

Monetary policy issues in the Nordic countries after 1992

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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,

* The author is grateful to Palle Andersen, Pentti Pikkarainen and Lars Svensson for helpful comments.

¹ In addition, the markka was also adjusted twice within the fluctuation margins in the 1980s. See Lehmuussaari 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.

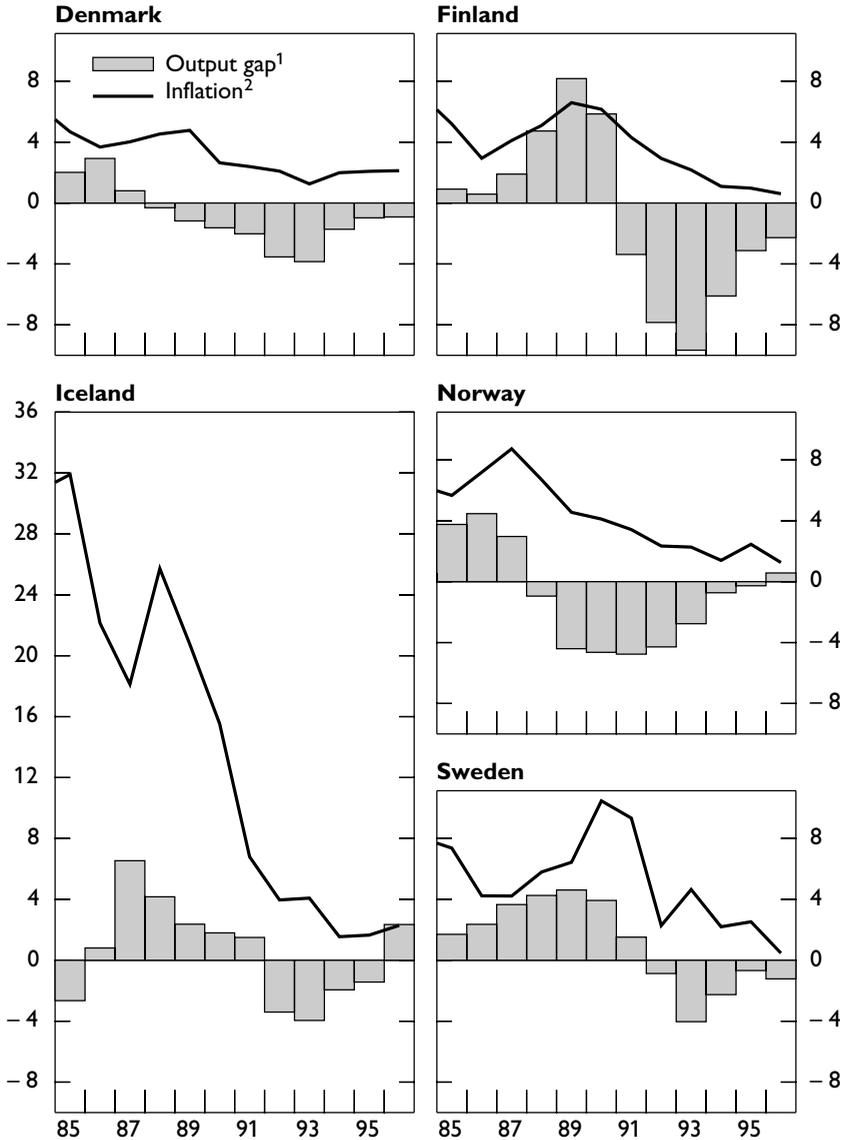
Section 2 reviews changes in the *monetary policy framework* in the Nordic area after 1992. The section compares the inflation targets adopted in Sweden and Finland in 1993, and then turns to Norway, Iceland and Denmark. The section also compares some structural aspects of the Nordic countries with eleven 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

