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increase in public debt. The crisis in Swedish public finances at the beginning of the 1990s has been solved in the short term. It is less clear that the long-term trend has changed.

The current situation for monetary policy

BY URBAN BÄCKSTRÖM

Urban Bäckström is Governor of Sveriges Riksbank. This speech was held at the hearing of the Standing Committe on Finance on 10 October 2000.

The economic developments in Sweden are impressive. Having achieved a growth rate in the past six years that averages 3 per cent, it seems that our economy is now expanding at an annual rate of around 3 to 4 per cent. Employment has really taken off. To date this year the number of people in work is 70,000 higher than in the same period of 1999. I can also note, once again, that notwithstanding the rapid economic growth, the rate of inflation has remained moderate.

But these favourable developments do not mean that the Riksbank can sit back and relax. The path ahead contains a number of risks to which we must be alert.

What lies behind the favourable economic trend?

A basic factor behind the Swedish economy's favourable path is, in my opinion, the economic policy realignment that has been carried out in the past decade and a half. Credit and currency markets have been deregulated, the tax system has been reformed, compon-

ents of the transfers system have been modified and competitive pressure has increased. All this has helped improve the workings of our economy. Then there is economic policy's commitment to stability, with price stability as a statutory objective, as well as a successful consolidation of the government finances.

In the inflation forecast we are presenting today, productivity growth is judged to be marginally higher than we foresaw in the June forecast. That in itself is a sign that the economy is functioning better.

The Riksbank's assessment of productivity has been revised gradually over the past few years. Higher productivity means that more can be produced with the same input of resources. So a lasting improvement raises the economy's potential long-term output. The higher productivity growth does not seem to be solely connected with the economy's upward phase. Whereas productivity growth in the period from 1974 to 1993, for example, averaged less than 1.5 per cent a year, the average rate since 1994 has been almost 2 per cent.

There are not yet any clear signs of the kind of accelerating productivity growth which has occurred in the United States.

At the same time I want to underscore that there are not yet any clear signs of the kind of accelerating productivity growth which has occurred in the United States. One explanation for the discrepancy between our economies may lie in the different ways in which productivity is measured in the United States and in Europe. There are also some indications that productivity growth may accelerate in the future but they are still too uncertain to support any more far-reaching conclusions in the formation of monetary policy.

It is accordingly conceivable that the Swedish economy will move into a process with accelerating productivity growth but let us wait until that happens before incorporating it in our expectations and policy decisions. Our economy is developing favourably enough as it is.

A growth process driven by rising investment and productivity can result in good circles. To some extent, that can be said to have been the case in recent years. It accordingly helps to explain the favourable economic developments in Sweden. Another cause lies in the various deregulations that have been implemented.

Inflation this year improved by deregulation and competition

It is positive supply-side effects that have helped to achieve the rapid output growth without generating inflationary impulses.

Thus, it is other positive supply-side effects that have helped to achieve the rapid output growth without generating inflationary impulses. The effects have come from the deregulation of electricity and telecom markets, as well as from the EU's agricultural reform. Meanwhile, the temporarily lower rate of inflation has meant that real wage growth has exceeded expectations and thereby acted as a general demand stimulus.

On the whole, however, the effects are of the one-off kind that lower the

price level and stimulate demand for just a limited period. But if these effects have a gradual impact on different segments of the economy, their overall impact on inflation may be spread over many years.

Another explanation for the favourable overall price trend is the generally stronger competition. It is now more difficult for firms to raise prices in order to improve profit margins, as usually happens at this stage in a business cycle. To some extent this may also be because firms know that price impulses from that quarter will inevitably cause the Riksbank to raise the instrumental rate. To achieve a reasonable return on capital, firms are obliged instead to make production more efficient. That tends to result in better productivity.

Another explanation for the favourable overall price trend is the generally stronger competition.

The increased oil prices can be cited correspondingly as an example of a negative supply shock. That is not en entirely adequate description, however, because to a certain extent, rising oil prices have to do with the better global activity, which normally leads to a general increase in commodity prices. The oil price increases tend to push prices up and curb output. But so far, the combined impact of all the supply shocks seems to be positive, that is, lower inflation and high demand growth.

Larger amount of unutilised resources

Yet another explanation for the moderate path of inflation could be that the amount of unutilised resources is larger than we – and many others – counted on earlier. Last autumn, for example, many observers believed, along with the Riksbank, that labour shortages would lead to increased price pressure via higher wages. But our fears have not yet been confirmed. Wage increases have been moderate even though the increase in employment is the highest for forty years and unemployment has dropped to a level that few believed would be feasible after the profound crisis in the early 1990s. Moreover, the labour shortage figures in the Swedish economy have continued to be moderate.

Wage increases have been moderate even though the increase in employment is the highest for forty years.

More people have joined the labour market. Many of those who were full-time students earlier and thus not classified as participating in the labour force have now found work. The number of persons on labour market programmes has also fallen, thereby making a further contribution to the increased labour supply and helping to meet demand.

These are some signs that the extent of the unutilised resources has been somewhat larger than allowed for earlier. We have therefore gradually altered our appraisal of resource utilisation in the Swedish economy in recent years.

There are, accordingly, a number of factors that have contributed to such a good economic development in recent years. A combination of favourable circumstances has so far made it possible to combine high total demand with price stability.

If the strong demand continues, sooner or later there will be labour shortage situations.

But if the strong demand continues, sooner or later there will be labour shortage situations. Shortages of labour with certain qualifications already exist in some regions. As the labour market becomes increasingly tight and shortages arise more generally, the risk of accelerating wage and price increases will grow. Then, if not before, the repo rate will have to be raised.

The present assessment

There are a number of clear risks that we must keep an eye on in the future.

Today the Riksbank is presenting a new economic assessment of the coming one to two years. The general features of the picture are the same as in our June report. Although the economy has moved further along the upward phase, we continue to believe in a main scenario that combines a strong economic trend with no unduly alarming inflationary tendencies. It is important to note, however, that there are also a number of clear risks that we must keep an eye on in the future.

UND1X inflation with an unchanged repo rate of 3.75 per cent is forecast to be 1.5 per cent one year ahead and 1.9 per cent after two years.

Monetary policy is currently formulated on the basis of an assessment of inflation excluding transitory effects from indirect taxes, subsidies and house mortgage interest expenditure (UND1X). In the main scenario in the Inflation Report, UND1X inflation with an unchanged repo rate of 3.75 per cent is forecast to be 1.5 per cent one year ahead and 1.9 per cent after two years. When various alternative paths are taken into account – above all the risks of a higher oil price, a weaker exchange rate and more rapid wage increases – the rates of inflation are judged to be somewhat higher, namely 1.6 and 2.1 per cent, respectively.

The inflation assessment starts from a continuation of strong international

economic activity. Together with rising consumption and a favourable development of investment, this provides conditions for further rapid growth in Sweden, too. GDP growth in the main scenario is forecast to be

4 per cent this year, 3.7 per cent in 2001 and 3 per cent in 2002. Compared with the June Report, only minor revisions have been made to GDP growth in Sweden up to 2002. Neither has the inflation forecast been altered more than marginally. That future inflation is not higher, even though the economic upswing is continuing and the forecast horizon has been shifted ahead, is partly a consequence of the amount of unutilised resources now being considered to be somewhat larger. Wage increases are judged to be somewhat lower, accompanied by marginally higher productivity growth. In the short run, however, inflation is expected to be somewhat higher than forecast in June, mainly because the oil price is higher and the exchange rate somewhat weaker.

While the oil price and exchange rate assessments have been revised in the light of developments in the summer and early autumn, the forecast of inflation one to two years ahead still counts on a successive

appreciation of the krona and a gradual fall in the price of oil. However, the uncertainty is considerable. A higher oil price and a weaker exchange rate could lead to inflation rising more rapidly than assumed in the main scenario.

The assumption of a somewhat lower rate of wage increases is supported by, for example, wage outcomes to date this year as well as inflation expectations that are relatively low and stable. Still, there is considered to be some risk, albeit relatively small, of a development of wages that is considerably

stronger, for example as a result of negotiators' demands for parity and compensation. Together with confidence in the low-inflation policy, the situation in the labour market and the coming wage negotiations will be of crucial importance for the future formation of monetary policy.

The present decision to leave the repo rate unchanged for yet another while is to be seen in the light of the assessment that for virtually the whole of the time horizon the Riksbank currently appraises, inflation is calculated to be below 2 per cent. When various alternative paths are incorporated in the assessment, how-

ever, inflation two years ahead is marginally above the target. The picture of a strong upswing in the Swedish economy still holds, with rising resource utilisation in the labour market, for example. That suggests that the repo rate may need to be raised in the future.

Credit rating and the business cycle: can bankruptcies be forecast?

By Tor Jacobson and Jesper Lindé
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Credit rating agencies have an important role to fulfil in the financial markets. In this article, we study the characteristics of credit ratings carried out for Swedish limited companies by Dun & Bradstreet Sverige AB and Upplysningscentralen AB during the period 1993–1999. A central question in the article is how macroeconomic developments relate to the credit ratings carried out, and to the actual risk of bankruptcy. We also examine whether credit ratings contain information on the banks' future credit losses, and whether the banks appear to take account of the ratings by the credit rating agencies in the credit granting process.

Credit rating agencies in Sweden and abroad

In their role of financial intermediaries, the banks are assumed to have an information advantage, which makes them particularly suited for deciding which investment projects (credit applications) to grant and which to reject. In practice, this advantage is partly achieved through the purchase of external risk assessments of both existing and potential counterparties. The banks' need for forecasts of future credit risks has provided the basis of an industry specialising in the credit rating of limited companies, partnerships and sole traders as well as private persons. This industry is currently dominated in Sweden by two agencies, UC AB and Dun & Bradstreet Sverige AB (D&B), which jointly have a market share of approximately 90 per cent. UC is a

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wholly owned subsidiary of the Swedish banks and thus has almost a monopoly position with regard to the sale of credit ratings to the banks. D&B, like UC, has a large sales volume of corporate information, but works to a greater extent for other issuers of credit, such as the retail trade, financial companies, housing companies and telecoms companies. UC has a dominant position in the private person information sector.

Swedish credit rating agencies differ from their foreign counterparts as regards both method and scope.

Swedish credit rating agencies differ from their foreign counterparts as regards both method and scope. Swedish agencies rate in principle all Swedish companies, while traditional US credit rating agencies, such as Moody's and Standard & Poor's, rate a company at the company's request.[1] This means in practice that UC and D&B continuously rate between 500,000 and 750,000 companies, while Moody's and Standard & Poor's cover a much smaller proportion of companies. The difference is explained by the rating method. The US ratings are determined by an officer through extensive investigations of the objects' creditworthiness. Both Swedish agencies utilise the relatively good access to reliable data in Sweden in automated computer-based ratings, though essentially different from each other. It is important to note that UC and D&B use the strong relationship existing between the banks' total credit losses and the bankruptcy trend for Swedish companies. Bankruptcy risk is assumed in practice to be directly related to credit risk.[2] The reason for this is that information on company bankruptcies is public and collected centrally, while the banks' credit failures are corporate secrets, which are not disclosed.

It is clear that both these agencies' credit ratings are of great importance for the functioning of the Swedish financial markets.

It is clear that both these agencies' credit ratings are of great importance for the functioning of the Swedish financial markets. The banks use external credit ratings in their credit assessments. In addition, the banks use external credit ratings as an input in their internal credit rating systems, though to a varying extent. This means that external credit rating can have an impact on the banks' allocation of buffer capital, at least to the extent that internal credit

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[1] There are other international players such as FairIsaac and Experian which use methods similar to UC's. FairIsaac has developed a scoring model for small and medium-sized companies in the USA. Access to information is, however, considerably poorer than in Sweden. Credit rating models based on subjective sets of rules of the type used by D&B (see below) are provided by a number of international credit rating agencies.

[2] Note that both D&B and UC's insolvency criterion for limited companies includes bankruptcy (legal force), distraint, scheme of arrangement, suspension of payments and company reconstruction. In the remainder of the article, we use their insolvency criterion as the operational measure of bankruptcy.

rating systems are used for such purposes. One reason for the Riksbank to study Swedish credit ratings is the bank's monitoring of the financial markets with regard to the stability of the system. The banks' future credit losses are a central issue in this task, and external credit ratings appear to be a possible forecasting tool, due to the relation between credit losses and the bankruptcy trend for Swedish companies. Non-financial companies rated by D&B and UC accounted for over 75 per cent of the banks' credit losses during the banking crisis of 1991–1993, and it may be assumed for good reasons that credit losses in the corporate sector precede credit losses in the household sector.

The usefulness of credit ratings for these purposes may be studied from a number of starting points. One important, and the one we have chosen, is their ability to incorporate macroeconomic effects, i.e. to what extent do

To what extent do improvements or deteriorations in the general corporate climate have an impact on credit ratings?

improvements or deteriorations in the general corporate climate have an impact on credit ratings? D&B and particularly UC have very generously given us access to quarterly and monthly data on credit ratings (forecasts) and the proportions of bankruptcies (outcomes) for a period which includes the economic upturn since the banking crisis (1993–1998). By analysing this data we will try to shed light on the following questions:

- How have D&B and UC's credit ratings varied over time and is there a co-variation between them?
- Can a macroeconomic impact on credit ratings be shown?
- To the extent that the forecast and outcome for percentage of bankruptcies differ, is the difference between them systematically related to macroeconomic developments?
- To what extent can credit ratings be used to forecast the banks' future credit losses?
- Is there a relationship between credit ratings and the growth rate in the banks' lending to companies and households? Which other macroeconomic variables are important?

Within the scope of the revision of the capital adequacy regulations, the Basle Committee on Banking Supervision at the Bank for International Settlements has commissioned an extensive study on external credit ratings.[3] One basic aim of

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[3] See BIS (2000).

this study is to examine the possibilities of using external credit rating as a basis for determining the banks' capital adequacy. However, the macroeconomic impact on credit ratings is not studied explicitly in BIS (2000). Lindhe (2000) identifies the ability of individual macroeconomic variables to forecast aggregated bankruptcies using Swedish data.

Method and data

This section provides an account of the methods developed by UC and D&B to produce credit ratings.

This section provides an account of the methods developed by UC and D&B to produce credit ratings. We also briefly discuss differences in the content of the credit ratings – or interpretation – and application between the two agencies, since the agencies' rating philosophy is of importance for their choice and design of method. We will then go on to discuss the data made available to us by the agencies and conclude by presenting some basic characteristics of the data.

