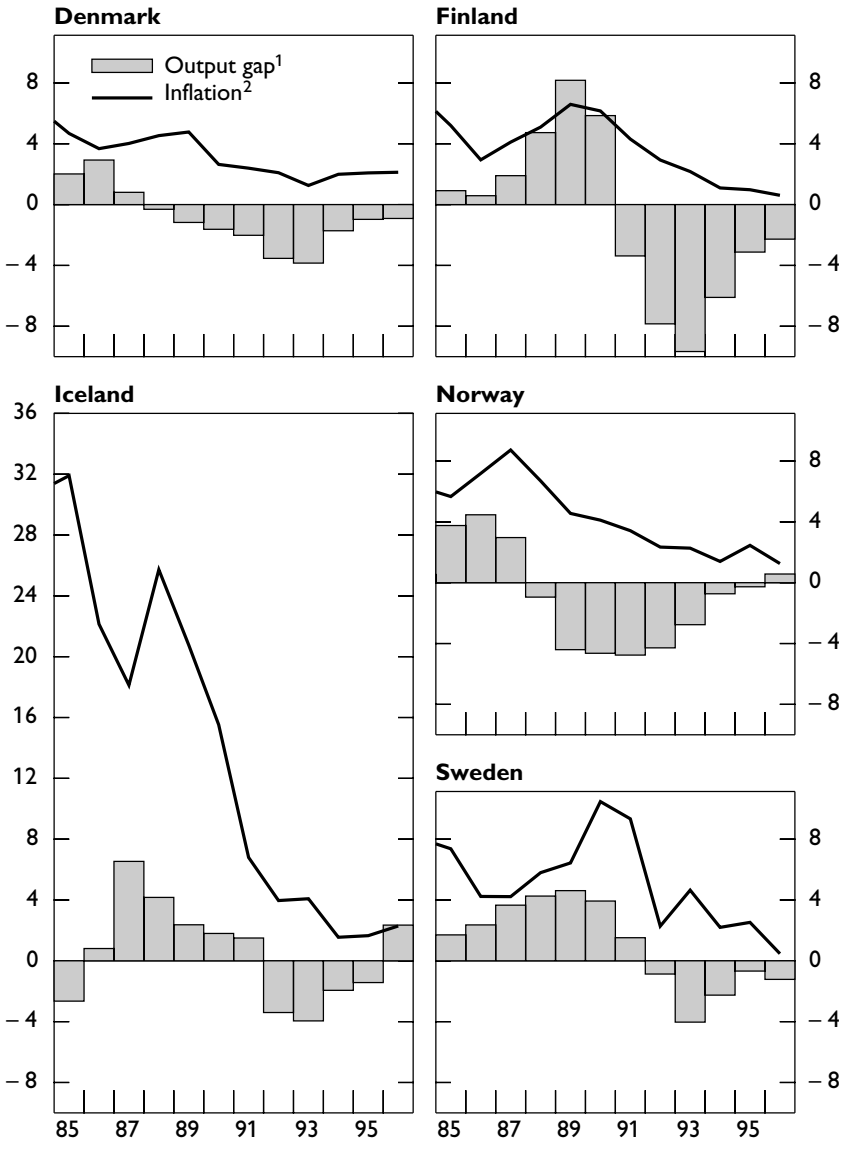
The central policy question in the Nordic countries following the exchange market turmoil in 1992–93 was how to conduct policy in an environment of large shifts in the public's perception of the *credibility of monetary policy*. Section 3 contains a brief review of the credibility of the exchange rate objectives in the Nordic countries in the 1992–93 period, and provides some evidence of changes in short-run inflation expectations since 1990. These suggest that the Finnish and Swedish inflation targets are both seen as credible in the near term. The section also reviews the behaviour of spreads between 10-year yields in the Nordic countries and Germany, and provides some simple econometric estimates suggesting that domestic inflation and growth of industrial production, which may be indicators of future inflation pressures, have influenced the spreads over German rates.

1. The Nordic countries and the exchange market events of 1992

A striking aspect of the foreign exchange markets events of 1992 and 1993 is that the Nordic countries were affected to such varying degrees. While Denmark managed to endure the episode with no change of its monetary policy framework and with an unaltered central parity, Finland and Sweden were quickly forced to let their currencies float, and policy-makers in both countries felt that the imbalances were too large to permit the adoption of new exchange rate commitments immediately after the floating of the currencies. In Norway and Iceland, the authorities

Figure 1

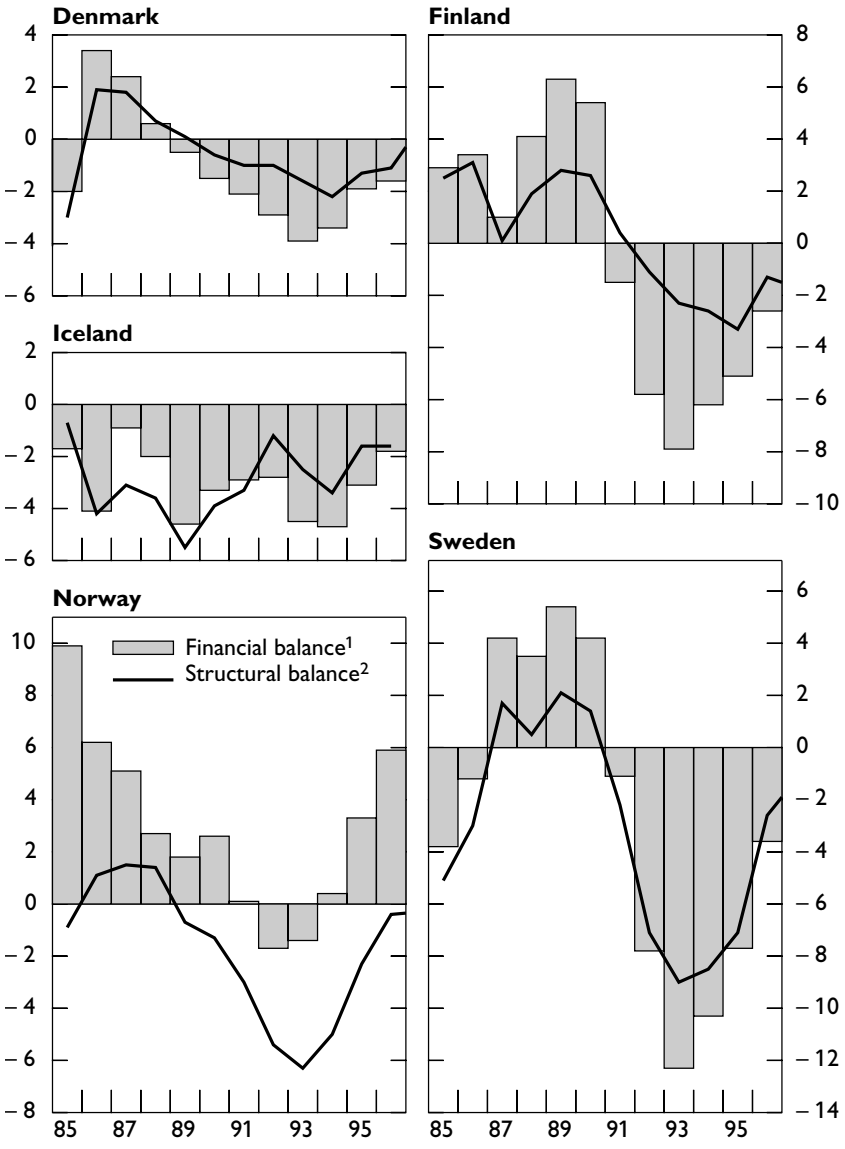
Output gap and inflation



[1] As a percentage of potential GDP. [2] Annual average percentage change in consumer prices.

Sources: OECD Economic Outlook, national data and BIS calculations.