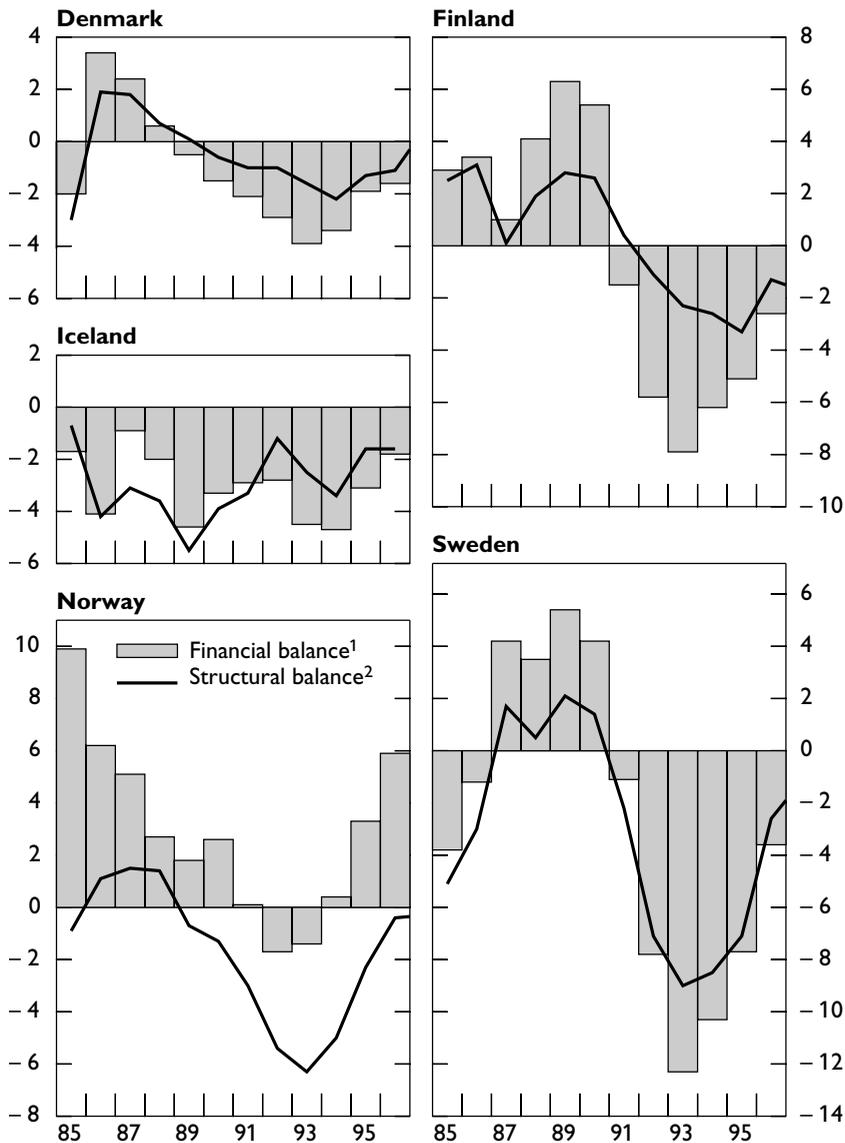
Figure 1
Output gap and inflation



¹ As a percentage of potential GDP. ² Annual average percentage change in consumer prices.

Sources: OECD Economic Outlook, national data and BIS calculations.