Models and methodology

D&B uses a five degree scale for risk classification.

D&B uses a five degree scale for risk classification, which coincides with the principal shareholder Moody's classification. Limited companies are assigned the credit ratings AAA, AA, A, B and C. Partnerships and sole traders cannot be assigned AAA, the best credit grade. D&B's rating method uses an *expert system*. Accounting data, industry analysis, the company's payment record, and information on the individuals on the company's board (such as wealth, income and records of non-payment) are evaluated in a formalised, computer-based set of rules.[4] The criteria determining that a company is placed in a certain class are based on expert assessments, hence the name expert system.

UC determines credit ratings by means of a statistical method based on a logistic regression model combined with a decision tree.

UC determines credit ratings by means of a statistical method based on a logistic regression model combined with a decision tree. Previously, only limited companies and partnership were rated using this method, but as from this year sole traders are also rated. Like D&B, UC classifies companies into

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[4] Since knowledge of the expert system's structure and exactly which information is used is a trade secret, we cannot be more precise in our presentation. However, our impression is that great importance is attached to both accounting data for the company and information on the individuals on the board, e.g., records of non-payment.

five risk classes: 1, 2, 3, 4 and 5. Companies in class 5 have the best creditworthiness and those in class 1 the poorest. The credit rating model uses in principle the same information as D&B's expert system, i.e. corporate information and personal information concerning board members. The model's end product is an estimate of the probability that the company in question will go into bankruptcy within the next two-year period. UC's risk classes are quite simply a classification of the bankruptcy probability distribution into five intervals. For example, companies with an estimated bankruptcy probability greater than 25 per cent are placed in risk class 1.[5]

Neither of the two credit rating agencies has included macroeconomic variables in their rating models, but for different reasons. In order to understand these, it must be taken into account that the agencies' choice of

Neither of the two credit rating agencies has included macroeconomic variables in their rating models.

credit rating method reflects an important difference in their approach to what a credit rating represents. D&B aims with its method to measure the *relative* creditworthiness of a company, while UC tries to measure the *absolute* risk. One important implication of the difference in approach is that according to D&B's approach an A-rated company would be an A-rated company whether there is a boom or a recession. UC, on the other hand, will alter the risk class of many companies when the economic situation changes, since the estimated bankruptcy probabilities change, while the class limits are fixed. There is thus no reason for D&B to explicitly include macroeconomic variables in the expert system. In the case of UC, it can be argued that it is possible that the model's variables indirectly reflect macroeconomic developments. If this is true, it follows that UC's credit ratings can be useful as indicators of cyclical creditworthiness in the corporate sector as a whole. For this reason, the Riksbank currently uses UC's ratings in its Financial Stability Report as an indicator of the absolute risk in the corporate sector, and thus of future credit losses. Despite the fact that D&B's credit ratings are only intended to measure the relative risk, they may also be of interest to study from a financial stability perspective. They may be thought to reflect a possible risk build-up, i.e. increased credit granting by the banks in an economic upturn, and thus the formation of companies of poorer quality in a boom which are not robust in the next downturn. If this were the case, the proportion of companies in classes B and C would tend to increase as the boom peaks, and D&B's

[5] Note that UC – besides providing the relevant risk class – also provides the estimated bankruptcy probability for a company.

ratings could function as an indicator of risk build-up, for example when the Riksbank carries out its financial stability analysis.

DATA

The data made available by D&B and UC differs as a result of the differences in the agencies' rating methods. From D&B we obtained quarterly statistics for the period Q3 1993 to Q4 1999 on the number of companies in different risk classes and the total number of rated companies, broken down into limited companies, partnerships and sole traders.[6] We also obtained information on the actual bankruptcy outcome for the different risk classes for various time-frames (three months to three years) for the period 1996–1999.

From UC we obtained statistics on the distribution of limited companies over the bankruptcy probability distribution percentiles. This is explained most simply by an example: in April 1993, UC assigned 12,804 companies estimated probabilities of bankruptcy within two years in the 3.00–3.99 percentile. In addition, we obtained statistics on the outcome, i.e. the proportion of limited companies in a given percentile, which actually went into bankruptcy. With reference to the example above, the outcome statistics provide information on the proportion of the 12,804 companies in the 3.00–3.99 percentile which actually went into bankruptcy during the two-year period April 1993 to April 1995. These forecast and outcome statistics are available on a monthly basis for the period April 1993 to February 1998. The reason that they only extend to February 1998, and not to 1999 as for D&B, is that it takes two years for UC to reconcile the forecast with the outcome. Since GDP data is only available on a quarterly basis, we have used the quarterly mean values for the monthly observations.[7] Prior to May 1997 (and thus during the greater part of our investigation period), UC used the following percentiles for classification into risk classes 1 to 5: class 5 had a bankruptcy forecast of ≤3.00 per cent, companies in class 4 a forecast of 3.01–5.00 per cent, class 3 a forecast of 5.01–10.00 per cent, class 2 a forecast of 10.01–25.00, and class 1 a forecast of ≥ 25.01 per cent.[8] As from May 1997, the limits were altered to

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[6] Note that D&B does not assign all companies a credit rating. This applies to newly registered companies as well as a small number of other companies where adequate information is not available. UC also "extinguishes" certain companies if specific criteria are met. However, for neither D&B nor UC, this does not apply to a large proportion of companies.

[7] In cases where we have not obtained information for each month in a given quarter from UC, the quarterly observation is based only on the month/months for which information was provided. For example, the information for Q1 1998 is based only on information for January and February.

[8] The reason that UC altered the class limits in 1997 was that a new model was introduced at that time.

≤1.04 per cent for class 5, 1.05–3.04 for class 4, 3.05–10.49 for class 3, 10.50–25.49 for class 2, and ≥25.50 for class 1.[9]

Diagrams 1 and 2 show how the risk classes evolve over time for UC and D&B. We have taken an average of the quarterly observations for a given year in the diagrams. In Diagram 1, we see a significant movement from poorer to better

Diagram 1. Distribution of limited companies according to UC's risk classification, 1993-1998

Per cent

■ Risk class 5   ■ Risk class 4   ■ Risk class 3   ■ Risk class 2   ■ Risk class 1
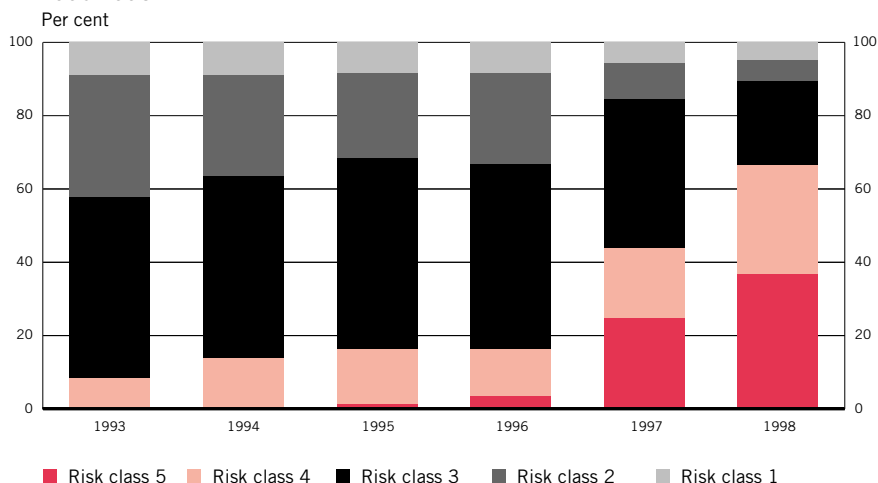
Diagram 2. Distribution of limited companies according to D&B's risk classification, 1993-1999

Per cent

■ AAA   ■ AA   ■ A   ■ B   ■ C
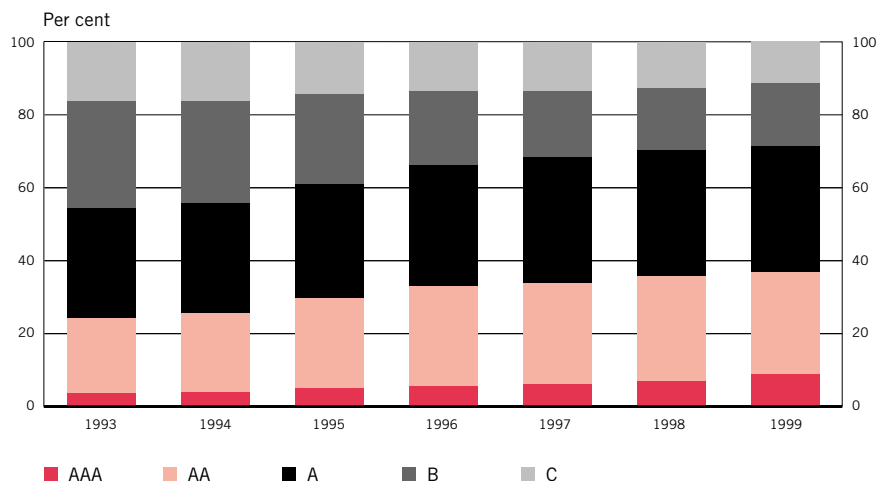
[9] Note that since we only have statistics for the proportion of companies in whole figure percentiles (0.00–0.99, 1.00–1.99, 2.00–2.99, etc.), we cannot replicate UC's risk classes exactly.

risk classes. There were practically no companies in risk class 5 in 1993 and 1994, while over 20 per cent of the total of approximately 250,000 active limited companies were in this risk class in 1998. From the diagrams we can see that risk classes 2 and 3 have decreased and risk classes 4 and 5 have increased. The proportion of limited companies in the poorest risk class 1 is most constant over time. In Diagram 2, we see a considerably smaller, but nevertheless marked movement. In particular, the proportion of companies in risk class B has fallen and the proportion of limited companies in class AAA has increased. Table 1 confirms that the proportion of companies has increased most in the best risk class (AAA/5) and fallen most in the second poorest class (B/2). Here we see that the correlations (which measure the degree of linear co-variation) between UC and D&B's credit ratings are largest for these risk classes (0.66 and 0.78).

Table 1. Correlations between D&B and UC's risk classes during the period Q3 1993–Q1 1998

| UC's risk classes | D&B's ratings | | | | |
	AAA	AA	A	B	C
5	0.66	0.51	−0.37	−0.77	−0.72
4	0.60	0.49	−0.33	−0.73	−0.66
3	0.71	0.37	−0.35	−0.75	−0.77
2	−0.69	−0.50	0.39	0.78	0.74
1	−0.49	−0.35	0.21	0.62	0.60

Note. The correlations in the table measure the degree of linear co-variation between two risk classes over time. A value of 1 implies a perfect positive relation, and a value of −1 a perfect negative relation.

On average, companies have been assigned a considerably increased credit rating during the period.

From Diagrams 1 and 2 we can conclude that, on average, companies have been assigned a considerably increased credit rating during the period. It also seems reasonable to believe that actual average creditworthiness has increased, since the period coincides with a strong economic upturn. Since UC aims to measure absolute creditworthiness in each time period, and D&B relative creditworthiness, it is also natural that UC's credit ratings reflect the economic upturn to a greater extent. For D&B, the results are problematic, since it explicitly intends to measure only relative creditworthiness. One possible explanation for the trend in its ratings during the period may be that the sector composition has changed. Another possible explanation may be that D&B's ratings do not solely take into account relative outcomes, but also certain absolute key ratios. Irrespective of the explanation for the marked trend, further data is needed in order to analyse whether D&B's credit ratings are informative regarding a possible build-up of risk in the corporate sector as a whole. This, in combination with our primary interest in the absolute risks in light of the questions formulated in the introduction, means that we will

focus on UC's credit ratings in the remainder of the article. We will begin our analysis by evaluating UC's bankruptcy forecasts per se, and then proceed to their relations to the business cycle.

We have chosen to evaluate UC's bankruptcy forecasts at three levels. The first level is with regard to the estimated bankruptcy probabilities at a given date, the second level concerns UC's risk classes over time, and at the third level we aggregate the risk classes and study time series for bankruptcy forecasts and actual outcome.

We have chosen to evaluate UC's bankruptcy forecasts at three levels.

Diagram 3 shows the forecasts and outcomes for UC's bankruptcy probabilities for three arbitrarily chosen months: one at the beginning, one in the middle and one at the end of the investigation period. If the forecast and actual proportion of bankruptcies coincided in each percentile, all observations in the diagrams would lie on a 45 degree line from the origin and thus have a slope coefficient of 1. However, we see that this is not the case, in particular not for April 1993 where large deviations occur, particularly for the higher risk forecasts. In certain percentiles – particularly the higher ones – the number of companies is very small, however, which may give a slightly misleading picture of the model's forecasting ability. For December 1997, which shows the results for the new model used by UC, the forecasts appear to correspond considerably better with the outcome. A formal test of the hypothesis that the slope coefficient is 1 for the three chosen months results in non-rejection only in the case of December 1997. This indicates that UC made systematic forecasting errors during the period, at least on some occasions.

UC made systematic forecasting errors during the period, at least on some occasions.

Since the period April 1993 to April 1996 coincided with a strong economic upturn and the recovery of the Swedish economy, it is of interest to study whether the forecasting errors made by UC during this period are random or systematically related to economic development. This analysis is easier to carry out for the risk classes presented by UC than for the percentiles which we examined in Diagram 3, since there are five risk classes and 100 percentiles. If the errors are systematic and in the same direction for each percentile, this will be seen more clearly in an analysis of the risk classes. Even though the results in Diagram 3 indicate satisfactory forecasts of the frequency of bankruptcies – at least for the end of the period – this is no guarantee that the results for the risk classes are equally good.

Even though the results in Diagram 3 indicate satisfactory forecasts of the frequency of bankruptcies, this is no guarantee that the results for the risk classes are equally good.