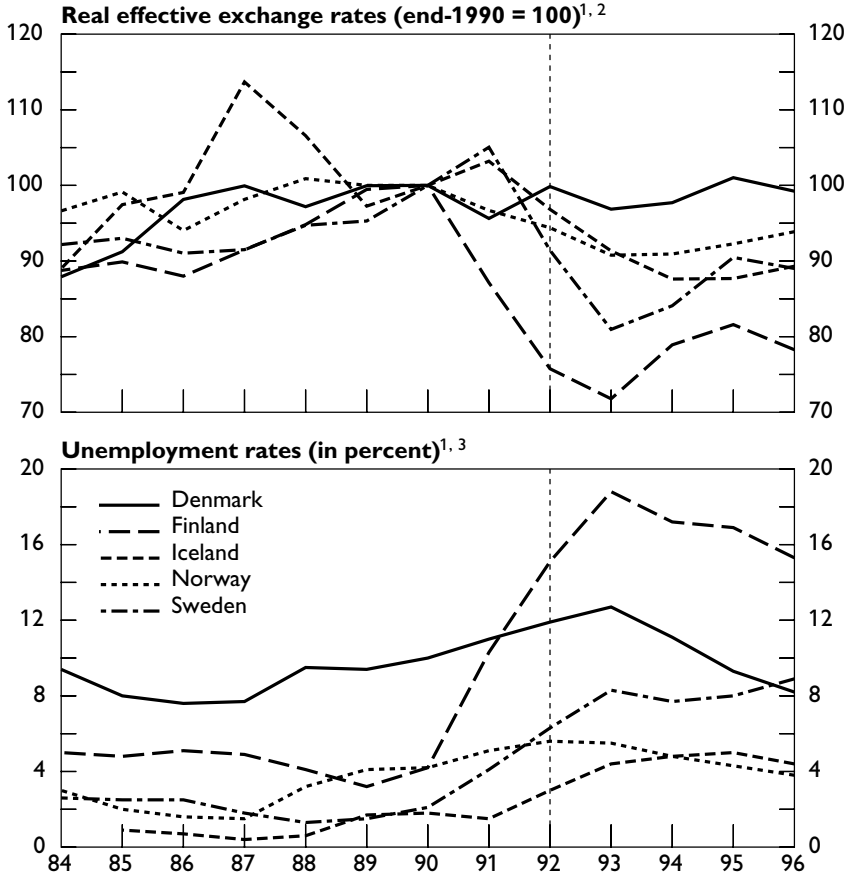
Figure 2
Fiscal balances



[1] As a percentage of nominal GDP. [2] As a percentage of potential GDP.
Source: OECD Economic Outlook.

Figure 3

Real effective exchange rate and unemployment



[1] At end-year. [2] In terms of relative consumer prices. [3] National definitions.

Sources: IMF, national data and BIS calculations.

were able to maintain exchange rate stability as the central component of policy, although in Norway a formal peg and announced fluctuation margins were abandoned. These differences in the extent of the pressures on the exchange rates and the options open to policy-makers were, to a large extent, determined by the macroeconomic conditions in the Nordic countries in the early 1990s (Figures 1–3).

1.1 Macroeconomic imbalances

As is also discussed in the companion piece, macroeconomic developments in *Finland* and *Sweden* in the early 1990s were dramatic.[3] Following financial liberalisation and accommodative monetary and fiscal policies during the 1980s, both countries experienced rapid credit growth, a sharp upswing in asset prices and very rapid output growth in the late 1980s. The collapse of exports to the former Soviet Union and a terms-of-trade shock stemming from weakness in world market for forestry products caused a severe recession in Finland in 1991. External developments, reinforced by weak domestic demand, also led to a recession in Sweden.[4] As a consequence, unemployment surged in both countries, rising between 1990 and 1993 from 3.5 to 17.9% in Finland and from 1.6 to 8.2% in Sweden.[5] The sharp recession also led to large general government budget deficits, which in 1993 reached 8.0% of GDP in Finland and 12.3% in Sweden. While these deficits reflected the weakness of activity, structural budget deficits also rose, reaching 2.5% in Finland and 8.8% in Sweden by 1993.

An important factor explaining the depth of the recession in Finland and Sweden was the banking crises both countries underwent in the early 1990s. The rapid increase in credit exposures of banks in the 1980s, which was caused by a combination of financial market liberalisation and fiscal and monetary policies that in retrospect were insufficiently restrictive, led to an increase in the vulnerability of the financial sector to macroeconomic shocks. The combination of worldwide economic slowdown, coupled with increases in real after-tax interest rates – stemming from higher interest rates (which were necessary to maintain exchange stability following the tightening of German monetary policy after unification), reductions in marginal tax rates and in the deductibility of interest payments, and lower inflation – led to dramatic increases in corporate bankruptcies and heavy loan losses in the banking sector, and to sharp falls in equity and real estate prices. This triggered reductions in consumption

[3] Svensson (1994) reviews the causes of the exchange rate crises in 1992–93.

[4] Deputy Governor Heikensten has argued that the generalised realignment of economic policy in Sweden in the early 1990s – the combination of disinflation, tax reform and measures to improve government finances – played an important role in triggering the crisis in the Swedish economy. See Heikensten (1996).

[5] These (and other) statistics refer to open unemployment. Total unemployment, which includes those participating in labour market programmes, would probably be a more useful indicator.

and corporate investment and extraordinary drops in activity in both countries in the early 1990s.

In Finland, the recession was also exacerbated by the fact that firms and households had large debts denominated in foreign currency. The devaluation of the Finnish markka in 1991 and the subsequent depreciation in 1992 thus led to sharp increases in the real debt burden, which depressed activity.

Although *Norway* underwent the same process of financial liberalisation, credit expansion, asset price boom, banking crisis and overheating, macroeconomic conditions in 1992 were clearly better than in Finland and Sweden. One reason for this was that the deterioration in economic conditions in Norway occurred already in 1987, partially in response to the sharp decline in oil prices in 1986 and the onset of weakness in the banking sector. Thus, the Norwegian economy had already had some time to adjust when external economic conditions worsened in the early 1990s. By 1992, the output gap was large but closing, and the unemployment rate had remained between 5 and 6% between 1990 and 1993, that is, far below rates in Denmark, Finland and Sweden. Moreover, the real exchange of the krone had been depreciating somewhat since 1988.

Macroeconomic conditions in *Denmark* in 1992 were, relative to the other Nordic countries, quite good. While Finland, Norway and Sweden experienced rapid credit growth and sharp increases in prices for residential and commercial real estate in the 1980s, credit growth and the upswing in real estate prices were more modest in Denmark.[6] Moreover, the supervision and regulation of financial institutions had arguably been comparatively tighter and banks had a stronger capital cushion.[7] As a consequence, Danish banks were better able to withstand the credit losses experienced, and weakness in the financial sector created much less of an "overhang" for monetary policy in the early 1990s. The fiscal situation was also stronger in Denmark. In particular, fiscal policy had been tightened in the mid-1980s, and the structural budget deficit was comparatively small in 1992. Thus, when the turmoil in the foreign exchange markets arose in 1992, macroeconomic conditions in Denmark were stronger than in the other Nordic countries.

[6] For a discussion of the episode of financial deregulation, credit growth and asset price fluctuations observed in many OECD countries in the 1980s and early 1990s, see Borio et al. (1994).

[7] Koskenkylä (1994) and Drees and Pazarbasioglu (1995) discuss the Nordic banking crisis.

Iceland also experienced a recession in 1992. While several factors played a role, the main causal factor was the poor fish catch in 1991 – fish being the by far most important export good of Iceland – combined with a second poor catch in 1992 and worsening terms of trade. The tight monetary policy required to support the disinflation program and the hardening of the exchange rate objective which was undertaken in 1989 may also have played a role, as did efforts to reduce the large structural fiscal deficit. Thus, by 1992 Iceland experienced an output gap of almost 4% and rising, albeit still low, unemployment. The fact that cod quotas were being cut back also generated expectations that real output would remain weak in 1993.