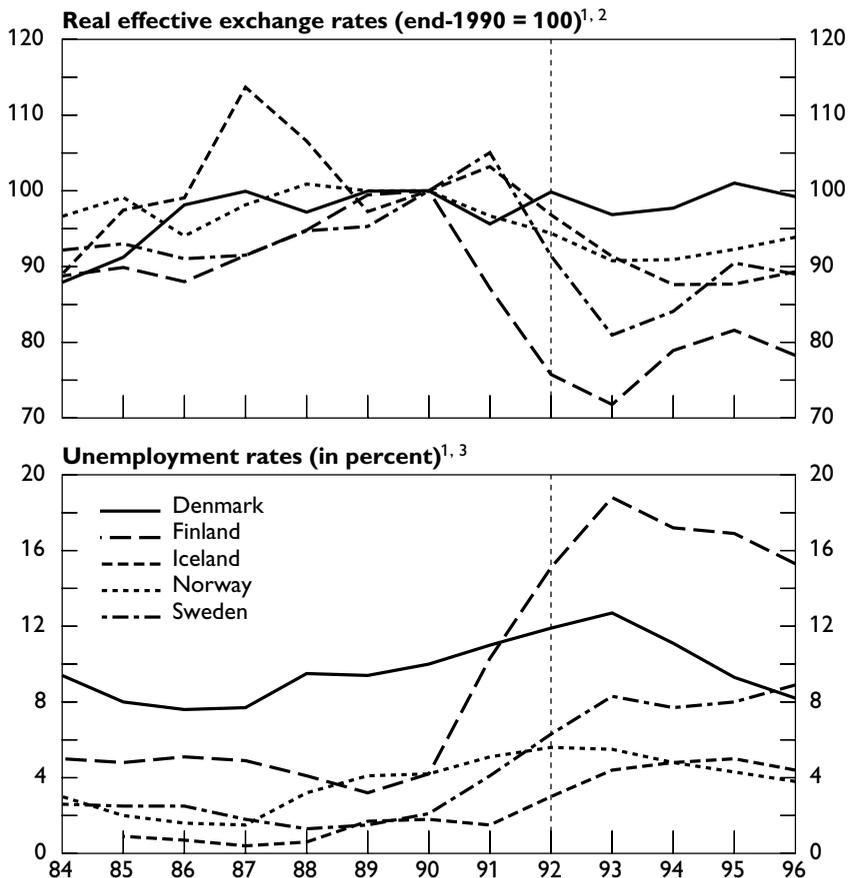
Figure 2
Fiscal balances



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 $\pm 1\%$ 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, subsidies 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, subsidies, 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 $\pm 15\%$ 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 $\pm 15\%$ 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 $\pm 2.25\%$, that is, the same width as in the ERM at that time.

In September 1995, the exchange rate band was broadened to $\pm 6\%$. 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.

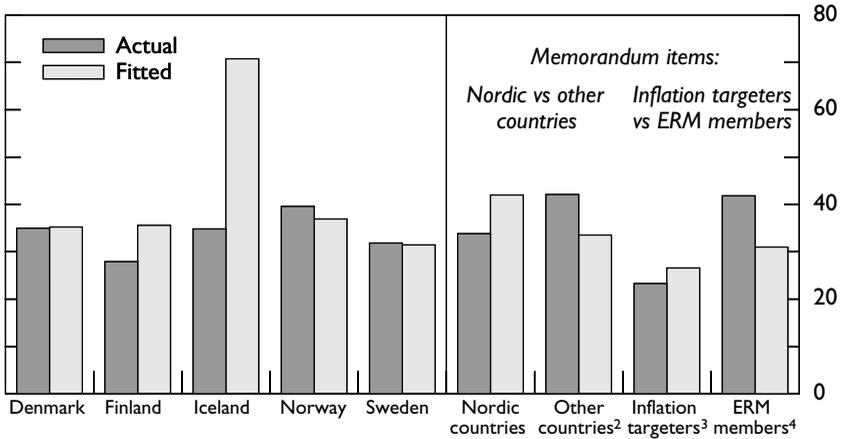
Figure 4 shows the ratio of exports to GDP, which is commonly used to gauge the extent to which an economy is exposed to trade, in 1993 for the Nordic countries. For comparison purposes, the figure also shows averages for the Nordic and non-Nordic countries. Since the non-Nordic countries use different 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 ratio¹



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.