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Diagram 3. Forecasted and actual frequency of bankruptcies for limited companies according to UC's credit ratings

April 1993

y=1,0786X

March 1996

y=0.9362X

December 1997

y=0.9672X
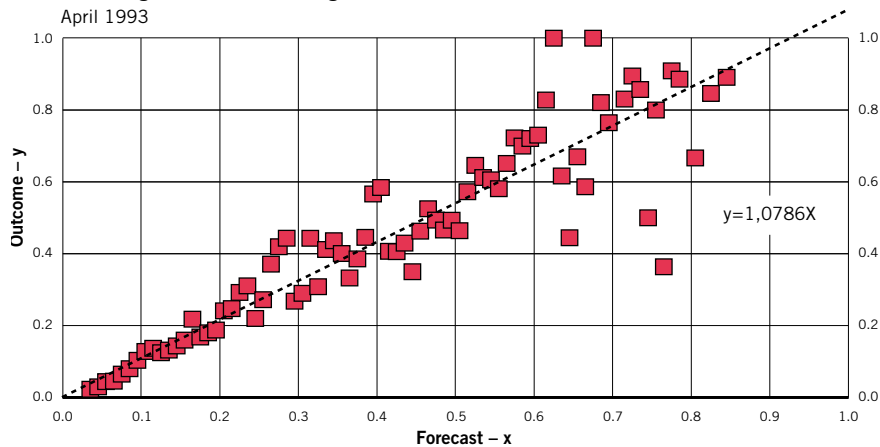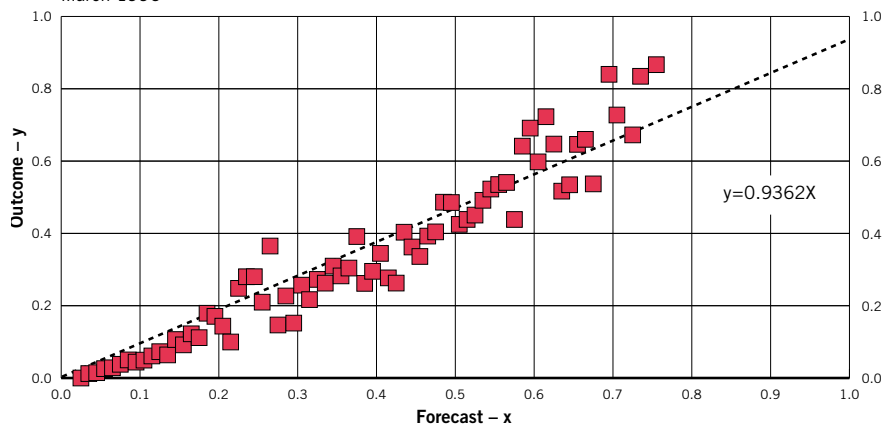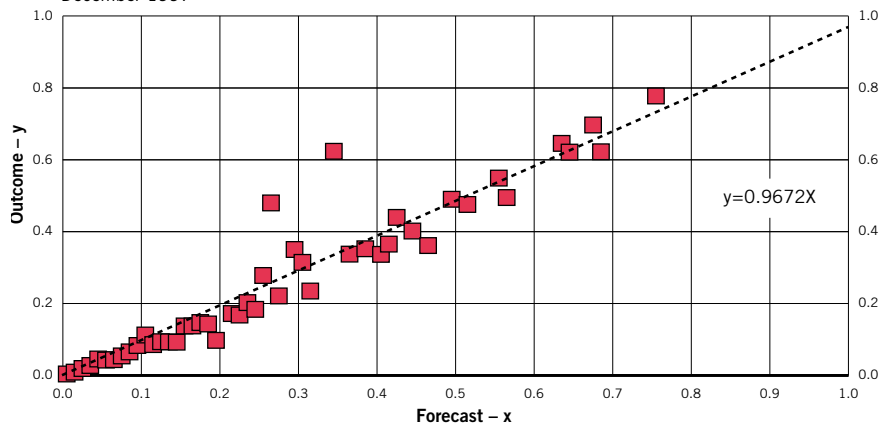
Diagram 4. Forecasted and actual proportion of bankruptcies in UC's risk classes,   Q2 1993-Q1 1998

Risk class 1

Risk class 2

Risk class 3

Risk class 4

Risk class 5
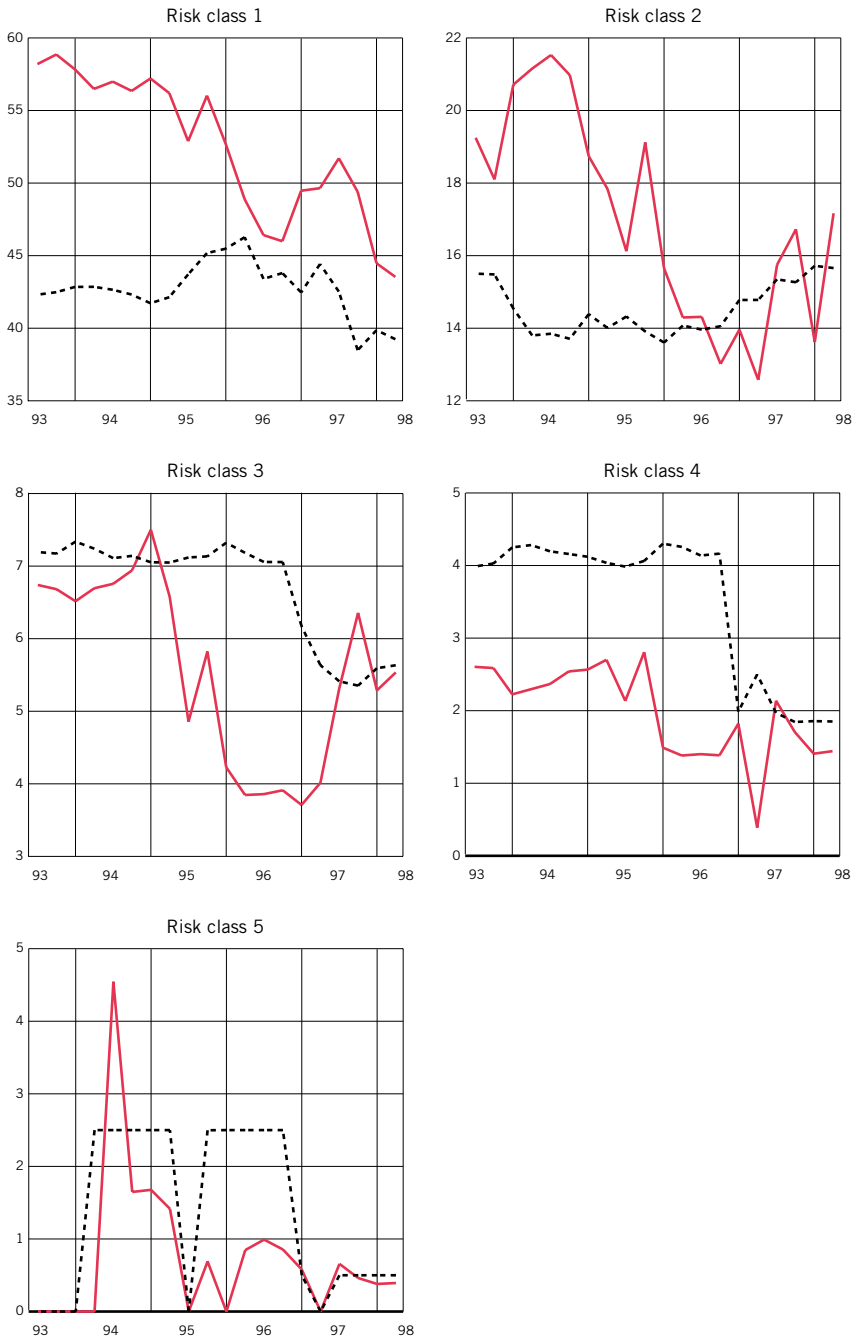
Diagram 4 shows the forecast and actual proportion of bankruptcies in each risk class during the period Q2 1993 to Q1 1998.[10] It appears from the diagrams that UC systematically overestimated the bankruptcy risk for risk classes 3 and 4 and underestimated the bankruptcy risk for classes 1 and 2. Following the introduction of the new model, this tendency to overestimate and underestimate fell sharply. Since a large number of companies are in risk classes 3 and 4, this indicates that the model systematically overestimated the bankruptcy risk for limited companies as a whole during the period 1994–1996.

Diagram 5. Forecasted and actual proportion of bankruptcies among limited companies rated by UC, Q2 1993-Q1 1998

Per cent
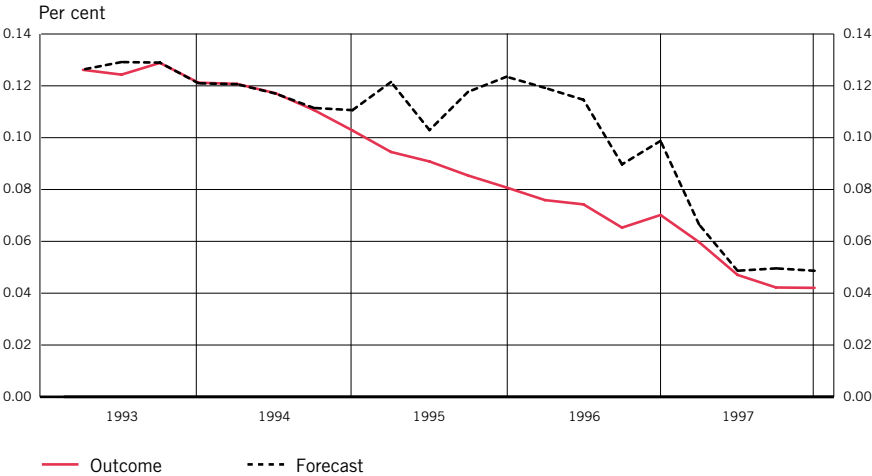
Finally, Diagram 5 shows the aggregated bankruptcy forecasts over time, i.e. forecast for *all* limited companies rated by UC. In addition, the diagrams show the aggregated actual proportion of bankruptcies. We can confirm that the model systematically overestimated the bankruptcy risk for limited companies as a whole during the period 1994–1996. The ratings reflect the falling bankruptcy risk seen over the whole period, but with a clear time lag.

[10] The series of forecasts and outcomes for risk class 5 are not particularly informative at the beginning of the period, since few companies were in this class at that time.

Importance of macroeconomics on credit ratings

Since the systematic overestimate of the bankruptcy risk shown in Diagram 5 coincided with a period of strong economic upturn, it is of interest to study whether macroeconomic developments can explain the differences between forecast and outcome. This is studied in this section.

Diagram 6 shows the development of some key macroeconomic variables during the period Q1 1980 to Q2 2000. The first frame shows the growth rate in

Diagram 6. Macroeconomic development, Q1 1980-Q2 2000
Per cent

— Real GDP growth
--- Actual minus potential GDP

— Changes in real exchange rates

— 6-month interest rate
--- 5-year interest rate

— Annual changes in housing prices
--- Annual changes in credit volumes
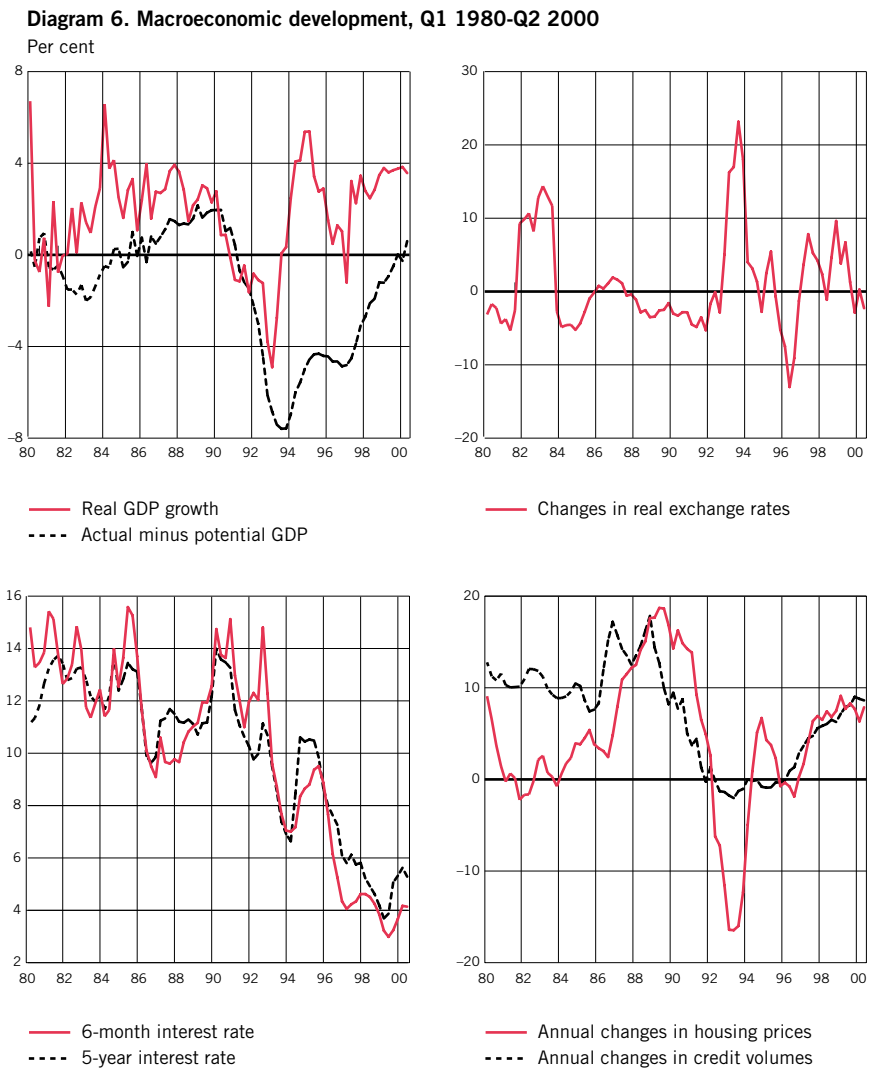
real GDP at 1995 prices together with the GDP gap, which is an estimate of the difference between the actual and potential GDP level.[11] The deep recession can be clearly seen from the diagram, with strongly negative growth figures (over 4 per cent at most) and a GDP gap of over 8 per cent. The strong economic improvement of 1994–1996 is also clearly seen. The second frame shows the real exchange rate (TCW) development (a higher value implies a depreciation of the krona).[12] The major depreciation of the krona in 1993 is apparent. After that, the krona strengthened, particularly in 1996. The third frame shows the six-month nominal interest rate for Treasury bills and the five-year nominal interest rate for government bonds, where we can see how the Riksbank established the credibility of the Swedish inflation target in 1994–1995. The last frame shows the growth rate in nominal credit to companies and households together with the growth rate in nominal house prices. The dramatic impact of the deep recession on house prices and the credit growth rate is obvious.