1.2 Implications for speculative pressures and policy options

The macroeconomic conditions had an important influence on the countries' ability to cope with the foreign exchange turmoil that started in 1992.[8] With large output gaps, fragile banking system, and weak public finances, the monetary authorities had little scope to raise short-term interest rate for any length of time to defend the exchange rate objectives against speculative capital movements. These constraints were naturally tightest in countries where macroeconomic imbalances were most pronounced, a fact that was not overlooked by financial markets. When speculative pressures gathered across a broad range of European exchange rates after the Danish rejection of the Maastricht treaty in June of 1992 and in advance of the French referendum on the treaty in September, currencies with weaker fundamentals were particularly exposed.[9] Consequently, exchange rate arrangements were changed first in countries with weaker fundamentals: Finland, which had devalued the markka in late 1991, abandoned its unilateral ECU parity already in early September 1992, followed by Sweden and Norway some months later. The Icelandic króna was devalued in November 1992 and June 1993. By contrast, the Danish krone survived a number episodes of speculative outflows, before the broadening of the fluctuation margins in the ERM in August 1993.

[8] See Gudmundsson (1994a).

[9] For instance, the average spread of 10-year yields against Germany during the first five months of 1992 were 68 basis points (b.p.) for Denmark, 138 b.p. for Norway, 147 b.p. for Sweden and 357 b.p. for Finland. By the end of August, the spreads had risen to 153 b.p. for Denmark, 179 b.p. for Norway, 305 b.p. for Sweden and 484 b.p. for Finland.

The macroeconomic imbalances also played a role in determining what policy options were open to the authorities. Denmark and Iceland, where conditions were relatively good, were able to maintain explicit exchange rate objectives as keystones of the monetary policy framework. In Norway, where conditions were less favourable, the authorities initially let the currency float freely, but soon started to conduct policy to maintain the exchange in trading range just below the old parity. By contrast, in Finland and Sweden where macroeconomic imbalances were pronounced, policy-makers probably had little choice but to let the currencies float freely.

2. The framework of monetary policy after 1992

Intermediate exchange rate objectives have historically played an important role in the conduct of monetary policy in the Nordic countries.[10] Indeed, all five Nordic countries did employ such objectives before the events of 1992. However, by early 1993, Finland and Sweden had abandoned the use of intermediate objectives, and instead geared policy directly to the final objective of price stability, using numerical inflation targets. Norway had also relinquished its intermediate exchange rate objective but continued to gear policy to maintaining stability of the exchange rate. Only in Denmark and Iceland have quantitative intermediate exchange rate targets remained the cornerstone of policy. In October 1996, however, Finland joined the wide-band ERM, and policy is now conducted using an inflation targets, while the exchange rate is seen as an additional constraint on policy. This section discusses in greater detail the monetary policy frameworks in the Nordic countries since 1992.

2.1 The design of inflation targets in Finland and Sweden

Following the abandonment of the unilateral ECU parities in Finland and Sweden in the autumn of 1992, policy was initially conducted in an eclectic manner, although both central banks noted that price stability would

[10] Gylfason (1990) discusses exchange rate policy in the Nordic countries in the 1970s and 1980s.

remain the main focus of policy. Subsequently in January 1993 the Riksbank, and in February 1993 the Bank of Finland, adopted numerical inflation targets as guides to monetary policy. While the two central banks adopted the inflation targets on their own accord, both governments soon announced their support for the new policy framework.

The inflation targeting strategies in the two countries are similar in several regards (Table 1). Both central banks target two percent inflation, which is the target adopted in Canada in 1991, but less restrictive than the 0–2% band adopted in New Zealand in 1990.[11] It is also similar to what many observers believe is the operational definition of price stability in Germany, which has served as a reference country for monetary co-operation in Europe. Furthermore, in Sweden and Finland the targets applied from 1995 onwards. The reason for this delay was that since monetary policy only affects prices with a lag of a year or two, it would be unable to prevent the substantial depreciation of the krona and markka that took place before the targets were announced in 1993 from increasing near-term inflation.

Despite these similarities, interesting differences remain. First, the Riksbank adopted a tolerance band of ±1% on the grounds that it is difficult to control inflation precisely by monetary policy; in contrast, the Bank of Finland did not announce such a band based on the concern that the public could incorrectly come to perceive the upper limit of any range as the effective target.[12] However, under the current arrangement with a point target, it is clear that the inflation rate will virtually always deviate from the target, which potentially could have credibility effects.

Secondly, the two central banks made different choices regarding whether to target headline or underlying inflation, and whether to pre-announce the conditions under which deviations from the targets would be acceptable. In Sweden, the target applies to headline CPI inflation, but the authorities have indicated that if major changes in taxes and subsidies are introduced, or if large unforeseen external price shocks occur the inflation rate may deviate from the target.[13] By contrast, in Finland the

[11] The band in New Zealand was changed to 0–3% in 1996 in order to reduce the risk of excessive activism that can arise if the targeted range is too narrow.

[12] An additional reason for why a band was not announced was that the optimal choice of band width depends on the nature of the economic disturbances affecting the economy. Since these are not known in advance, it was difficult to determine an appropriate band width.

[13] See Bäckström (1994).

Table 1
Monetary policy framework

	Denmark	Finland	Iceland	Norway	Sweden
Intermediate exchange rate target	ERM member since 1979. Since 1987, the central parity against the most stable ERM currencies has been unchanged	ERM member since October 1997	Against trade-weighted basket since December 1989. (ECU, US$ and yen basket until September 1995)	Exchange rate stability is the operational target of policy. The ECU exchange rate is maintained in a narrow band just below the pre-1992 parity	No
Band width	± 15% since August 1993 (± 2.25% earlier)	± 15%	± 6% since September 1995 (± 2.25% earlier)	No fluctuation margins, but policy will be used to guide the exchange rate back to the initial range if shocks occur	–
Numerical inflation objective	No	Adopted in February 1993; applicable since 1995	No	No	Adopted in January 1993; applicable since 1995
Target range	–	2%, no band	–	–	2%, ± 1% tolerance interval
Price measure	–	Underlying inflation (calculated by the CPI, excluding indirect taxes, subsides and house prices and mortgage interest payments)	–	–	Headline CPI
Caveats	–	No	–	–	Normally not, except in the event of "major changes" in taxes and subsidies or large unforeseen external price shocks
Set by	–	Central bank	–	–	Central bank

inflation target pertains to underlying inflation, which is calculated by excluding indirect taxes, subsides, house prices and mortgage interest payments from the CPI, and no caveats have been announced.[14]

Thus, the Riksbank has adopted the same approach as the Bank of Canada, that is, to target headline inflation, which may be more difficult to control than underlying inflation, but to announce in advance the conditions under which a breach of the inflation target would be justifiable. In Finland, the approach is similar to that of adopted in New Zealand in that underlying inflation rate is targeted which is less sensitive to shocks and therefore more controllable, but with no, or fewer, caveats.[15]

A third difference between the policy frameworks in the two countries arises from the fact that Finland joined the ERM in October 1996, and thus combines the inflation target with membership in the ERM.[16] This raises the possibility that the external and internal policy objectives could come into conflict. However, in light of the ±15% fluctuation margins in the ERM and as long as the narrow fluctuation margins are not reintroduced, this is unlikely.

2.2 Exchange rate policy in Norway

Following the abandonment of the unilateral peg in December 1992 and the initial depreciation of the krone by some 6% against the ECU, monetary policy in Norway continued to be geared towards maintaining a stable exchange rate against European currencies. In early 1993, the krone appreciated to a level about 3% below the former parity and has since, with the exception of the period in late 1996–early 1997, remained 2–5% below the previous parity. Thus, the Bank of Norway has effectively operated with an intermediate exchange rate objective. Even so, there are two differences against the earlier unilateral ECU parity.

First, while the Bank of Norway has declared that exchange rate stability is a central element in the monetary policy framework, it has not defined precisely what that implies. In particular, no new parity or fluctuation margins have been declared. Second, although there is no band, the

[14] The Finnish inflation target is discussed in Pikkarainen and Tyrväinen (1993) and in Pikkarainen (1996).

[15] The absence of a band in Finland is in this regard notable in that it would provide the authorities with some leeway if unexpected price changes occurred.

[16] In this regard, the Finnish system resembles that of Spain.

authorities have indicated that if large shocks to the exchange rate were to occur, monetary policy will be geared to returning the exchange rate gradually to its initial range. Thus, the authorities are not willing to defend the past trading range with interest rate increases and intervention to the same extent they were in the autumn of 1992. Indeed, the intention behind the decision not to announce at what points policy adjustments would be made seems to have been to reduce the risk that market participants might test the exchange rate objective, and thus to avoid having to take strong policy measures to defend it.