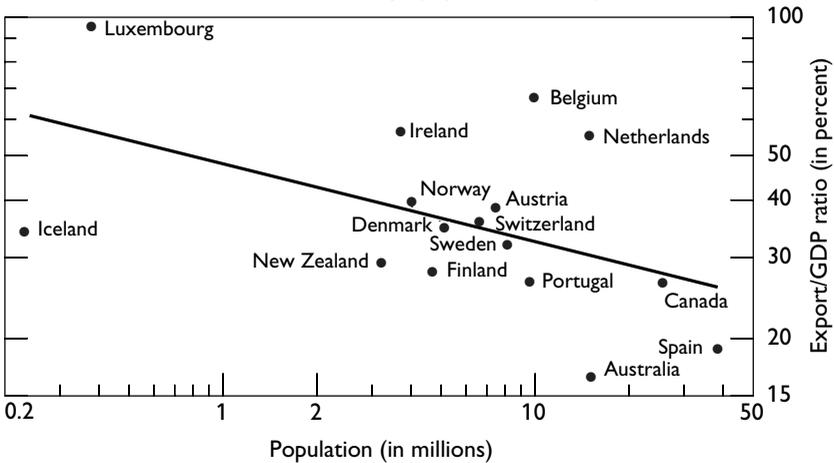
Sources: IMF, OECD, national data and BIS estimates.

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: $\log(\text{Export/GDP}) = 3.87 - 0.17 \log(\text{Population}) + \text{error}$ 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.

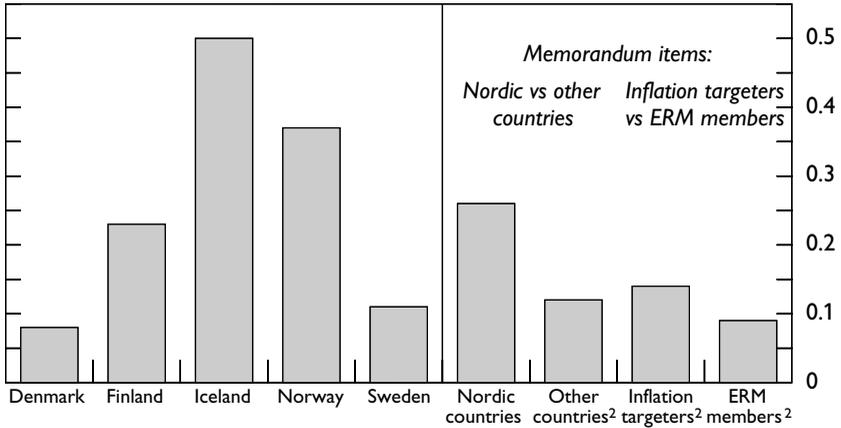
that countries that target inflation tend to be less open, and the ERM countries more open, than predicted by population size. Although this is partially due to the fact that Australia and New Zealand are geographically remote, the export/GDP ratio in Spain is also lower than expected given its population 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 exports¹



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.

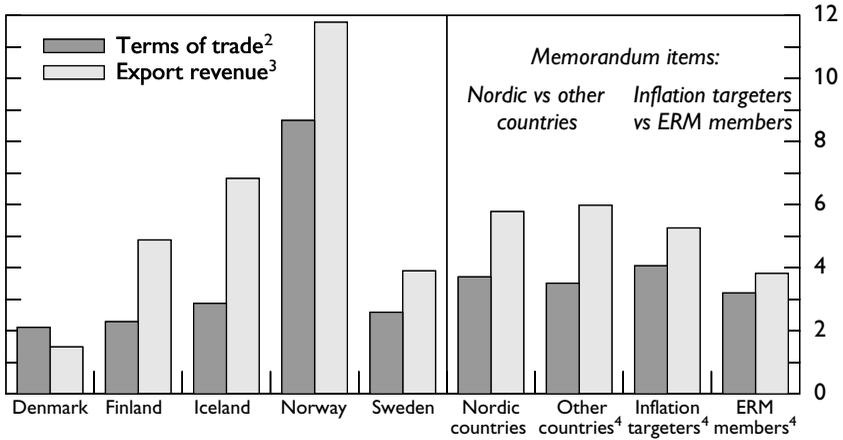
External shocks

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 revenue¹



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.