We have carried out a number of regression analyses.

In order to examine how well macroeconomic developments can explain the variation in actual and forecasted bankruptcies for companies rated by UC, we have carried out a number of regression analyses. In these analyses, we have used some central macroeconomic variables as explanatory variables, and the actual and forecasted proportions of bankruptcies in Diagram 5 as dependent variables.

The aim of the analysis is to answer two questions: can UC's forecasts be shown to deviate systematically from the actual bankruptcy outcome and could UC have improved its forecasts?

The aim of the analysis is to answer two questions. Firstly, can UC's forecasts be shown to deviate systematically from the actual bankruptcy outcome given the information available at the forecast date? In other words, would UC have improved its forecasts if it had incorporated the effects of current and previous outcomes of macroeconomic variables? We shall study this by estimating three regression equations; one for UC's forecasts, one for the actual bankruptcy outcomes, and one for the difference between UC's forecasts and the actual bankruptcy outcomes, i.e. the forecasting errors. If the first two regressions result in similar estimated coefficients, and if the regression for the forecasting errors gives insignificant coefficients, we can conclude that UC evidently would not have improved its bankruptcy forecasts by including current and previous

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[11] Here we use Apel and Jansson's (1999) measure of the GDP gap. We have also experimented with GDP gaps generated by the Hodrick–Prescott (HP) filter, but found that the results are invariant to the choice of measure.

[12] All growth rates, or annual changes, are measured using quarterly data by first taking the logarithm of the variable and then the fourth difference.

outcomes of the macroeconomic variables. The second question concerns the possibility of improving the current forecast for bankruptcies within the two-year forecast period by utilising information on macroeconomic developments during the forecast period itself. The interesting question here is whether there is a systematic relation between UC's forecasting errors and the macroeconomic outcome during the two-year forecast period. If this is the case, this means that UC could improve its bankruptcy forecasts by making these contingent on forecasts of macroeconomic developments. The regression results are shown in Table 2.[13]

Tabell 2. Regression analysis of forecasted and actual proportions of bankruptcies Q2 1993–Q1 1998

Explanatory variables	Dependent variable							
	UC's forecasted proportion of bankruptcies			Actual proportion of bankruptcies			Forecast – Actual outcome	
	1	2	3	4	5	6	7	8
Current real GDP growth	−0.59** (−2.75)			−0.19 (−0.83)				
Current GDP gap		−1.70*** (−7.25)			−1.57*** (−9.54)		−0.13 (−0.44)	
Current 6-month interest rate	1.15*** (5.24)	0.62*** (4.60)		1.08*** (4.73)	0.69*** (7.31)		−0.07 (−0.44)	
Current changes in real exchange rate	−0.05 (−0.95)	−0.15*** (−4.49)		0.10* (2.02)	−0.02 (−1.02)		−0.13*** (−3.10)	
GDP gap 2 years ahead			−2.33*** (−8.21)			−0.91*** (−8.30)		−1.41*** (−6.55)
6-month interest rate 2 years ahead			−0.43* (−2.04)			0.98*** (11.89)		−1.42*** (8.77)
Change in real exchange rate 2 years ahead		−0.16** (−2.78)			0.04* (1.79)		−0.20*** (−4.57)	
Explained variance	0.65	0.88	0.91	0.65	0.95	0.99	0.46	0.84
Autocorrelation problem	YES	NO	NO	YES	YES	NO	YES/NO	NO
Normal distribution problem	NO	NO	NO	NO	NO	NO	NO	NO
Spurious relation, probability	0.18	0.03	0.09	0.33	0.04	0.07	0.41	0.03
No. of observations	20	20	20	20	20	20	20	20

Note: A constant has been included in the regressions but is not reported. t-values for the estimated parameters are given in brackets. *(**)[***] show that a parameter is statistically significant at the level of 10(5)[1] per cent. The test for spurious relations refers to the regression's explained variance. The distribution for the explained variance assuming the null hypothesis that no relation exists is estimated by simulation. The value shown refers to the probability that a simulated explained variance exceeds the observed variance in the regression.

[13] We have also experimented with other macroeconomic variables such as inflation, the money supply, the rise in house prices, credit growth to private companies and households, the annual change in AFGX. None of these variables, however, appear to be of importance to the analysis results in Table 2.

Columns 1 and 2 in Table 2 show the results of regressions using two different measures of economic activity; the growth rate in real GDP on the forecast date and the size of the GDP gap on the forecast date. The results show that the GDP gap reflects the indirect macroeconomic effect on UC's forecasts much better than the growth rate in GDP. The proportion of the variation in the forecasted percentage of bankruptcies explained by the model rises from 70 to 90 per cent and the mis-specification due to autocorrelation disappears. Columns 4 and 5 show corresponding results for the actual proportion of bankruptcies. It is seen that the GDP gap is a better measure of economic activity than the growth rate for explaining the variation in the actual proportion of bankruptcies, analogous to the results in columns 1 and 2.

The GDP gap is a better measure of economic activity than the growth rate for explaining the variation in the actual proportion of bankruptcies, analogous to the results in columns 1 and 2.

The results in columns 2, 5 and 7 illustrate the first question: could UC improve its forecasts by including current and previous macroeconomic outcomes? The estimates of the coefficients in columns 2 and 5 are markedly similar, and consequently the estimates of the forecasting error regression in column 7 are insignificant, with the exception of the coefficient for the real exchange rate. We can thus state that UC's forecasts indirectly incorporate the effects of historical macroeconomic developments through the forecasting model's company-specific variables.

UC could improve its forecasts by trying to incorporate forecasts of future macroeconomic developments.

Columns 6 and 8 show analyses relating to our second question; can the incorporation of macroeconomic outcomes during the forecast period improve UC's bankruptcy forecasts? Our results suggest this to be the case. When we use macroeconomic developments during the measurement period two years ahead (column 6), we can explain a full 99 per cent of the variation in the actual proportion of bankruptcies, which can be compared with 95 per cent in the equation using historical macroeconomic outcomes (column 5). What is more important is that the equation in column 8, which explains the forecasting error, gives significant estimates of the coefficient. The conclusion is that UC could improve its forecasts by trying to incorporate forecasts of future macroeconomic developments.

A potential problem in this context is, however, that the high explanatory values may be a result of chance, since we have an investigation period characterised by strong trends in the dependent (see Diagram 5) and several of the

explanatory variables (see Diagram 6 the period 1993–1998).[14] We have therefore examined whether this is the case in our analyses. Under the heading "Spurious relations" we show estimated probabilities for our results being a result of spurious rela-

Our conclusion is that macroeconomic developments are of central importance to the actual and – indirectly – the forecasted proportions of bankruptcies.

tions.[15] As can be seen from the table, however, these probabilities are very low, less than 0.10 in the important cases. Together with our a priori opinion that these variables ought to be related to each other, this means that we feel confident of our conclusion that macroeconomic developments are of central importance to the actual and – indirectly – the forecasted proportions of bankruptcies.

Credit ratings as forward indicators of credit losses

In this section, we shall examine whether UC's forecasts can function as a forward indicator of the banks' future credit losses. This is, of course, the ultimate reason for the private banks – and also for the Riksbank – to use UC's ratings as forecasts of credit losses.

In this connection, it is important to examine in greater detail whether we can explain UC's forecasting errors, measured as the forecast minus the actual proportion of bankruptcies two years ahead, by previous

UC's ratings may be less useful as an indicator of future credit losses in situations where macroeconomic developments change.

changes in macroeconomic developments. There are good reasons to believe that it is precisely in economic upturns and downturns that UC's forecasts may lag behind actual developments. Since we have data for a period characterised by a strong upturn (see Diagram 6), this analysis can be carried out. One test of whether UC's forecasts correctly reflect the effects of changes in macroeconomic

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[14] See Granger and Newbold (1974).

[15] Spurious relation probabilities are calculated as follows. Firstly, equations are estimated for all the variables in Table 2. In these equations, the variables are modelled only on their own history, so-called autoregressive models. A sufficient number of lags is included so that the error term in the equation is random. Secondly, these estimates are used to construct artificial random samples by generating error terms using a random number generator with appropriate variance. Finally, all the equations in Table 2 are estimated again for the simulated random sample, and we record the explained variance. By repeating stages 1 to 3 a large number of times, a distribution of explained variances is obtained for each column in Table 2. By examining how many outcomes in the simulated distribution exceed the observed value obtained in the regression using actual data, an estimated probability is obtained. Since the adjusted explanatory values in the simulated distribution are generated using the hypothesis that all the variables are only explained by their own history, and that they are consequently independent of one another, this probability measures the risk that the regression in question is a spurious relation.

developments is to examine whether the forecasting error can be explained sys-
tematically by *changes* in macroeconomic variables. The results in Table 3 confirm
this to be the case. For example, when the change in the GDP gap one year earli-
er was positive, UC overestimated the proportion of bankruptcies two years
ahead. The conclusion is that UC's ratings may be less useful as an indicator of
future credit losses in situations where macroeconomic developments change.

Table 3. Regression analysis of difference between forecast and actual proportion of bankruptcies Q2 1993–Q1 1998

	Dependent variable
Explanatory variables	UC's forecast minus actual proportion of bankruptcies
Changes in GDP gap 1 year earlier	0.65***
	(6.17)
Changes in 6-month interest rate 1 year earlier	0.25***
	(3.81)
Changes in the growth rate of the real exchange	0.05**
rate 1 year earlier	(2.83)
Explained variance	0.82
Autocorrelation problem	NO
Normal distribution problem	NO
Spurious relation. probability	0.01
No. of observations	20

Note: A constant has been included in the regressions but is not reported. t-vaues for the estimated para-
meters are given in brackets. *(**)[***] show that a parameter is statistically significant at the level of
10(5)[1] per cent. The test for spurious relations refers to the regression's explained variance. The distrib-
ution for the explained variance assuming the null hypothesis that no relation exists is estimated by simu-
lation. The value shown refers to the probability that a simulated explained variance exceeds the observed
variance in the regression.

In order to further examine whether UC's ratings can be used as an indicator of
future credit risks, we have carried out a Granger (1969) causality test between
UC's forecasted proportion of bankruptcies and the banks' total credit losses on
loans to Swedish companies and households as a percentage of nominal GDP.[16]
The test involves examining whether the *current* forecasted proportion of bank-
ruptcies can explain the variation in *future* credit losses. We also check that the
logic is not flawed, by examining whether current forecasts have predictive infor-
mation for future credit losses, and at the same time current credit losses do not
have predictive information for future forecasts. We have also carried out the
analysis for the actual proportion of bankruptcies and the estimated proportion of
bankruptcies predicted by the macroeconomic variables in equation 6 in Table 2.

Table 4 shows the results of the Granger causality analysis. We see that UC's
ratings do not function as a leading indicator of aggregated credit losses according

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[16] This is a common test in time series analysis to examine whether a variable has the predictive ability to explain the
variation in another variable and vice versa.

to this test. We also see that credit losses can-
not be used to predict UC's forecast propor-
tion of bankruptcies. However, we see that the
actual proportion of bankruptcies can be used
as a leading indicator of future credit losses.

The converse relation does not apply. One implication of this is that if UC's fore-
casts were improved so that their deviation from the actual proportion of bankrupt-
cies was reduced, UC's ratings would be of more use as an indicator of aggregated
future credit losses. Finally, but nonetheless interestingly, we see that the proportion
of bankruptcies estimated on the basis of the macroeconomic variables in column 6
in Table 2 can be used as an indicator of future credit losses. While the converse re-
lation does not apply (current credit losses cannot predict the estimated proportion
of bankruptcies). This means that if a good opinion could be formed on the macro-
economic outcome two years ahead (which is, for example, the Riksbank's forecast
horizon for monetary policy), a reasonable forecast of banks' future credit losses
could be made by means of the equation in column 6.

Table 4. Result of Granger causality test Q2 1993–Q1 1998

UC's forecasted proportion of bankruptcies	$\not\Rightarrow$	Credit losses on loans to companies and households (proportion of nominal GDP)
Credit losses on loans to companies and households	$\not\Rightarrow$	UC's forecasted proportion of bankruptcies (proportion of nominal GDP)
Actual proportion of bankruptcies	$\Rightarrow$	Credit losses on loans to companies and households (proportion of nominal GDP)
Credit losses on loans to companies and households	$\not\Rightarrow$	Actual proportion of bankruptcies (proportion of nominal GDP)
Forecast proportion of bankruptcies estimated using macroeconomic variables (equation 6 in Table 2)	$\Rightarrow$	Credit losses on loans to companies and households (proportion of nominal GDP)
Credit losses on loans to companies and households	$\not\Rightarrow$	Forecast proportion of bankruptcies estimated using macroeconomic variables (equation 6 in Table 2) (proportion of nominal GDP)

Note: The chosen significance level for the test is 5 per cent. Two lags have been used. The number of
observations is thus 18.

Overall, this means that UC's ratings are currently of limited use as a leading
indicator of aggregated future credit losses. When the economic situation
changes, UC's ratings risk lagging behind the actual bankruptcy risk for rated
companies, since the model does not explicitly incorporate future macroeconom-
ic developments. This is a potential problem if UC's ratings are used as an impor-

tant factor in the banks' granting of credit. In this context, it appears that a good picture of future macroeconomic developments is of central importance for assessing the bankruptcy risk in the corporate sector, and thus also the banks' future credit risks. Our results indicate that improved modelling of macroeconomic developments could make UC's bankruptcy forecasts useful as indicators of future credit losses.

Importance of credit ratings for the banks' credit granting

Since the results of the analysis above indicate that UC's ratings do not fully reflect aggregated future credit risks, it is important to form an opinion on the extent to which the banks take account of UC's forecasts when granting credit. If they take great account of UC's ratings, this may, for example, lead to the banks underestimating credit risks when the economic situation deteriorates rapidly.