The intended operation of this system was recently illustrated following the appreciation of the krone which started in late 1996. As the appreciation continued and the exchange rate reached a level about 4% above its pre-1992 ECU parity, policy-controlled interest rates were reduced in early January, and eventually guided the exchange rate back into its earlier trading range.

2.3 Exchange rate objectives in Denmark and Iceland

In contrast to Norway, Denmark and Iceland have maintained explicit intermediate exchange rate targets. In Denmark the exchange rate objective arises from the long-standing membership of the ERM. While the ECU parity was unaffected by the exchange rate turmoil in 1992–93, the krone depreciated rapidly by about 9% against the DM following the widening of the fluctuation margins in the ERM to ±15% in August 1993. Since late 1993, however, the currency has remained within the former intervention limits, except during a brief period in 1995. While the authorities have not stated that they intend to maintain the exchange rate within the old narrow band, the behaviour of the krone since 1993 suggests that this may have been an objective of policy.

Since 1989, the Central Bank of Iceland has used an intermediate exchange rate objective as the cornerstone for its disinflation policy.[17] However, in light of Iceland's large exposure to external disturbances, the authorities seem willing to offset such shocks by nominal exchange rate adjustments. In contrast to the pre-1989 pattern, the frequency of exchange rate adjustment has been curtailed sharply, and exchange rate

[17] Icelandic exchange rate policy is discussed in Gudmundsson (1994b) and Guðnason (1996).

policy is no longer used to accommodate internal disturbances. Thus, before the 6% devaluation in November 1992, which was undertaken largely in response to the competitive effects of the exchange rate depreciations in Europe, the Icelandic króna experienced almost three years of stability, after having been devalued thirteen times in 1988–89.

A second exchange rate adjustment took place in June 1993, when the króna was devalued by 7.5%. The driving factor in this case was the reduction in the allowable fish catches for the year 1993/94, which was expected to lead to a fall in the real value of the fish catches which in turn would exert a dampening effect on the real economy and justify a real depreciation.

Another major development for Icelandic exchange rate policy was the establishment in May 1993 of an interbank market for foreign exchange, which was rendered necessary by the liberalisation of financial markets and the deregulation of international capital flows. Whereas the central bank earlier had quoted an exchange rate based on the desired level of the exchange rate basket, which was used by the four commercial banks in their transactions with customers, the exchange rate is now determined by the central bank together with the commercial banks at a fixing session every morning on the basis of interbank transactions. This system permits market forces to have a direct impact on the exchange rate and allows it to deviate from the central rate; the authorities therefore announced the establishment of an exchange band of ±2.25%, that is, the same width as in the ERM at that time.

In September 1995, the exchange rate band was broadened to ±6%. By doing so, the central bank increased its ability to respond to external disturbances of a temporary nature, without being forced to adjust the central rate which increasingly is seen as the anchor for monetary policy. Furthermore, the liberalisation and growth of Icelandic financial markets increased the potential pressure that could be brought to bear on the exchange rate parity. By widening the band, an element of two-way risk was also introduced which enhanced the authorities' ability to deal with speculative pressures. The exchange rate has remained stable within the old narrow band.

2.4 International comparisons

In considering the challenges faced by monetary policy-makers, it is informative to compare the structures of the Nordic economies with those of

other countries. Such a comparison can also be useful in considering the strength and weaknesses of possible alternative monetary policy frameworks. This subsection uses data for a group of eleven countries – Australia, Austria, Belgium, Canada, Ireland, Luxembourg, the Netherlands, New Zealand, Portugal, Spain and Switzerland – to explore these issues.[18] It should be emphasised that the economies in this group are heterogeneous. However, the considerations faced by the authorities in these countries in designing an appropriate policy framework, in particular determining the appropriate degree of exchange rate flexibility, are similar to those faced by the Nordic central banks.[19]

Openness

An important factor influencing the choice of policy framework and the degree of exchange rate flexibility is the exposure to foreign trade. In very open economies, prices and wages tend to be more directly influenced by the exchange rate, implying that exchange rate changes have relatively little impact on relative prices. Since the benefits of nominal exchange rate flexibility thus is lower in highly open economies and policy-makers in such countries frequently conduct monetary policy using intermediate exchange rate targets, it is of relevance to consider how open the Nordic countries are.

Figure 4 shows the ratio of exports to GDP, which is commonly used to gauge the extent to which an economy is exposed to trade, in 1993 for the Nordic countries. For comparison purposes, the figure also shows averages for the Nordic and non-Nordic countries. Since the non-Nordic countries use different policy frameworks, averages are also shown for countries that target inflation (Australia, Canada, New Zealand and Spain) and countries that are members of the ERM (Austria, Belgium, Ireland, Luxembourg, the Netherlands, Portugal and Spain).[20] The figure illustrates that the export/GDP ratio is quite similar among the Nordic countries and that on average the Nordic countries are about as open as the

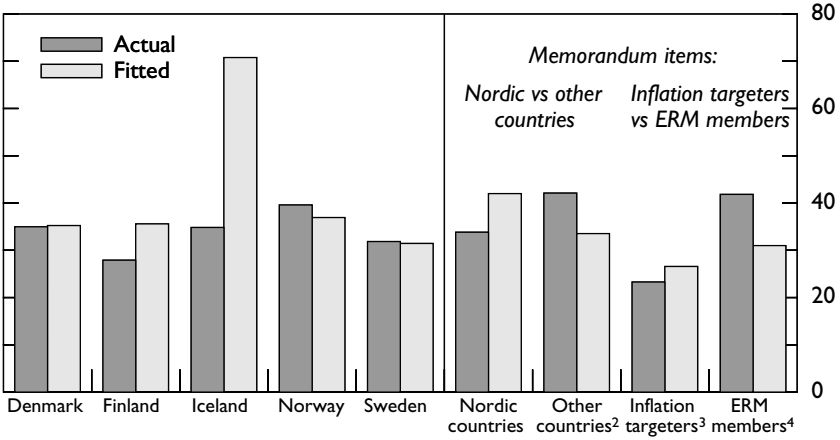
[18] The reason for including Luxembourg in the sample is that it is the only economy with approximately the same size as Iceland.

[19] While other medium-sized economies, e.g. Italy and the United Kingdom, could be included in the control group, they are much larger than the Nordic countries (and, as measured by real GDP, are about twice as large as Canada and Spain), and were therefore not considered. This, of course, is an arbitrary choice.

[20] Since monetary policy in Spain is conducted using both inflation and intermediate exchange rate targets, Spain is in both subgroups.

Figure 4

Export/GDP ratio[1]



[1] As a percentage; average of annual ratios (1980–92), in nominal terms. For country groups, simple arithmetic mean. [2] Australia, Austria, Belgium, Canada, Ireland, Luxembourg, the Netherlands, New Zealand, Portugal, Spain and Switzerland. [3] Except Finland and Sweden. [4] Current ERM participants, except Finland.

Sources: IMF, OECD, national data and BIS estimates.

non-Nordic countries. One interesting difference that is apparent is that countries that target inflation are, by this measure, relatively less exposed to trade.