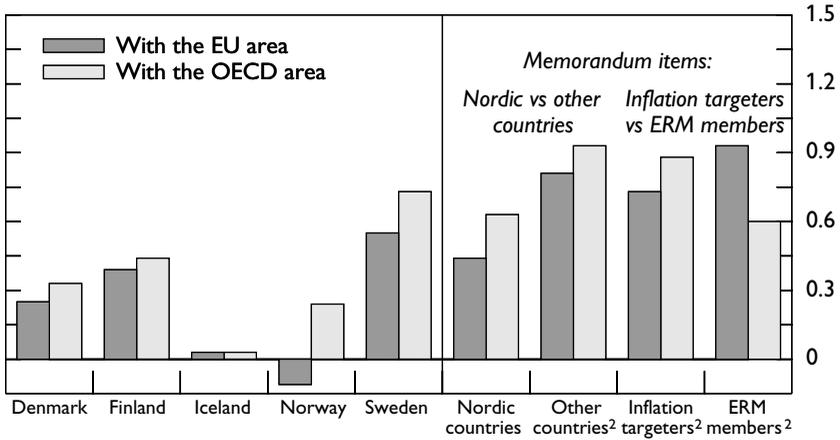
trade and real export revenue (measured in terms of imports) over the period 1979–95, which are intended to capture the exposure to external shocks. As in the previous figure, Finland, Iceland and Norway appear to be more exposed than Denmark and Sweden, in particular with regard to real export revenue. 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 cycles¹



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 a 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	<i>Repo rate</i> , set in fixed rate tenders, 14 days maturity, set once per week	<i>Tender rate</i> , set in fixed rate tenders since 1994 (volume tenders before), 1 month maturity	<i>Repo rate</i> , set in fixed rate tender, 10 days maturity, central bank active throughout the week	<i>Overnight deposit rate</i> , sets floor	<i>Repo rate</i> , 1 week maturity, set once per week, normally fixed rate tenders; variable rate tenders possible
Other policy rates	<i>Current account rate</i> , which sets floor on money market rates <i>Discount rate</i> which plays a role solely for signalling purposes (equals current account rate)	<i>Excess reserve rate</i> , sets floor, 2% below tender rate <i>Liquidity credit rate</i> , sets ceiling, 2% above tender rate, one week maturity	<i>Current account rate</i> , sets floor for interest rates <i>Discount rate</i> , some credit provided	<i>Overnight lending rate</i> , sets ceiling	<i>Lending rate</i> , sets ceiling. <i>Deposit rate</i> , 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	<i>Reserve requirements</i> 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