Table 5 shows the results of an analysis which examines to what extent the variation in the growth rate in nominal credit to companies and households can be explained by UC's forecasted proportion of bankruptcies and other key macroeconomic variables. From the table we see that the single variable which can explain most of the variation in credit growth is UC's forecasted proportion of bankruptcies. It can alone explain 86 per cent of the variation in credit growth. The other two most important variables seem to be the six-month Treasury bill rate and the GDP gap. Together these variables can explain a full 98 per cent of the variance in the credit growth rate (see column 7). The house price development also seems to be important (see column 6). If the six-month rate and the five-year rate, or alternatively house prices, and the GDP gap are incorporated in the same analysis, the six-month rate and the GDP gap are found to have a marginally higher explanatory value. Note that it does not seem possible to obtain a well-specified equation for the credit growth rate unless UC's forecast proportion of bankruptcies is included in the analysis. Autocorrelation problems arise, which illustrates the importance of including this variable in modelling the banks' credit granting.

To summarise, the results in this section indicate that the banks have taken account of UC's ratings. According to the regressions, the banks have also taken

account of other variables, such as interest rates, house prices and the economic situation.

Table 5. Regression analysis of growth rate in the banks' lending to companies and households Q2 1993–Q1 1998

Explanatory variables	Dependent variable						
	Growth rate in credit to companies and households (nominal)						
	1	2	3	4	5	6	7
UC's forecasted proportion of bankruptcies	−0.84*** (−10.50)					−0.46*** (−7.14)	−0.40*** (−6.71)
6-month Treasury bill rate		−1.12*** (−7.74)				−0.63*** (-8.46)	−0.64*** (-9.92)
5-year government bond rate			−1.04*** (−4.89)				
Growth rate in housing prices (nominal)				0.193** (2.81)		0.05** (2.50)	
GDP gap					1.21*** (3.88)		0.33*** (3.64)
Explained variance	0.86	0.77	0.57	0.30	0.46	0.97	0.98
Autocorrelation problem	YES/NO	YES	YES	YES	YES	NO	NO
Normal distribution problem	NO	NO	NO	NO	NO	NO	NO
Spurious relation. probability	0.03	0.06	0.13	0.18	0.26	0.00	0.00
No. of observations	20	20	20	20	20	20	20

Note: A constant has been included in the regressions but is not reported. t-values for the estimated parameters are given in brackets. *(**)[***] show that a parameter is statistically significant at the level of 10(5)[1] per cent. The test for spurious relations refers to the regression's explained variance. The distribution for the explained variance assuming the null hypothesis that no relation exists is estimated by simulation. The value shown refers to the probability that a simulated explained variance exceeds the observed variance in the regression.

Conclusions

The analyses leads us to draw the following conclusions.

Both UC and D&B's credit ratings co-vary with macroeconomic developments. But UC's credit ratings do so to a greater extent. This implies that UC's credit ratings should

Both UC and D&B's credit ratings co-vary with macroeconomic developments.

be of greater interest to study as a useful indicator of absolute credit losses. In the case of D&B, which has an explicit policy of measuring relative creditworthiness, the results mean that its ratings cannot be used without deeper analyses, in order to form an opinion on risk build-up in the corporate sector. In this article we have therefore focused on UC's ratings for the period 1993–1998.

It is seen that UC's forecast bankruptcy risks as well as actual bankruptcy outcomes co-vary systematically with macroeconomic developments. However, it

> **A development of UC's model, which tries to reflect macroeconomic developments during the forecast period, ought to be a very useful indicator of aggregated future credit losses.**

seems that UC's forecasts do not reflect the effects of changes in the importance of macroeconomic developments on actual bankruptcy outcomes. To be more specific, UC's forecasts overestimate the bankruptcy risk in an economic upturn, and thus lag behind macroeconomic developments. We also find support for the conclusion that the actual proportion of bankruptcies is useful as an indicator of future credit losses, while UC's forecasts are not. The predicted proportion of bankruptcies estimated using macroeconomic variables is useful for forecasting future credit losses. Consequently, a development of UC's model, which tries to reflect macroeconomic developments during the forecast period, ought to be a very useful indicator of aggregated future credit losses. One possible explanation for the results is that UC's old model, which was used up to and including April 1997, functioned unsatisfactorily. UC did not begin to use a new model until May 1997, and there is thus insufficient data to examine the validity of the new model. But since the new model used by UC does not explicitly incorporate future macroeconomic developments, there is reason to believe that the results in the article may also be valid for UC's new model.

It also seems that UC's credit ratings really are important in the banks' credit granting decisions. This means that it is vital in the present situation to develop credit rating models, which correctly incorporate future macroeconomic developments, in order to improve the banks' credit granting decisions. This applies to both UC's forecasting model and the banks' internal credit risk models.

> **It is of central importance for the Riksbank to analyse macroeconomic developments, in order to identify risk build-up in the banking system.**

The results lead to the following conclusion for the Riksbank's task of monitoring financial stability. Since macroeconomic developments can, to such a large extent, explain the actual proportion of company bankruptcies, and since companies account for a large proportion of the banks' credit losses, it is consequently of central importance for the Riksbank to analyse macroeconomic developments in order to identify risk build-up in the banking system.

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Accession countries' choice of exchange rate system in preparation for EMU

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Ten countries in Central and Eastern Europe hope to become members of the EU within a few years, and later also to adopt the euro. These "accession countries" are now faced with a critical choice: what to do with their own currencies in the interim? Should they tie them rigidly to the euro or allow them to float freely? Are the EMU convergence requirements actually reasonable? In many emerging markets, the choice of exchange rate regime has been crucial to economic success or failure. The aim of this article is to ascertain, on the basis of the economic arguments, which exchange rate choice would be most beneficial to the accession countries.

Accession countries with widely differing exchange rate regimes

Ten years after the fall of communism, ten countries in Central and Eastern Europe are in negotiations with the European Union on future membership.

The choice of exchange rate system in the countries in Central and Eastern Europe has become an increasingly urgent topic in recent years. Ten years after the fall of communism, ten countries in Central and Eastern Europe are in negotiations with the European Union on future membership.[1] It is hoped that at least half of these accession countries will be given the green light for EU entry over the next few

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[1] The ten countries are Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, the Czech Republic and Hungary. To these will be added Cyprus and Malta, as well as Turkey, whose application has not yet been considered. Five of the Central and Eastern European countries, Estonia, Poland, Slovenia, the Czech Republic and Hungary, were previously regarded as being in a "first group". Now they are all regarded as negotiating on the same terms.

years. The requirements laid down for membership, the Copenhagen Criteria (after the Copenhagen summit of 1993), are that the accession countries must have a functioning market economy and the ability to compete in EU markets. Another way of expressing this is that the countries must demonstrate *real convergence*, the functioning of the economy and GDP per capita must converge with the EU's.[2] During the first ten years, the choice of exchange rate has been highly significant for progress or setbacks in this process of real convergence. The big question is what will happen when these countries are faced with the possibility – albeit remote – of membership in EMU.

Despite the fact that the requirements for EU membership cover many thousands of pages of legal text, they contain no formal requirements relating to the actual exchange rate system these countries should adopt. Since none of the accession countries have requested, or are expected to request, opt-out from EMU (which, so far, only the UK and Denmark have), they should, on accession, also formally become part of the Economic and Monetary Union, EMU, just as Sweden is today. But what is known in everyday language as EMU, that is entry into the euro zone, need not necessarily apply from the actual date of entry into the EU. The EU's finance ministers have in fact issued declarations stating that it is neither practicable nor desirable that countries should seek rapid and early entry into the euro zone.[3] The decision on exchange rate regimes will, therefore, remain with the accession countries for many years to come. The requirements laid down for euro entry relating to inflation, interest rate levels, budget balances, debt trends and exchange rate movements do *not* apply to EU entry.

There is, however, in many of the accession countries a clear desire to become part of the euro zone relatively soon after EU entry. For this reason, the question has arisen of the best route from EU membership to entry into the euro zone. This choice of exchange rate regime has created an intense debate, both in the EU and academic circles.

In this paper, the exchange rate question will be approached in two ways:

> **Despite the fact that the requirements for EU membership cover many thousands of pages of legal text, they contain no formal requirements relating to the actual exchange rate system these countries should adopt.**

> **There is, however, in many of the accession countries a clear desire to become part of the euro zone relatively soon after EU entry.**

[2] De Grauwe and Lavrac (1999).
[3] Ecofin Council (2000).

- First, the most important: what exchange rate strategy is best for the accession countries to achieve *real convergence*, to catch up with the EU in economic development and living standards? This question is synonymous with the question of what exchange rate strategy is best to fulfil the economic criteria for EU entry.
- To this is added the question of what strategy will most surely lead to the accession countries fulfilling the formal requirements which apply to EMU entry, requirements which revolve around *nominal convergence*[4], convergence in nominal inflation and interest rates, as well as a stable nominal exchange rate against the euro.

In connection with EMU significant emphasis is often laid on the Maastricht Criteria, nominal convergence, not least participation in ERM2, but for the accession countries it will be much more important to focus on economic fundamentals. Nominal convergence is only one of several ways of achieving real convergence, i.e. a developed economy and a reduced welfare gap in comparison to the West.

The accession countries in Central and Eastern Europe are now exhibiting a widely differing spectrum of exchange rate regimes, from fully-floating exchange rates to currency boards in the euro.

The accession countries in Central and Eastern Europe currently exhibit a spectrum of widely differing exchange rate regimes, from freely floating exchange rates to currency boards in euro.[5] The alternative exchange rate regimes which will be examined here comprise all systems currently in use and those which have been discussed in Central and Eastern Europe: (1) relatively or fully floating exchange rates with inflation targets, (2) fixed (but adjustable) exchange rates, (3) currency boards and (4) full introduction of euro notes and coins, euroisation.[6]

The conclusion is that the most clear-cut exchange rate alternatives – either totally flexible or totally fixed – are probably those which lead to the most stable

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[4] For a discussion of these concepts, see IMF (2000), the European Commission (1999), de Grauwe and Lavrac (1999), van der Haegen and Thimann (2000) as well as Gulde, Keller and Kähkönen (2000).

[5] The workings of a *currency board* will not be explained in detail in this article. Put simply, the principle of a currency board is that no notes and coins will be issued in the country's own currency unless a certain predetermined quantity of foreign currency has been exchanged and deposited in the currency board's reserves, so that anyone who has a note in the country's currency can, at any time, go to any bank and exchange it for the same predetermined amount in hard currency. The Central Bank or the authority which manages the currency board must, accordingly, have at least sufficient reserves of foreign currencies to cover the monetary base, so that notes and coins can be exchanged at all times. In the modern financial world, the boundary is somewhat fluid. Most currency boards have more foreign hard currency than necessary for covering just notes and coins, and the question is how broad a definition of money should be covered, and how to make a distinction between a currency board and a very fixed exchange rate peg backed up by large hard-currency reserves. The currency boards in the accession countries are written into law, even to some extent into their constitutions, but some countries, including Hong Kong, have currency boards which are maintained only by custom.

[6] The introduction of the euro before EMU entry, i.e. unilateral euroisation, was discussed by the Estonian Prime Minister, Mart Laar, at the beginning of 2000.

progress. It is best if the focus is either on inflation, similar to the approach taken in Sweden, the UK and other countries using inflation targeting, or on the exchange rate, and in that event with a far-reaching link to the euro, such as a currency board, so that it resembles the conditions under a future membership of EMU. The choice between these two solutions must depend on the specific conditions in the individual country. But having a clear objective for monetary policy makes it easier for the countries to achieve real convergence, which in turn is the most important condition for achieving nominal convergence. Direct or indirect requirements that all accession countries must join the exchange rate mechanism ERM2 at an early stage is very much the poorer alternative. In fact there is a risk that a very rigid strategy to fulfil the convergence requirements of the Maastricht Treaty may, paradoxically, delay the move towards the euro zone. A fixed exchange rate with a commitment to a very limited scope for variation within the framework of ERM2, or even a unilateral commitment to pegged exchange rates before EU entry, can create serious problems if the country is exposed to large short-term capital inflows in connection with EU entry. There may also be longer-term problems in reconciling the exchange rate target with low inflation if the country experiences a rapid growth in productivity.

Where do the accession countries stand today?

At present, the accession countries' exchange rate systems can be divided schematically into three main groups:
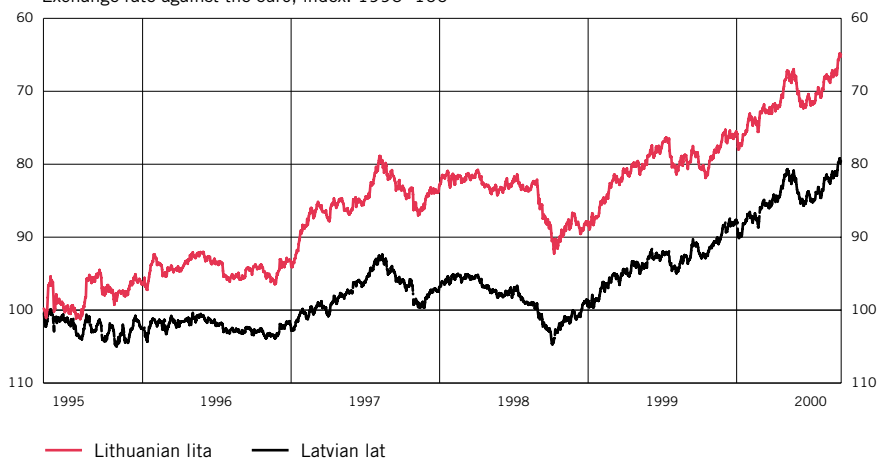
1. Currency board countries:

This group comprises the three Baltic States, which, after a brief period of temporary coupon currencies (to replace the Soviet rouble), pegged their currencies through currency board arrangements:

- Estonia has had its currency, the *kroon*, pegged (eight to one) to the D-mark, which is now the euro, since 1992.
- Lithuania has had its currency, the *lita*, pegged (four to one) to the US Dollar since 1994.
- Latvia does not have a formal currency board, but has since 1993 adopted an arrangement similar to a currency board, in which its currency, the *lat*, has been backed by reserves equivalent to those held in a currency board (see note 2), directly pegged to the International Monetary Fund's (IMF) unit of account, SDR (special drawing rights), the value of which is determined by a basket of leading international currencies, principally the US dollar and the euro.

Diagram 1. Lithuanian lita (currency board USD) and Latvian lat (pegged to SDR)

Exchange rate against the euro, index: 1995=100

Lithuanian lita —— Latvian lat

Sources: Hanson & Partner and IMF.

One country in Southeast Europe also belongs to this group;

- Bulgaria, after a period of highly unstable monetary policy, pegged its currency, the *lev*, to a currency board in D-marks (one to one) in 1997, which have subsequently become euro.