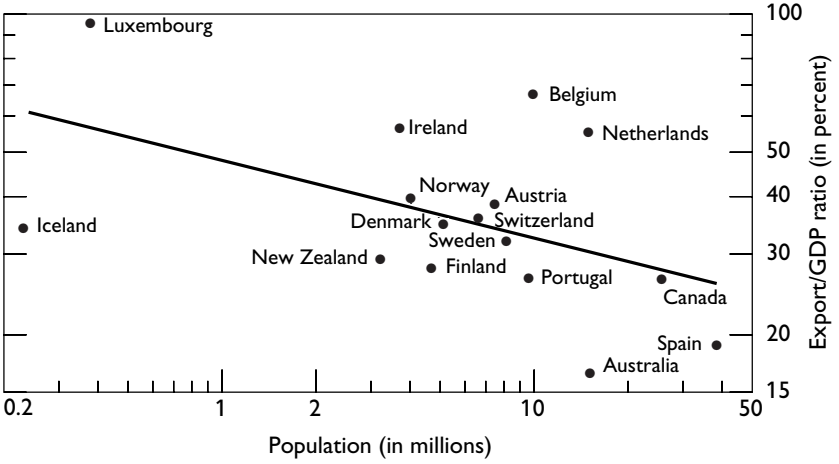
However and as evidenced by Figure 5, since smaller countries tend to be more open, it is difficult to use the export/GDP ratio to compare the openness of countries of as different size as those considered here. As suggested by Krugman (1991), it is useful to adjust the export/GDP ratio for population size.[21] The adjusted export/GDP ratios are quite interesting. First, as noted by Krugman (1991) and Gudmundsson (1994b), Iceland is much less open than one would have expected given its small population. Furthermore, on average, the Nordic countries are somewhat less open than one would have expected. More interesting, however, is

[21] The adjusted export/GDP ratio, which indicates the export/GDP ratio that would have been expected on the basis of population size, is given by the fitted value from the regression:

log (Export/GDP) = 3.87–0.17 log (Population) + error

where the t-statistics on the constant and the slope are 23.2 and 2.2 respectively, and the R-squared 0.20.

Figure 5
Export/GDP ratio and population
1980–92 average (logarithmic scales)



Sources: IMF, OECD and national data.

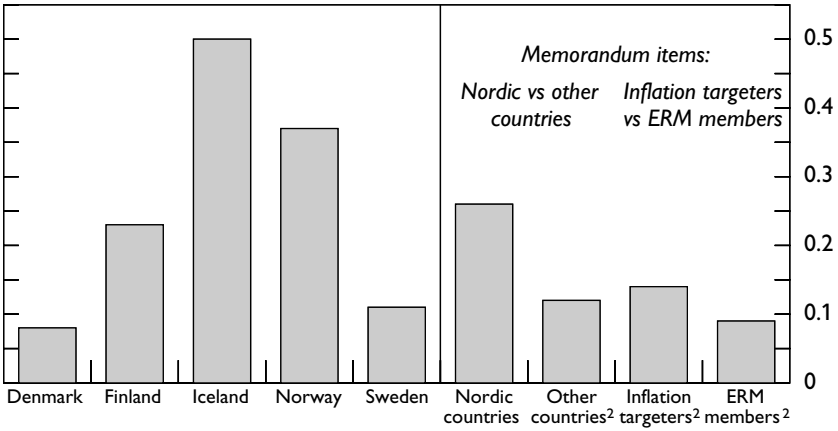
that countries that target inflation tend to be less open, and the ERM countries more open, than predicted by population size. Although this is partially due to the fact that Australia and New Zealand are geographically remote, the export/GDP ratio in Spain is also lower than expected given its population size. Furthermore, the export/GDP ratio for Canada is very close to that predicted by its population size, despite Canada's proximity to the United States.[22]

Commodity concentration of exports

Since industry-specific disturbances are likely to influence aggregate economic conditions in economies which are dominated by a few export industries, the commodity-concentration of exports is a significant consideration in adopting a monetary policy framework and exchange rate strategy. Figure 6 contains information on this, using an index for the

[22] By contrast, the export/GDP ratios for the Benelux countries, which are adjacent to Germany, are much greater than predicted by population size.

Figure 6
Commodity concentration of exports[1]



[1] In 1990. Measured by comparing commodity shares in a country's total exports with commodity shares in world total exports; values rank between 0 (low) and 1 (high concentration). For country groups, simple arithmetic mean. [2] Country coverage as in Figure 4.

Source: UNCTAD.

commodity concentration of exports in 1992 (a high index value means that the country exports relatively few commodities).[23]

Three lessons can be drawn from the figure. First, the Nordic countries do not form a homogenous group in that the concentration index is much higher in Finland, Iceland and Norway than in Denmark and Sweden. Second, the Nordic countries on average tend to have a higher export concentration than the other countries. Third, countries in which monetary policy is pursued using inflation targets tend to display a higher degree of commodity concentration of exports than ERM members.

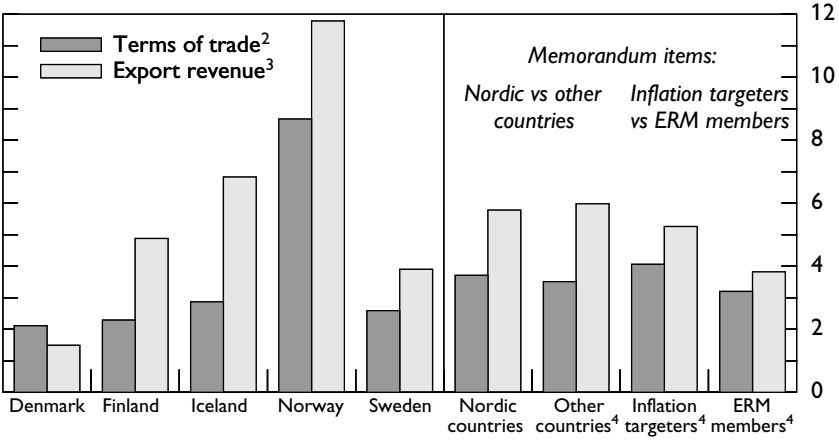
External shocks

Since the adjustment to external shocks may require changes in real exchange rates, nominal exchange rate flexibility is more desirable in economies where such disturbances are common. Thus, the importance of external shocks is a consequential element in determining the overall policy framework. Figure 7 shows the standard deviation of the terms of

[23] Concentration is measured by the "concentration index" for 1992 in Table 4.5 in UNCTAD (1994).

Figure 7

Standard deviation of terms-of-trade and export revenue[1]



[1] For 1980–92 (based on annual data). For country groups, simple arithmetic mean. [2] Ratio between export and import deflators. [3] Real exports times terms-of-trade. [4] Country coverage as in Figure 4.

Sources: IMF, OECD and national data.

trade and real export revenue (measured in terms of imports) over the period 1979–95, which are intended to capture the exposure to external shocks. As in the previous figure, Finland, Iceland and Norway appear to be more exposed than Denmark and Sweden, in particular with regard to real export revenue. Furthermore, it is notable that countries that target inflation appear to have experienced larger external shocks than ERM members.

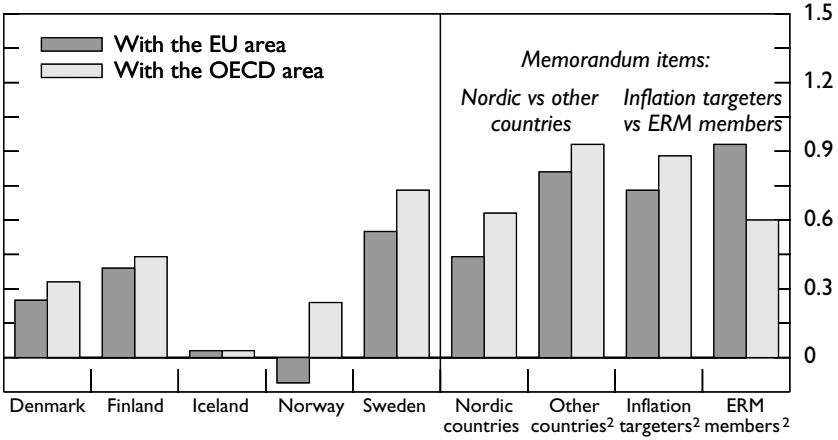
International correlations of output growth

For central banks that use intermediate exchange rate objectives it is desirable if cyclical fluctuations at home and in the economies to whose currencies the exchange rate is pegged are similar, since this reduces the likelihood of a conflict between external and internal policy objectives. Figure 8 contains estimated correlation coefficients between real GDP growth in the different countries and real GDP growth in the EU area and in the OECD area, estimated over the period 1980–95.

As the figure shows, output growth in the Nordic countries as a group is less strongly correlated with output growth in the EU and OECD areas

Figure 8

Correlation of business cycles[1]



[1] For 1980–92; correlation of annual GDP growth rates. For country groups, weighted mean (based on 1990 GDP and PPP exchange rates). [2] Country coverage as in Figure 4.