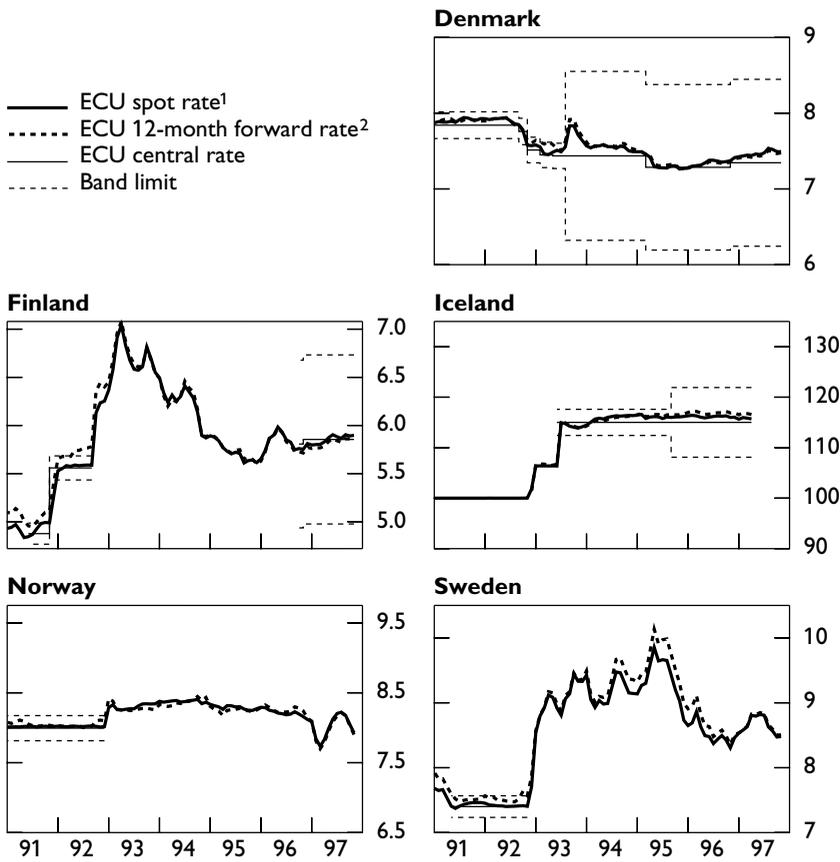
Figure 9 contains plots of the spot and 12-month forward exchange rate, together with the central parity and fluctuations margins for the relevant periods.²⁷ For Denmark, Finland, Norway and Sweden, the exchange rates are vis-à-vis the ECU; for Iceland it is vis-à-vis the currency basket.

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 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:

$$\bar{\pi}_t = \sum_{i=0}^{11} \pi_{t-i} / 12.$$

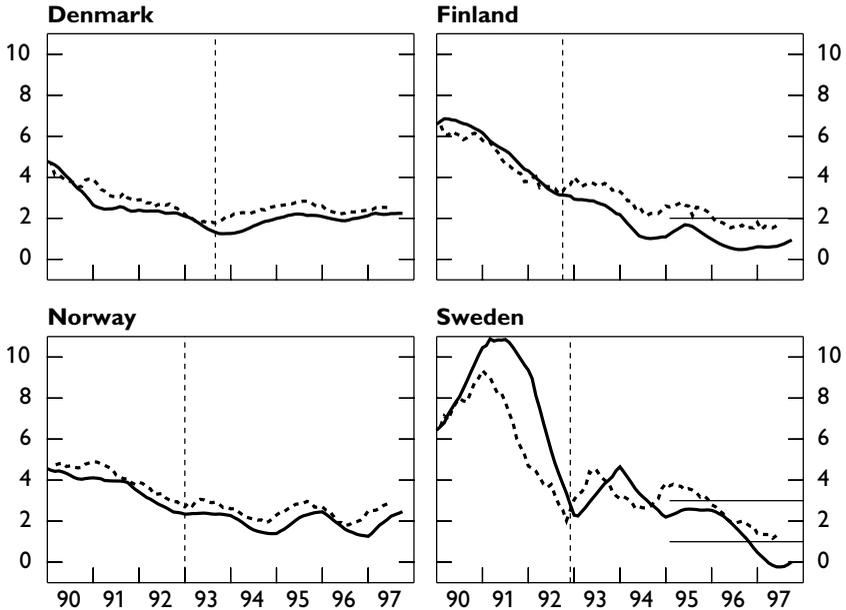
Let $E_k \bar{\pi}_T$ denote the expectation, formed in month k , of the average inflation rate at the end of year T . The expected average inflation rate for the coming 12 months at month k is then computed as the weighted average of the expected rate of inflation for the current year, $E_k \bar{\pi}_T$, 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

— Actual average inflation over the past 12 months¹
 - - - - Expected average inflation for the coming 12 months²
 — Target or target band



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.