2. Countries with fixed exchange rates (managed float):

- Hungary has, up to the present time, allowed its currency, the *forint*, to depreciate month by month against a basket of the euro and the US Dollar, in accordance with a crawling peg, around which the exchange rate is allowed to deviate only within narrow, pre-determined bands.
- Slovenia has attempted to stabilise its currency, the *tolar*, against the D-mark, now against the euro.
- Romania, ever since 1990, has been attempting, with little success, to stabilise its currency, the *leu*, against the US Dollar and the euro.

3. Countries with largely floating exchange rates and inflation targeting:

- The Czech Republic began with a fixed exchange rate against a basket of the D-mark and the US Dollar, but after a crisis of confidence in May 1997 (before the Asian crisis), the country was forced to allow the *koruna* to float. The Czech Republic now has an inflation target, but it tries to combine this with exchange rate variations limited to a band of ±15 per cent, similar to that which applies within ERM2.

- Slovakia, which also inherited the fixed exchange rate of the joint Czechoslova-kian koruna, followed the Czech Republic in 1998, and allowed its currency, the *koruna*, to float. Slovakia has, however, confined itself to stabilising its exchange rate, without an explicit inflation target.
- Poland, which instituted its reforms with a totally fixed rate for the *zloty* against the US Dollar (to reduce inflation expectations), then went over to a crawling peg, and has now finally adopted an inflation target policy, though with a pledge to maintain the stability of the currency within the ±15 per cent which applies in the ERM.

Diagram 2. Hungarian forint and Slovenian tolar
Exchange rate against the euro, index: 1995=100

Hungarian forint (left scale)   Slovenian tolar (right scale)
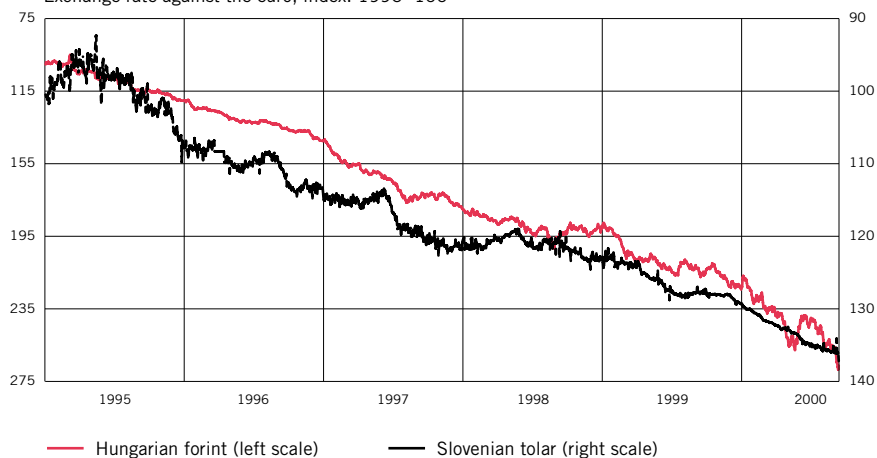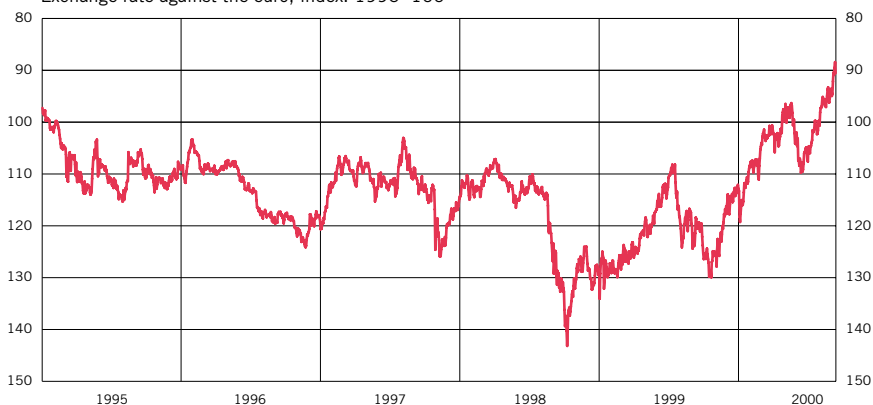
Source: Hanson & Partner.

The exchange rate policies of the different countries are summarised in table 1. The table shows that the number of countries in the "intermediate position", fixed but adjustable exchange rates, has fallen since the reforms were introduced. During the course of the reforms, five accession countries have gone over to some form of cor-ner solution, two countries to inflation targets and two to currency boards.

What results have the exchange rate regimes provided so far?

It is difficult to isolate the effects of the exchange rate regimes from the effects of the many other aspects of reforms during the accession countries' transition to rapidly-growing market economies. The progress of the accession countries so far does, however, give some support to the view that the currency board countries have had more success in *fighting inflation* than the countries with fixed exchange rates and
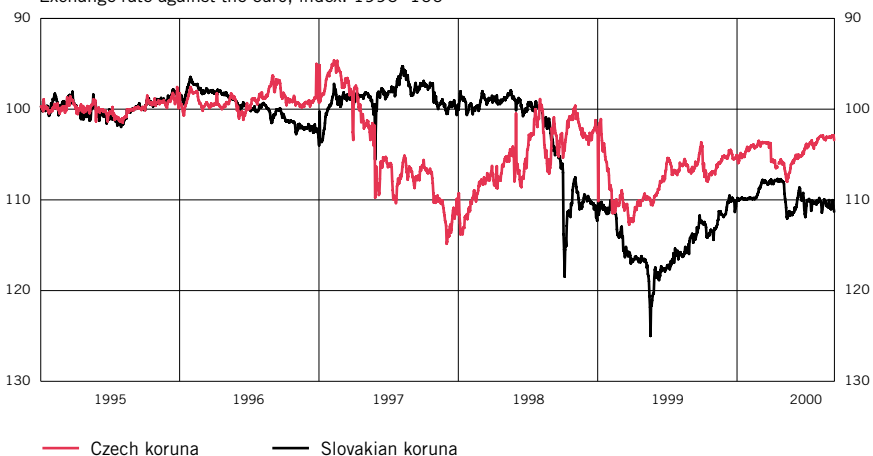
Diagram 3. Polish zloty

Exchange rate against the euro, index: 1995=100

Source: Hanson & Partner.

Diagram 4. Czech and Slovakian koruna

Exchange rate against the euro, index: 1995=100

——— Czech koruna   ——— Slovakian koruna
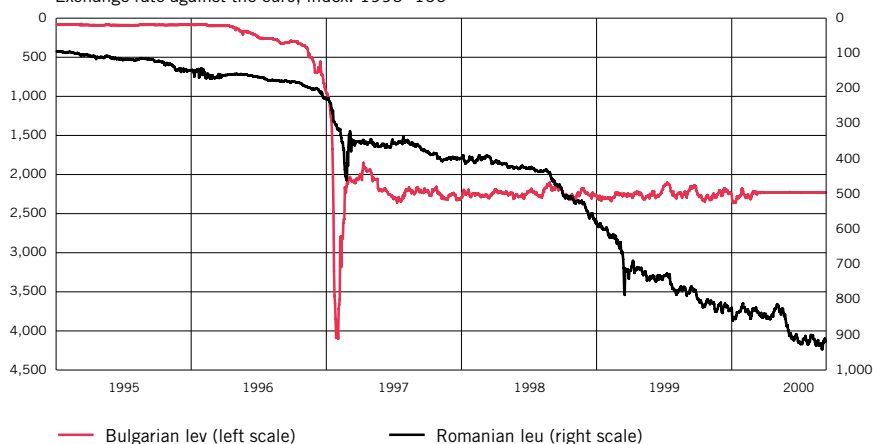
Source: Hanson & Partner.

The currency board countries have had more success in *fighting inflation* than the countries with fixed exchange rates and crawling pegs.

crawling pegs. This tallies well with empirical studies of emerging markets in other countries in Eastern Europe, Asia and Latin America, which show that currency board countries have, on average, lower inflation than countries with other exchange rate regimes.[7]

[7] Rivera Batiz and Sy (2000).

Diagram 5. Bulgarian lev and Romanian leu
Exchange rate against the euro, index: 1995=100

— Bulgarian lev (left scale)   — Romanian leu (right scale)

Sources: Hanson & Partner and IMF.

Table 1. Exchange rate regimes in accession countries 1997–2000

Country	Exchange rate regime 1997	Exchange rate regime 2000	Future plans
Bulgaria	"Managed float" against DEM	Currency board 1 EUR = 1.95583 Bulgarian lev	No change
Estonia	Currency board 1 DEM = 8 Estonian kroon	Currency board 1 EUR = 15.6466 Estonian kroon	No change
Latvia	Fixed rate 1 SDR = 0.7997 Latvian lat ±1 %	Fixed rate 1 SDR = 0.7997 Latvian lat ±1 %	EUR new reference currency
Lithuania	Currency board 1 USD = 4 Lithuanian lita	Currency board 1 USD = 4 Lithuanian lita	EUR new currency board currency 2001
Poland	"Crawling peg" −1 % per month against basket[1] ±7 %	Inflation target in stages, ±15 % against EUR	Inflation target down to 4 %
Romania	"Managed float" against USD	"Managed float" against USD and EUR	Prospective peg to EUR
Slovakia	Fixed rate against basket[2] ±7 %	"Managed float" against EUR	–
Slovenia	"Managed float" against DEM	"Managed float" against EUR	–
Czech Republic	Fixed rate against basket[3] ±7.5 %	Inflation target in stages, "Managed float" against EUR	No change
Hungary	"Crawling peg" −1.1 % per month against basket[4] ±2.25 %	"Crawling peg" −0.4 % per month against basket[5] ±2.25 %	Prospective peg EUR 2001

[1] Basket consisted of 45 % USD, 35 % DEM, 10 % GBP, 5 % FRF and 5 % CHF.
[2] Basket consisted of 60 % DEM and 40 % USD.
[3] Basket consisted of 65 % DEM and 35 % USD.
[4] Basket consisted of 70 % DEM and 30 % USD.
[5] Basket consisted of 70 % EUR and 30 % USD.

In all the accession countries (with the exception of Romania), however, inflation has fallen dramatically from the high figures, sometimes verging on hyperinflation, prevalent throughout Eastern Europe, apart from Czechoslovakia, at the beginning of the 1990s. Only the Czech Republic and the Baltic States have so

far been able to reduce inflation to below the 10 per cent mark – countries which used successive devaluations have had the greatest difficulty in lowering their inflation rate (see Diagrams 6, 7 and 8). Nominal and real interest rates have without exception been lower in the Czech Republic, which adopted inflation targets, and in the currency board countries, than in countries with fixed or managed exchange rates (see Diagrams 10 and 11).

Diagram 6. CPI inflation in Central Europe and the euro zone, 1995-2000
Annual percentage change
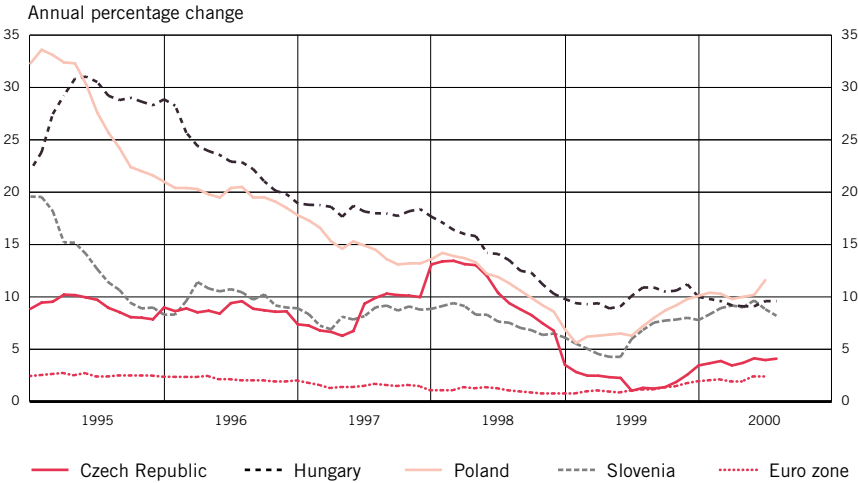
Sources: Eurostat, Government statistics agencies in Poland, Slovenia, Czech Republic and Hungary.

Diagram 7. CPI inflation in the Baltic States, 1993-2000
Annual percentage change. Logarithmic scale
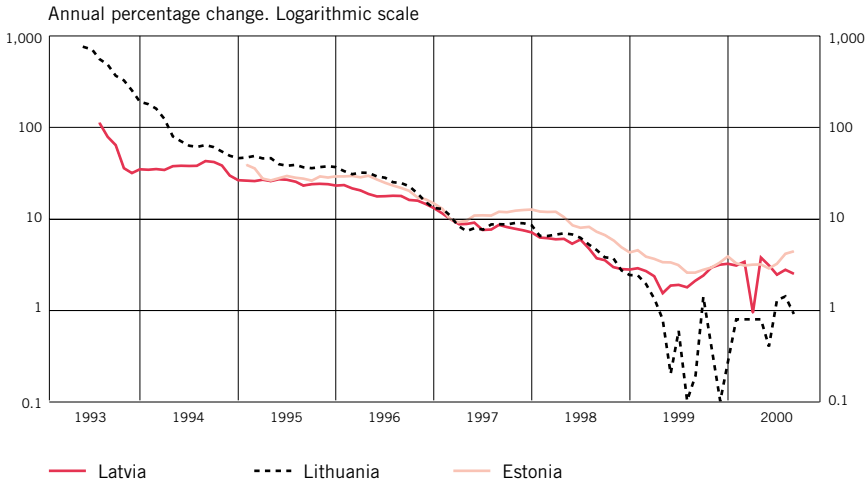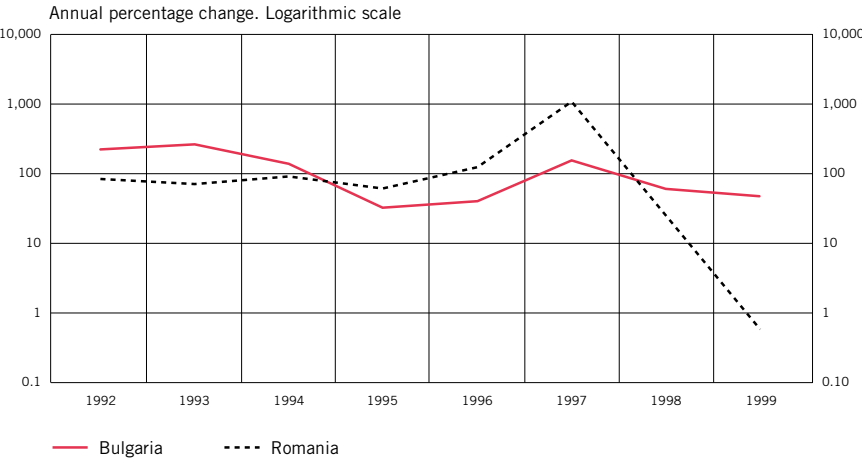

Sources: Hanson & Partner and IMF.