Sources: IMF, OECD, national data and BIS estimates.

than output growth in the other economies is. However, there are considerable differences between the Nordic countries, with the correlations for Sweden and Finland above average and Norway and Iceland considerably below. Two factors may explain these differences. First, as noted above, Sweden and Finland both experienced very deep recessions in the early 1990s at the same time as economic conditions were weak worldwide. Since these recessions were mostly due to unique internal developments, simple correlation coefficients tend to overstate the correlation of Finnish and Swedish output movements with those elsewhere. Second, output fluctuations in Iceland and Norway are partially due to disturbances to the fishing and oil sectors, which are largely independent of output in the EU and OECD areas.

Finally, the figure also illustrates that output fluctuations among countries with inflation targets are more strongly correlated with output growth in the OECD area than in the EU area, and that the opposite is the case for ERM members. Since three of the four inflation target countries are non-European, this is not surprising.

Some caveats

The comparisons presented above have suggested that although there are differences among the Nordic economies, they tend as a group to be less open than other economies considered, especially after adjusting for population size; their exports also tend to be more concentrated on a few goods; they are relatively more exposed to external shocks; and output fluctuations in the Nordic area are less correlated with output fluctuations in the EU or OECD area. However, it is important not to overinterpret these findings as giving indications of the appropriate policy framework for the Nordic countries. Many factors, such as the extent of labour and product market flexibility and whether financial markets are internationally integrated, are not considered in this analysis. Moreover, the weight attached to exchange rate stability in the framework of policy may also affect estimates of the importance of external shocks.[24] Similarly, the correlation of business cycles are naturally higher among countries that are members of an adjustable peg regime, where policy-determined interest rates have tended to converge. However, the comparisons do point to some of the factors that have tended to complicate the conduct of monetary policy in the Nordic area.

2.5 Implementation of monetary policy

The implementation of monetary policy in the Nordic countries has also undergone important changes since the early 1990s. These developments have been in line with a broader international trend towards a greater focus on interest rates as operating objectives of policy, lower reserve requirements, increased reliance on market operations at the expense of standing facilities in guidance of money-market rates, and enhanced transparency.[25] These changes have been driven by the development and internationalisation of financial markets in the late 1980s and early 1990s, in particular the development of liquid money markets and the deregulation of capital flows. With short-term interest rates more sensitive to

[24] This could be the case if export and import prices react with different speeds to nominal exchange rate changes.

[25] Borio (1997) provides an comparison of monetary operating procedures in a number of countries. Monetary operating procedures in the Nordic area are discussed by Danmarks Nationalbank (1992), Guðnason (1996), Hasko (1996), Hasko and Kuisma (1995), Holmberg (1996), Hörngren (1994), Kuosmanen (1996), and Mehlbye and Topp (1996).

market forces and expectations, the need for clearer policy signals has increased. A greater need for clarity has also arisen from the shift in monetary policy strategy from narrow to broad exchange rate bands and the adoption of inflation targets, which have also heightened the importance of longer-term interest rates, which central banks influence to the extent they can affect interest rate expectations. Moreover, with market interest rates increasingly responsive to rates of return in foreign currency, central banks need to be able to adjust short-term rates more finely.

Table 2 provides an overview of the monetary policy instruments in the Nordic countries. It is evident that there is a great deal of similarity across the Nordic central banks. Except in Norway, the key policy rate in all countries is the repo rate, which is typically set by fixed rate tender in order to clarify the authorities' view of the appropriate level of short-term rates.[26] Furthermore, except in Denmark, short-term rates are steered within an interest rate corridor determined by standing facilities, which permits the central bank to control interest rates in times of market pressures. In Denmark, Norway and Sweden, reserve requirements are no longer used.

One possible distinction between the different Nordic central banks concerns the maturity of the short-term interest rates that are used as operating objectives of policy. While overnight interest rates play little role in the implementation of policy in Denmark, Finland, and Norway, the Riksbank attaches considerable emphasis on controlling this rate. It is not clear whether these differences reflect central banks' views regarding the importance of overnight rates, or the institutional set-up of money markets.

In Iceland, the central bank is a market maker for three-month Treasury bills. It has thus an additional lever on short-term interest rates, and interbank rates play no role as operational targets for policy. However, while the central bank in the past played a focal role in Icelandic financial markets, following the establishment of a money market in 1992 and a foreign exchange market in 1993, the bank has taken the view that its role as a market maker should be reduced in line with the growth and deepening of financial markets. Thus, in early 1996 the central bank ceased to

[26] Variable rate tenders were used in Finland until the end of 1994. While fixed rate tenders are typically used in Sweden, variable rate tenders may be employed when market rates fluctuate around levels in line with policy intentions.

Table 2
Monetary policy instruments

	Denmark	Finland	Iceland	Norway	Sweden
Key policy rate	*Repo rate*, set in fixed rate tenders, 14 days maturity, set once per week	*Tender rate*, set in fixed rate tenders since 1994 (volume tenders before), 1 month maturity	*Repo rate*, set in fixed rate tender, 10 days maturity, central bank active throughout the week	*Overnight deposit rate*, sets floor	*Repo rate*, 1 week maturity, set once per week, normally fixed rate tenders; variable rate tenders possible
Other policy rates	*Current account rate*, which sets floor on money market rates *Discount rate* which plays a role solely for signalling purposes (equals current account rate)	*Excess reserve rate*, sets floor, 2% below tender rate *Liquidity credit rate*, sets ceiling, 2% above tender rate, one week maturity	*Current account rate*, sets floor for interest rates *Discount rate*, some credit provided	*Overnight lending rate*, sets ceiling	*Lending rate*, sets ceiling. *Deposit rate*, sets floor
Main rate used for signalling	Discount rate	Tender rate	Repo rate	Overnight deposit rate	Repo rate main signalling rate; lending and deposit rates can also be used
Operating objective	Short-term money-market rates, some emphasis on 3-month rate. Overnight rates of little importance	1-month money-market rates. Overnight rates of little importance	Not applicable. As market maker for 90-day Treasury bills, the central bank can steer short-term rates directly	Short-term money-market rates	Overnight money-market rates
Interest rate corridor	No	Yes	No	Yes	Yes
Reserve requirements	No	Between 1–2% depending on liability, only excess reserves are remunerated at a rate below market, averaging applied since October 1995	*Reserve requirements* of between 2.5–4% depending on liability, remunerated (at 3.5% indexed), no averaging	No	No (Set to zero)

make markets in long-term government bonds. If this process continues and the bank relinquishes its role as a market maker for Treasury bills, it will need to specify an operating objective in terms of some interbank rate.

3. Credibility and monetary policy experiences since 1992

The conduct of monetary policy in the Nordic countries in the 1990s has been complicated by large shifts in the public's perception of the credibility of monetary policy. For what follows, it is useful to make a distinction between short- and long-run credibility. The first of these concepts refers to whether the public believes that the authorities will be able to reach or maintain announced exchange rate or inflation objectives in the near future; the second refers to whether the central bank is seen as likely to deliver low and stable inflation in the longer run. This section presents some evidence on the near-term credibility of the exchange rate bands and inflation targets adopted by the Nordic countries, and then assesses shifts in credibility more generally.

3.1 Credibility of exchange rate bands

Figure 9 contains plots of the spot and 12-month forward exchange rate, together with the central parity and fluctuations margins for the relevant periods.[27] For Denmark, Finland, Norway and Sweden, the exchange rates are vis-à-vis the ECU; for Iceland it is vis-à-vis the currency basket.