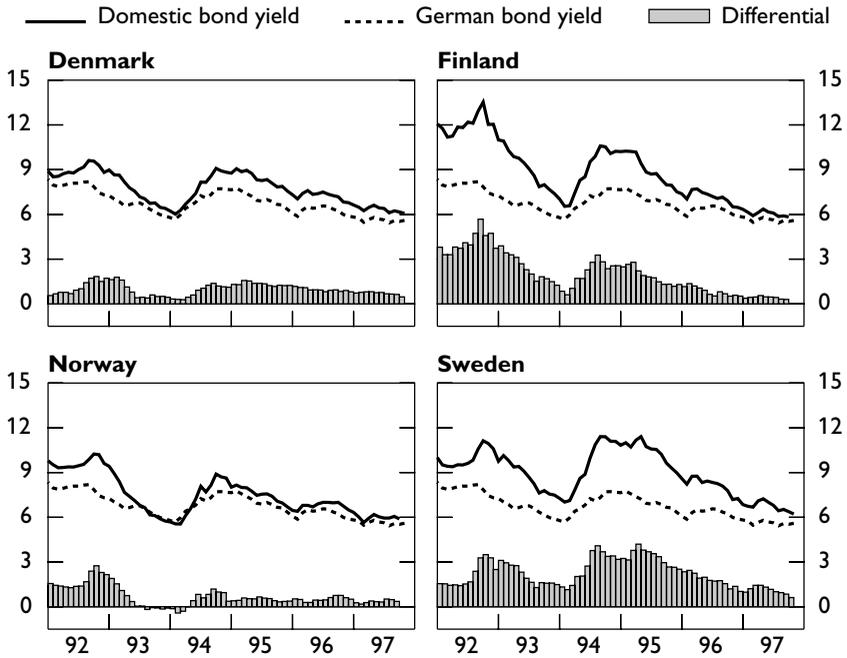
The figure raises the question of the causes of the fluctuations of the spreads against German rates. One interesting possibility is that shifts in inflationary expectations have played a role in triggering these movements. In order to explore this possibility, the change in the domestic long rate was 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 bank 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 <i>0.05/0.43</i>	0.06 <i>0.06/0.30</i>	0.03 <i>0.04/0.46</i>	0.18 <i>0.10/0.07</i>
Change in 3-month rate	0.06 <i>0.01/0.00</i>	0.31 <i>0.05/0.00</i>	0.15 <i>0.06/0.01</i>	0.11 <i>0.02/0.00</i>
Change in inflation	-0.03 <i>0.06/0.64</i>	0.18 <i>0.11/0.10</i>	-0.10 <i>0.05/0.05</i>	0.12 <i>0.07/0.08</i>
Change in industrial product growth (relative to trend)	0.01 <i>0.00/0.00</i>	0.02 <i>0.01/0.10</i>	0.00 <i>0.00/0.61</i>	0.02 <i>0.01/0.04</i>
Change in German yields	1.14 <i>0.10/0.00</i>	1.08 <i>0.24/0.00</i>	1.23 <i>0.14/0.00</i>	1.10 <i>0.27/0.01</i>
Lagged yield spread against Germany	-0.03 <i>0.04/0.46</i>	-0.04 <i>0.03/0.09</i>	-0.02 <i>0.04/0.63</i>	-0.08 <i>0.04/0.08</i>
Dummies:				
November 1991	-	0.69 <i>0.10/0.00</i>	-	-
December 1991	-	1.49 <i>0.13/0.00</i>	-	-
August 1992	0.43 <i>0.01/0.00</i>	0.60 <i>0.10/0.00</i>	0.25 <i>0.04/0.00</i>	0.46 <i>0.08/0.00</i>
September 1992	0.30 <i>0.04/0.00</i>	0.68 <i>0.16/0.00</i>	-	-
October 1992	-	-	0.70 <i>0.22/0.00</i>	1.00 <i>0.18/0.00</i>
November 1992	-0.33 <i>0.03/0.00</i>	0.78 <i>0.10/0.00</i>	-0.78 <i>0.11/0.00</i>	0.21 <i>0.10/0.03</i>
December 1992	-	-0.43 <i>0.13/0.00</i>	-0.24 <i>0.07/0.00</i>	-0.44 <i>0.10/0.00</i>
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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