Diagram 8. CPI inflation in the Baltic States, 1997-2000

Annual percentage change

Latvia — Lithuania ---- Estonia
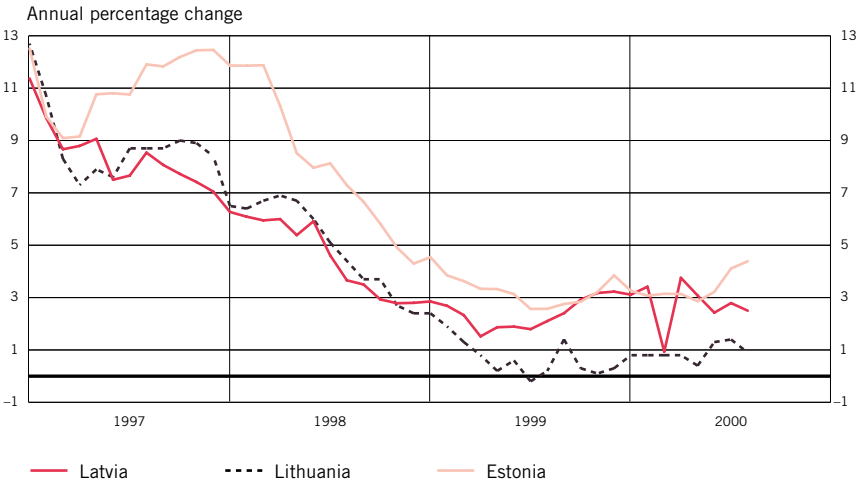
Sources: Government statistics agencies in Estonia, Latvia and Lithuania.

Diagram 9. CPI inflation in Bulgaria and Romania, 1992-1999

Annual percentage change. Logarithmic scale

Bulgaria — Romania ----

Source: EBRD.

Diagram 10. Short-term interest rates in the Baltic States, 1998-2000
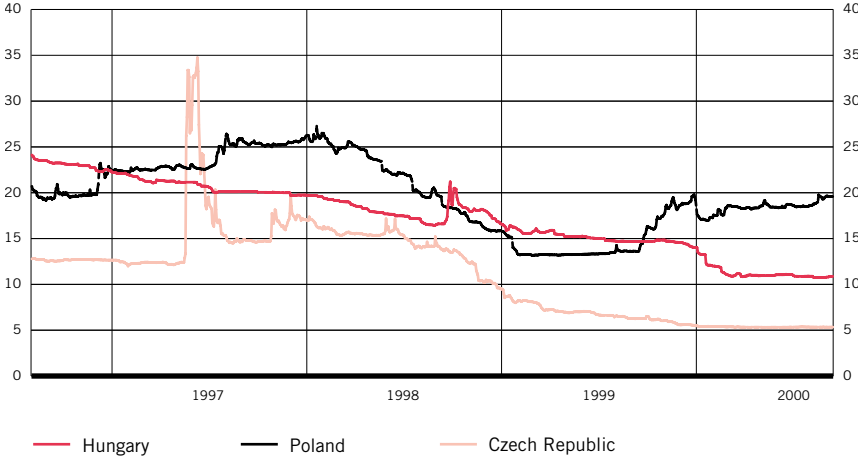Percentage points

Estonia — Latvia — Lithuania — Euro zone
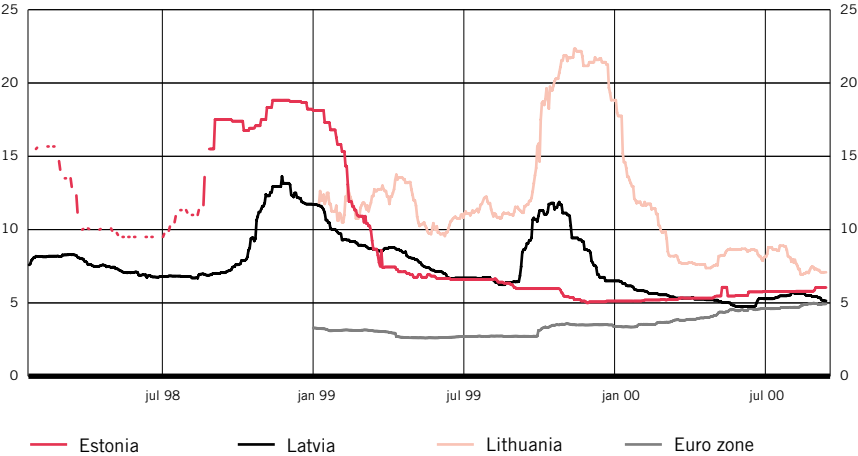
Source: Hanson & Partner.

Diagram 11. Short-term interest rates in Hungary, Poland and the Czech Republic, 1997-2000
Percentage points

Hungary — Poland — Czech Republic

Source: Hanson & Partner.

Growth trends have been fairly similar in all countries with strong, reform-oriented economic policies, irrespective of exchange rate regime.

Fiscal policy discipline seems generally to have been tightest in countries which adopted a clear fixed exchange rate arrangement, although the Czech Republic, with a floating exchange rate, has successfully reduced its public sector

deficit in recent years. The Baltic States, on the other hand, have been forced to relax their tight fiscal policies in response to the crisis in Russia. Budget discipline came late to Hungary, four years after the reforms started. The massive deficits in current account balances and budgets shown by the

The massive deficits in current account balances and budgets shown by the accession countries at the end of the 1990s have been interpreted as a sign of lack of competitiveness and overvalued currencies.

accession countries at the end of the 1990s (twin deficits) have been interpreted as a sign of lack of competitiveness and of overvalued currencies. Deficits of this type have emerged in most accession countries, but the current account deficits have been greatest in the Baltic States and Poland (see Diagrams 12 and 13).

It should, however, be pointed out that the accession countries, during the reconstruction phase following the fall of communism, have had exceptionally high investment requirements, both resulting from the need to catch up and the high level of growth natural at their stage of development, and from the systematic underinvestment and misdirected investment of the planned economy, which left an antiquated and worn-out capital stock. A large net inflow of capital, with the attendant current account deficit, is, therefore, completely natural. A more detailed analysis shows also that a substantial part of the inflow consisted of long-term foreign direct investments (FDI) which are not expected to create any risk of rapid outflows.[8]

Real convergence – moving closer economically to the EU average

Today (1999 data), the ten accession countries are still far from the welfare levels of the current EU countries (although some of them are approaching those of the two countries with the lowest per capita income: Greece and Portugal). GDP per capita adjusted for price differences varies from just over 20 per cent (Bulgaria and Romania) of the EU average to over 70 per cent (Slovenia) (see Diagram 14). It should be noted, however, that the richer countries (Slovenia, the Czech Republic and Hungary) have about the same relationship to the EU average in their GDP per capita as did Portugal, Greece, Spain and Ireland when they

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[8] It should also be borne in mind here that GDP in the countries involved has been undervalued when measured using ordinary exchange rates. Since the current account balance is measured in US Dollars, the deficit looks alarmingly high at first glance, before revaluation of the size of the GDP in Dollar terms and the real appreciation of the currency shows that the current account deficit as a proportion of GDP is, in fact, smaller than it first seemed.

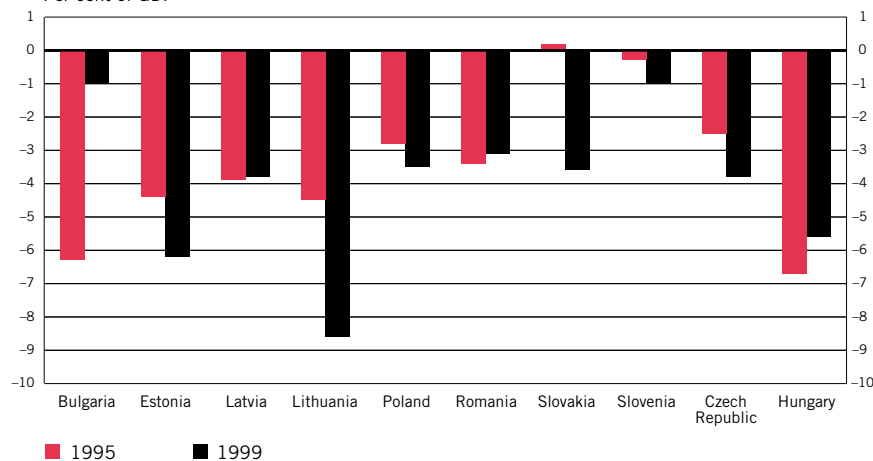**Diagram 12. Current account balance in the accession countries in 1995 and 1999**
Per cent of GDP

■ 1995 ■ 1999
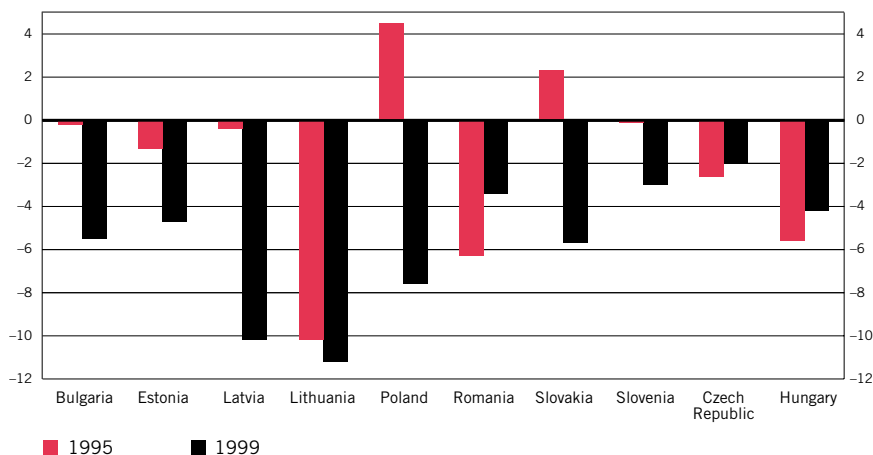
Source: EBRD Transition Report, May 2000.

Diagram 13. Budget balance in the accession countries in 1995 and 1999
Per cent of GDP

■ 1995 ■ 1999

Source: EBRD Transition Report, May 2000.

began negotiations for EU entry in the 1970s and 1980s. In this context, the relative rate of growth is crucial; a growth rate of 7 per cent over the next ten years would mean that GDP in these countries would double, but with a growth rate of

Diagram 14. Estimated GDP per capita in per cent of EU average, 1999

■ EBRD estimate, 1999   ■ European Commission estimate, 2000
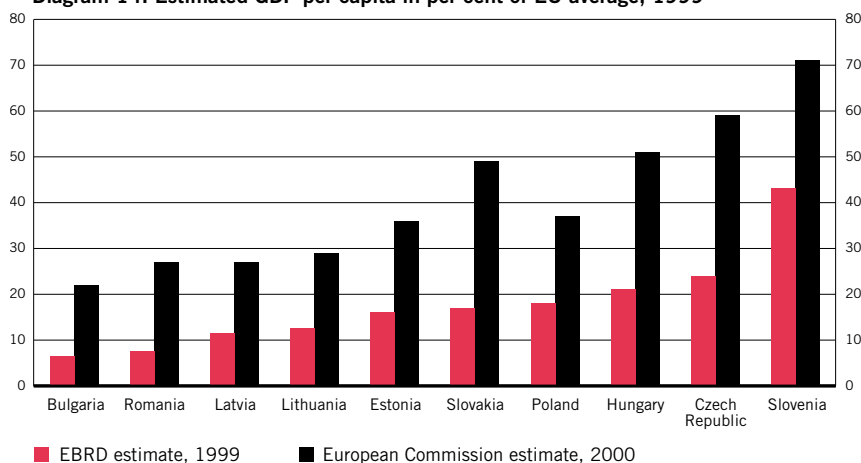
Sources: EBRD and the European Commission.

3 per cent, GDP would increase only by one-third, and the relationship to the EU average GDP per capita would change only marginally.

From the literature on exchange rate regimes, we have identified some criteria for evaluating whether an exchange rate regime can facilitate *real convergence* or *catching-up* for a formerly planned economy. The case of the accession countries is similar to that of other emerging markets, but with the additional burden of transition, with the concomitant restructuring and shocks.

CREDIBILITY OF MACROECONOMIC POLICY

Most accession countries have a past of high inflation or hyperinflation, weak public finances and "soft budget constraints" for state-controlled companies, where subsidies long kept loss-making workplaces in business.

> **The recent history of the accession countries makes the need for a credible standard for monetary policy especially important.**

At that time it was not possible to finance budget deficits via the financial markets, and large deficits were often covered by credits from the central bank – printing money – and inflation was allowed to decimate the general public's cash balances. The recent history of the accession countries, therefore, makes the need for a credible anchor for monetary policy especially important, both in relation to often weak governments and split parliaments, and to the initially high inflation expectations of the general public.

The most obvious option for the accession countries (where the US Dollar and the Deutsche mark were already common alternative currencies for savings and the black market) was to allow a fixed exchange rate to act as a confidence-creating standard, a nominal anchor for economic policy. By binding itself to maintain a fixed exchange rate, the government establishes a limit for how expansionary monetary policy can be, and, in the long term, price equalisation will create roughly the same price trend in the country's currency as the one selected for pegging. Poland was the first country in the former eastern bloc to peg its currency, the zloty, to the US Dollar until hyperinflation had abated. Subsequently, several countries adopted a crawling peg with programmed controlled devaluation, which also gives a degree of confidence. Inflation is higher than in the country the currency is pegged to, but it is still relatively predictable.