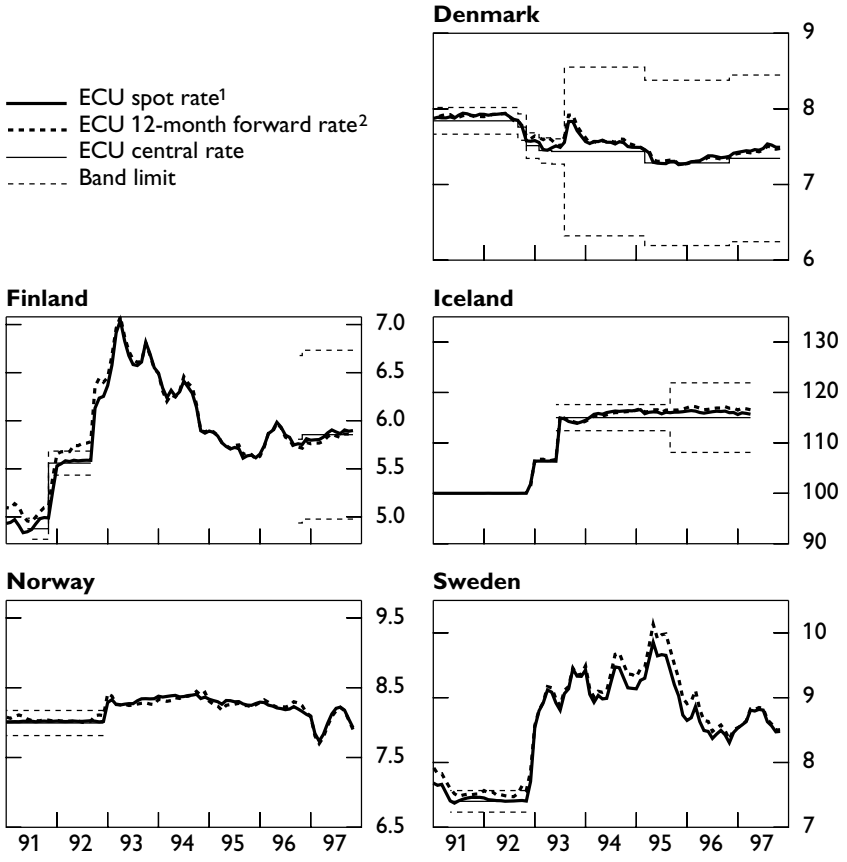
As argued by Svensson (1991), plotting the forward exchange rate against the band can be interpreted as a test of whether the exchange rate objective is seen as credible: disregarding the possibility of a large exchange risk premium, if the forward exchange rate is outside the fluctuation band, the band cannot be fully credible.[28] However, the converse is not true: if the forward exchange rate is in the band, investors may still

[27] For Iceland the maturity of the forward rate is three months. The forward rates are calculated using Euro-interest rates.

[28] To see this, suppose that the forward exchange rate is above the fluctuation margin. An investor who believes that the exchange rate would be remain in the band would then sell foreign exchange forward and buy it in the spot market at the time the forward contract matures. This would be a profitable transaction if the spot rate remained inside the band.

Figure 9

Exchange rates



[1] Domestic currency per ECU. [2] For Iceland, three-month forward rate.

Sources: National data and BIS calculations.

believe that under some conditions the spot exchange rate will fall outside the band at the time the forward contract matures.

To review familiar ground, the figure illustrates that the Finnish markka suffered from low credibility before the devaluation in November 1991, and before the floating of the markka in September 1992. The Swedish krona also experienced low credibility in late 1991, although it remained within the band, and in early autumn 1992, when the forward rate left

the band. The Danish krone and Norwegian krone, however, were not subject to the same deep lack of credibility as the markka and the krona. For the period since 1993, there is little firm evidence of weak credibility of the remaining exchange rate bands, although, admittedly, the bands in Denmark, Finland and Iceland are so broad as to make this test of little value.

3.2 Near-term inflation expectations

Turning to the near-term credibility of the Swedish and Finnish inflation targets, Figure 10 contains plots for the four Nordic countries for which the data was available, of the *expected* average inflation for the 12 months *ahead*, constructed from surveys of expectations of average inflation for the current and the next year, together with the *actual* average inflation over the *past* 12 months.[29] To interpret the figure, consider the behaviour of inflation and expected inflation in Finland. Before the floating of the markka in 1992, actual and expected inflation declined roughly together, indicating that the survey respondents expected the rate of inflation to remain at its current level, and that they only revised their expectations as inflation fell over time. In Sweden expected inflation was below actual inflation before the floating of the krona in 1992, that is, further disinflation was expected. In Norway and Denmark, by contrast, expected inflation was marginally above actual inflation, suggesting that a small increase in inflation was expected.

The most striking aspect of the figure is that the floating of the Finnish markka, the Swedish krona and, although less so, the Norwegian krone, and the broadening of the fluctuation margins for the Danish krone led to anticipation of increasing inflation pressures. In all countries, except in

[29] Let π_t denote the rate of inflation over the 12-month period ending at time t. The average inflation rate at time t is then given by:

$$\bar{\pi}_t = \sum_{i=0}^{11} \pi_{t-i} / 12.$$

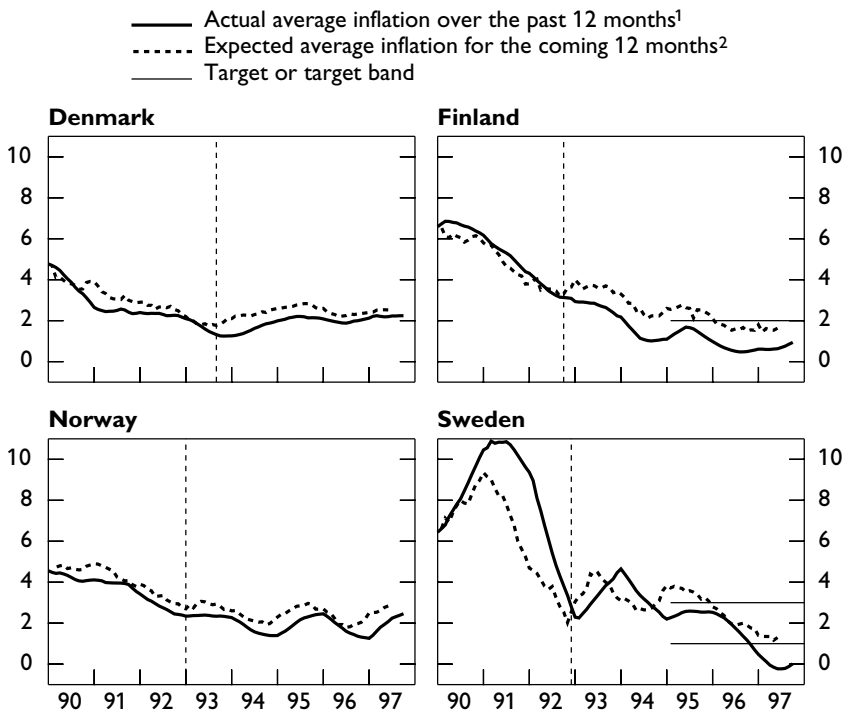
Let $E_k\bar{\pi}_T$ denote the expectation, formed in month k, of the average inflation rate at the end of year T. The expected average inflation rate for the coming 12 months at month k is then computed as the weighted average of the expected rate of inflation for the current year, $E_k\bar{\pi}_T$, and for the next year, $E_k\bar{\pi}_{T+1}$:

$$E_k\bar{\pi}_{k+12} = \frac{12-k}{12} E_k\bar{\pi}_T + \frac{k}{12} E_k\bar{\pi}_{T+1}.$$

The data on $E_k\bar{\pi}_T$ and $E_k\bar{\pi}_{T+1}$ are from Consensus Economics.

Figure 10

Actual and expected inflation



[1] Twelve-month moving average of annual changes in the consumer price index. [2] Weighted average of estimated annual changes in the consumer price index for the current and next year.

Sources: Consensus Economics, national data and BIS calculations.

Sweden in the period between late 1993 and late 1994, the survey respondents have since continually overpredicted inflation. The figure also suggests that the Finnish and Swedish inflation targets have been viewed as credible since late 1995.

The finding that actual inflation has been lower than expected inflation is indicative of credibility problems. However, since inflation is sluggish, near-term inflation expectations are largely determined by current inflation and do not contain much information about the public's perception of policy-makers' commitment to low inflation. To better assess whether policy is credible it is therefore important to consider longer time horizons. Unfortunately, this is difficult to do using survey data, which tend to

focus on short-run expectations. Instead, long bond yields are typically used for this purpose.

3.3 Long-run credibility

Figure 11 contains plots of 10-year bond yields in the Nordic countries (except Iceland, for data reasons) and Germany. It is readily apparent that movements in German interest rates are reflected in the Nordic bond yields. Furthermore, the spreads against German yields seem to depend on the *level* of Germany rates: any move in German bond yields appear to induce proportionally larger shifts in yield in the Nordic area. The factor of proportionality also seems to differ between the individual countries and to vary over time. Thus, until early 1994, spreads against German yields were largest for Finland, followed by Sweden, Norway and Denmark. Since 1994, however, the spreads have tended to be largest for Sweden, followed by Finland, Denmark and Norway. Most recently, however, Finnish yields have fallen below Danish yields, probably driven by expectations that Finland is more likely than Denmark to become a member of the single currency in the near future.

The figure raises the question of the causes of the fluctuations of the spreads against German rates. One interesting possibility is that shifts in inflationary expectations have played a role in triggering these movements. In order to explore this possibility, the change in the domestic long rate was regressed on the change in the rate of inflation over the past 12 months; the change in the growth rate of industrial production relative to trend; the change in the German long rate; the change in the domestic short rate; and dummy variables for November and December 1991 (the month of, and the month after, the Finnish devaluation), and August to December 1992.[30]

Before reviewing the results, two comments are in order. First, the domestic short-term interest rate were included for several reasons. An adverse shift in credibility may lead to pressures on the exchange rate, which, in turn, may increase short-term interest rates. Under this inter-

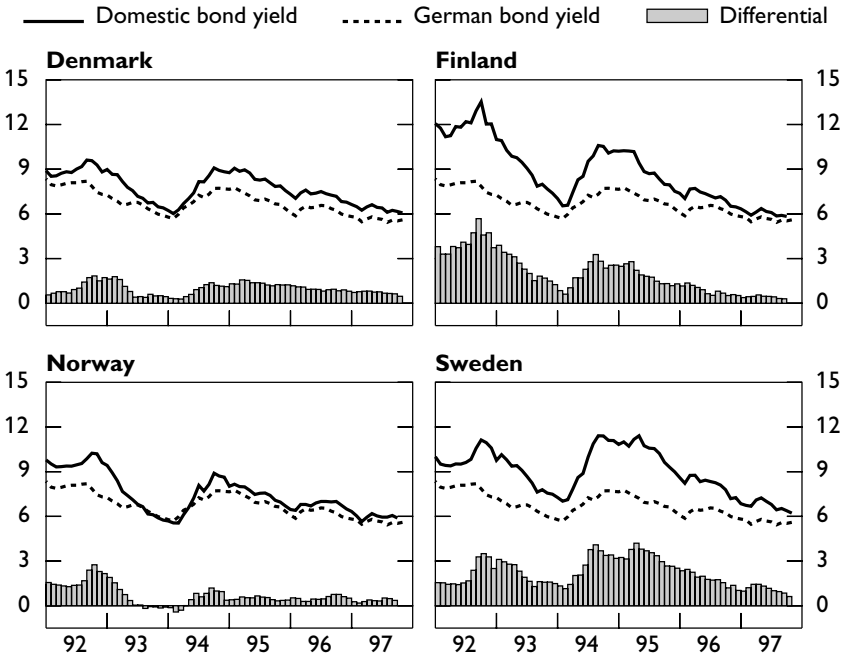
[30] Let R_t, R^*_t, r_t, π_t and g_t denote the domestic and German 10-year yields, the domestic 3-month rate, the domestic inflation rate (over 12 months) and the growth rate of domestic industrial production (over 12 months) relative to trend (computed using the Hodrick-Prescott filter) respectively. The following regression was fitted:

$$\Delta R_t = \alpha_1 + \alpha_2 \Delta r_t + \alpha_3 \Delta \pi_t + \alpha_4 \Delta g_t + \alpha_5 (R_{t-1} - R^*_{t-1}) + \text{time dummies} + \text{error}.$$

Figure 11

Ten-year Government bond yields

In percentages



Source: National data.

pretation the three-month interest rate is a measure of changes in credibility that are unrelated to the other variables in the model. The short rate may also matter because it captures shifts in the slope of the term structure. Suppose the domestic central banks raises short-term interest rates to prevent a depreciation of the exchange rate. Since long interest rates are influenced by the expected path of short rates, the tightening of monetary policy will lead to increases also in longer-term rates.

Second, German short interest rates, inflation rates etc. should, in principle, be included in the regression. However, during the early 1990s these variables behaved in an unusual way following the unification of Germany. Since market participants had good reasons to believe that these disturbances were temporary, German long interest rates did not

move much in response. Since preliminary work indicated that including German variables did not improve the fit of the equations, they are excluded in the models presented below.

Table 3 contains the regression results. It should be noted that the significance of the parameters are somewhat sensitive to the exact specification used, in particular the number of dummies, and whether the (insignificant) lagged yield spreads, are included. Several findings are of interest. First, the change in the short rate is significant in all countries. Thus, rising short rates imply widening spreads of long interest rates vis-à-vis Germany. Second, the change in inflation has a significant and positive coefficient in Finland (at the 10% level) and Sweden.[31] Since both countries experienced large exchange rate movements, the significance of inflation may indicate that financial market believed that the exchange rate changes would affect future inflation rates. Third, the growth of industrial production is significant except in Norway, where the exchange rate stimulus was limited and where industrial production grew at a comparably steady rate in the estimation period. One interpretation of this finding is that rising industrial production signalled closing output gaps and rising inflationary pressures. Fourth, the parameter on the change in long German interest rates is highly significant and close to unity. Thus, there is little evidence that the Nordic interest rates overreacted to German rates once domestic economic conditions are controlled for. Fifth and finally, the lagged spread between domestic and German interest rates are only significant for Finland and Sweden (at the 10% level) and not very large numerically, suggesting that there was little tendency for domestic yields to tend to German levels. However, this may be due to the short sample period.

In sum, the estimates suggest that the domestic economic conditions, in particular fears of rising inflation, played an important role in determining movements in long interest rates in the Nordic countries relative to in Germany.

[31] In Norway, however, the coefficient is negative and significant. The reasons for this result are not clear.

Table 3

Regression results

Dependent variable: monthly change in the 10-year yield

Sample period	Denmark 1991:9–1997:6	Finland 1991:9–1997:7	Norway 1991:9–1997:7	Sweden 1991:9–1997:6
Constant	0.04 *0.05/0.43*	0.06 *0.06/0.30*	0.03 *0.04/0.46*	0.18 *0.10/0.07*
Change in 3-month rate	0.06 *0.01/0.00*	0.31 *0.05/0.00*	0.15 *0.06/0.01*	0.11 *0.02/0.00*
Change in inflation	−0.03 *0.06/0.64*	0.18 *0.11/0.10*	−0.10 *0.05/0.05*	0.12 *0.07/0.08*
Change in industrial product growth (relative to trend)	0.01 *0.00/0.00*	0.02 *0.01/0.10*	0.00 *0.00/0.61*	0.02 *0.01/0.04*
Change in German yields	1.14 *0.10/0.00*	1.08 *0.24/0.00*	1.23 *0.14/0.00*	1.10 *0.27/0.01*
Lagged yield spread against Germany	−0.03 *0.04/0.46*	−0.04 *0.03/0.09*	−0.02 *0.04/0.63*	−0.08 *0.04/0.08*
Dummies:				
November 1991	–	0.69 *0.10/0.00*	–	–
December 1991	–	1.49 *0.13/0.00*	–	–
August 1992	0.43 *0.01/0.00*	0.60 *0.10/0.00*	0.25 *0.04/0.00*	0.46 *0.08/0.00*
September 1992	0.30 *0.04/0.00*	0.68 *0.16/0.00*	–	–
October 1992	–	–	0.70 *0.22/0.00*	1.00 *0.18/0.00*
November 1992	−0.33 *0.03/0.00*	0.78 *0.10/0.00*	−0.78 *0.11/0.00*	0.21 *0.10/0.03*
December 1992	–	−0.43 *0.13/0.00*	−0.24 *0.07/0.00*	−0.44 *0.10/0.00*
S.E.E.	0.11	0.24	0.17	0.28
Adjusted R-squared	0.81	0.70	0.68	0.48

Note: White standard errors/p-values for tests of the hypotheses that the parameters equal zero are shown in italics below the parameter estimates.

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