> **By binding itself to maintain a fixed exchange rate, the government establishes a limit for how expansionary monetary policy can be.**

The advantage, but also the major disadvantage, of fixed exchange rates is that if the economy is hit by a major shock, it is always possible to surprise the public with a devaluation which depresses wage levels, eases monetary policy and generates temporarily higher growth. The downside of having this emergency exit is that the currency markets and the public are always conscious of the risk of devaluation. The country has to pay for this risk through an interest rate gap in relation to the country to which it has pegged its currency. In addition, expectations of an "emergency" devaluation are factored in by the parties in the labour market, and this has a detrimental effect on discipline in wage formation. The devaluation risk is seen as greater if the government is seen as weak. This is the case for many of the governments in the accession countries, which are still immature democracies with rapidly shifting party systems.

Among the accession countries, the Czech Republic was forced to devalue in 1997, even before the Asian crisis, when a crisis of confidence hit a weak and paralysed government (see Diagram 15). In 1998, Slovakia was obliged to follow suit, and Bulgaria went through a string of similar exchange rate crises before the currency board was introduced in 1998.
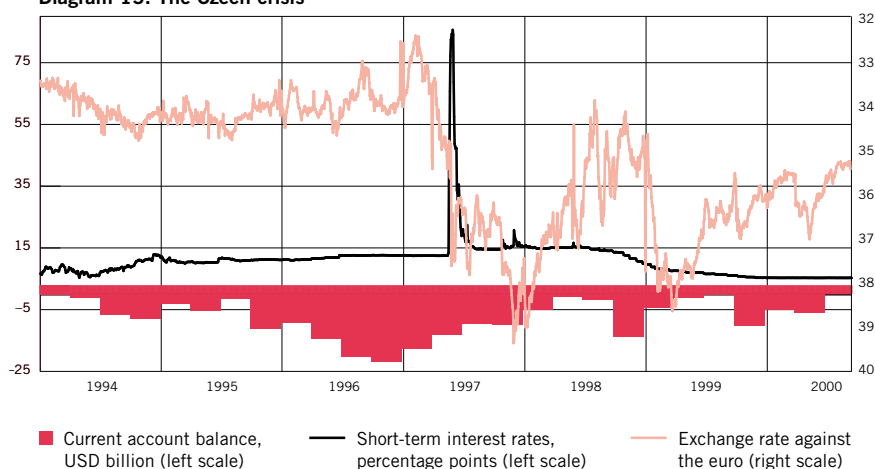
> **It can be easier to achieve credibility with a currency board, with its effective institutional provisions supporting the fixed exchange rate.**

It can be easier to achieve credibility with a currency board, with its effective institutional provisions supporting the fixed exchange rate. Given that all outstanding cash is covered by hard currency, it is not possible to force the collapse of a currency board through speculation. It is possible at all times to ex-

Diagram 15. The Czech crisis

| Current account balance, USD billion (left scale) | Short-term interest rates, percentage points (left scale) | Exchange rate against the euro (right scale) |

Sources: Czech National Bank and Hanson & Partner.

change the currency for hard currency to the last unit.[9] Abandoning a currency board must, therefore, be (by definition) a political decision, based on a national economic calculation. Such a decision is made even more difficult by the fact that the currency board is often backed up by statutory provision, or even in the constitution[10]. This reduces the risk premium both with respect to the general public and to players in the finance market – the currency board "straightjacket" creates a stronger incentive for adjustment. Studies show that currency boards in developing countries generally achieve lower interest rate levels.[11] As can be seen, this is also the case with the accession countries, where countries with currency boards have lower real interest rates than those with fixed exchange rates (see Diagrams 10 and 11).

The danger with the confidence created by the currency board is that if the

[9] The fact that the whole of the outstanding monetary base is covered by foreign currency does, however, have a price. It is the same price as for a normal note issuing monopoly, where the general public must give the note issuer an interest-free loan, seignorage, when they exchange real value for notes. Similarly, the purchase of foreign liquidity means that, in practice, the currency board pays seignorage abroad. The funds in the currency board can then be invested to provide a risk-free interest rate, provided that a seignorage is paid by the public to the currency board when the citizens accept the currency board's domestic notes. In contrast to normal note issuing, the net of the seignorage the general public pays to the currency board and the seignorage the currency board pays abroad should be almost zero (unless the reserves are unnecessarily large or managed with excessively high risk), while the foreign country receives a positive net. Precisely the same "interest-bearing loan of notes from abroad" takes place with euroisation, with the difference that the general public pays the seignorage directly abroad. With the euroisation of a currency board, however, there may be additional logistical problems with the supply of notes and bank liquidity, but the currency board should by definition already contain sufficient euro liquidity for the needs of the economy.

[10] Eesti Pank (1999 and 2000), Baliño and Enoch (1997).

[11] Gulde, Keller and Kähkönen (2000).

arrangement is ever abandoned, there is a risk of an even deeper crisis of confidence and interest rate rises, since the very symbol of stability will disappear. In principle, it is possible for "weak" currency boards to be hit with the same risk premium as ordinary fixed exchange rates. There is no recent example of such a "weak" currency board, but in Lithuania, where a debate has been in progress for a number of years on dissolving the currency board, interest rates have risen when uncertainty about economic policy has increased, and have remained for some time much higher than the corresponding interest rate in its currency board neighbour, Estonia (see Diagram 10). In recent years, Argentina's currency board has also been affected by high real interest rates. The role of the currency board in maintaining the credibility of monetary policy and the expectations of the general public would, consequently, make any dissolution of the currency board and a change of exchange rate regime during the period up until membership of the euro zone risky.

The introduction of the euro in the form of notes and coins, i.e. euroisation, would, on the other hand, create total credibility for exchange rate commitments.

The introduction of the euro in the form of notes and coins, i.e. euroisation, would, on the other hand, create total credibility for exchange rate commitments, and by definition remove the last currency risk premium (even in Estonia's case about 1 percentage point) which separates the currency boards from the euro zone (see Diagram 10).[12]

In the past decade, a totally different form of monetary policy model has been used successfully by an increasing number of OECD countries, and subsequently also by emerging markets: inflation targeting.

In the past decade, a totally different form of monetary policy model has been used successfully by an increasing number of OECD countries, and subsequently also by emerging markets: inflation targeting. In principle, the exchange rate has no direct role in this system, with monetary policy being managed with the goal of achieving price stability. Inflation targeting means that macroeconomic shocks can be reflected to some extent in the exchange rate, which can fall, for example, in the event of a negative shock. However other problems arise. An inflation target requires a good forecasting ability, since it can take up to two years for changes in the base lending rate, working through various channels, to take effect.[13] There also needs to be a

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[12] The risks to which the banking system is exposed when its liquidity is determined by external factors could, perhaps, lead to a risk premium for the euroising country, but it should be equivalent to, or below, the risk premium with a currency board.

[13] At present, we know very little about the transmission mechanism in the accession countries, since relatively few studies have been carried out in this area.

high degree of credibility for the inflation target, through strong political and institutional support. It is also essential that the new goal is explained to the general public, so that their expectations will be modified to suit, and that the target is achieved within a reasonable time frame.

On all these points there are elements of uncertainty in many emerging markets: macroeconomic data may not be of sufficiently high quality to permit accurate forecasting, and weak political support may make it necessary to adopt more powerful institutional arrangements, such as currency boards, to insulate monetary policy from political pressures. Finally, rapid changes in the financial markets, as well as structural factors such as the deregulation of prices which were previously indirectly subsidised in the planned economy (energy, public transport, railways, rents, etc.), may make it difficult to achieve the inflation target in the short term.[14]

> **The most successful accession country appears to be the Czech Republic, where the inflation model is working well.**

In the emerging markets where inflation targeting have been tried, however, the majority of these apprehensions have come to nothing. An example is Brazil, which has so far been successful in using inflation targeting to avoid a rise in inflation after the currency, the *real*, was decoupled from the US Dollar at the beginning of 1999. As has been mentioned above, there are two examples among the accession countries, and these point in different directions. The most successful accession country appears to be the Czech Republic, where the inflation model is working well, but where the fight against inflation has "benefited" to some extent from a weak economic situation. The second example, Poland, has had greater difficulty in achieving its inflation targets[15], partly as a result of weak fiscal policies and the deregulation of artificially low prices (see Diagram 16).[16]

On one important point, however, the credibility of monetary policy will be boosted in all countries which seek membership of the EU, irrespective of exchange rate regime: under the EU Treaty, the Central Bank must be granted effective independence.

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[14] National Bank of Poland (2000).
[15] Formulated in several stages, of which the last is an inflation rate of 4 per cent.
[16] National Bank of Poland (2000), (1999) and (1998), Czech National Bank (1999) and (2000) as well as Backé and Radzinger (1999).

Diagram 16. CPI inflation in Poland and the Czech Republic compared with in the euro zone, 1995-2000

Annual percentage change

Poland —— Czech Republic ---- Euro zone ——
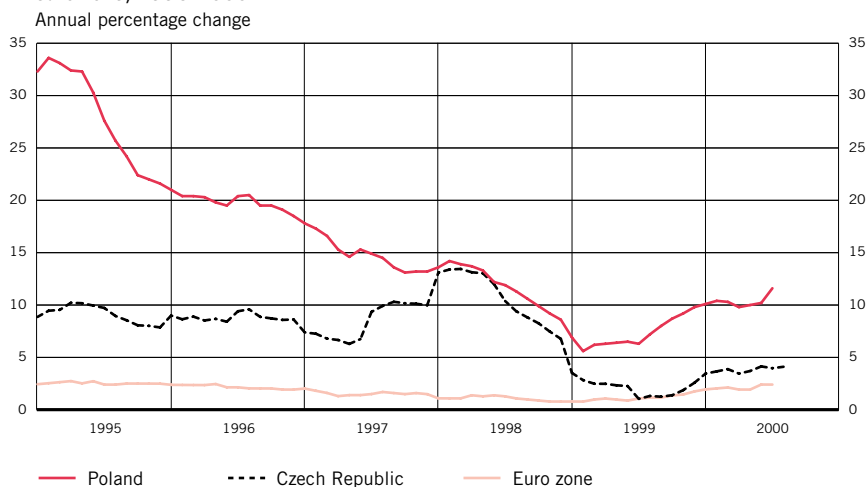
Sources: Eurostat, Government statistics agencies in Poland and the Czech Republic.

The ability to cope with real disruptions

At the same time as the exchange rate regime creates credibility, it must also permit the economy to respond flexibly to shocks to the country's productive capacity. With a floating exchange rate, this response can be either through exchange rate movements or through changes in wages and prices. The most interesting case, is that of fixed exchange rates, where the response can take place only through wages and prices. The arguments which will be put forward below will, in many cases, bear a striking resemblance to those offered in the debate on EMU.[17] This is no accident – very strong forms of currency pegging, such as currency boards, are, naturally, systems which are very close to EMU.

At the same time as the exchange rate regime creates credibility, it must also permit the economy to respond flexibly to fluctuations in the country's productive capacity.

The first question to ask is what the risks are that the accession countries will be exposed to an asymmetric shock, i.e. a shock which affects the accession country itself but not to the same extent the currency area to which the currency is pegged (if both are equally affected, a similar monetary policy can be adopted for both areas, without major difficulties).

[17] For an overview of the economic arguments in the EMU debate, see SOU 1996:158.

Diagram 17. Degree of openness among the accession countries, 1998

Exports and imports in relation to GDP. Per cent
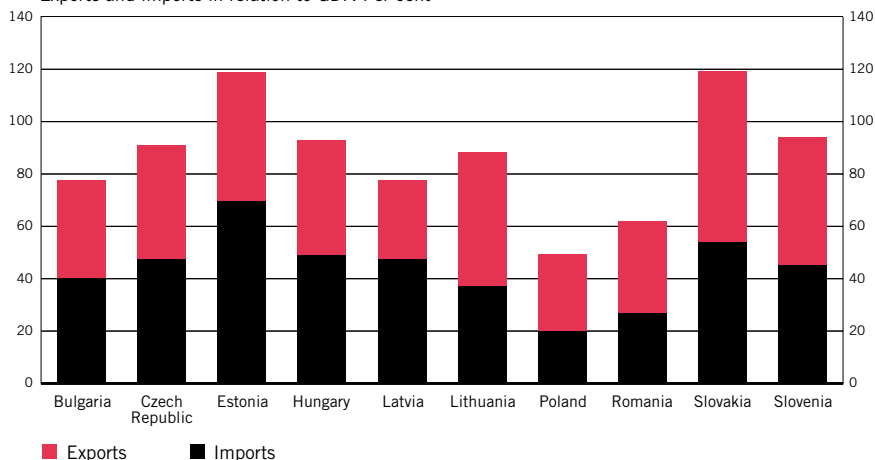
Source: IMF.

The risk of an asymmetric shock depends on a number of factors:

- If there is *extensive trade with* (and large investment flows to or from) *the country to which the currency is pegged*, there is a greater chance of remaining in synchronisation with the economic trends in this area, and of being affected by the same shocks – the risk of asymmetric shocks is smaller. It can be pointed out here that the accession countries, despite the fact that their economies were formerly relatively closed and trade directed towards the east (with the exception of Slovenia), are now among the most open economies in Europe, with exports equivalent to 20–70 per cent of GDP and equally large imports (see Diagram 17). In all these countries, the EU represents over half of their trade, in a number of cases over three-quarters, and the euro zone in turn is responsible for the bulk of EU trade. Second most important for trade (20–30 per cent) are other accession countries, countries which are themselves dependent on EU trade. Russia, on the other hand, currently represents a much smaller proportion – in general under 10 per cent (see Diagram 18).[18] Of the accession countries, Estonia, Latvia, Lithuania, Hungary and Slovenia are among the most open (the figures for the degree of openness in Slovakia and the Czech Republic are very much affected by the former intra-Czechoslovakian trade between the two countries). Poland and Romania, and maybe also the Czech Republic, Slovakia

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[18] Even in the Baltic States, trade with Russia has fallen dramatically since the Russian crisis of 1998.

and Bulgaria can be regarded as rather less open. Slovenia, Hungary and the Czech Republic are open towards the euro zone in particular. With these there is, accordingly, considerable reason to expect their development to be very closely linked to the euro countries. According to some calculations, GDP trends in the accession countries show a higher correlation to Germany's GDP trends than many of the euro countries do.[19]

Diagram 18. Trade structure for the accession countries by region, 1999
Index: Q1 1999=100

US   Asia   Other   Russia   Rest of Eastern Europe
Euro 11   Rest of EU
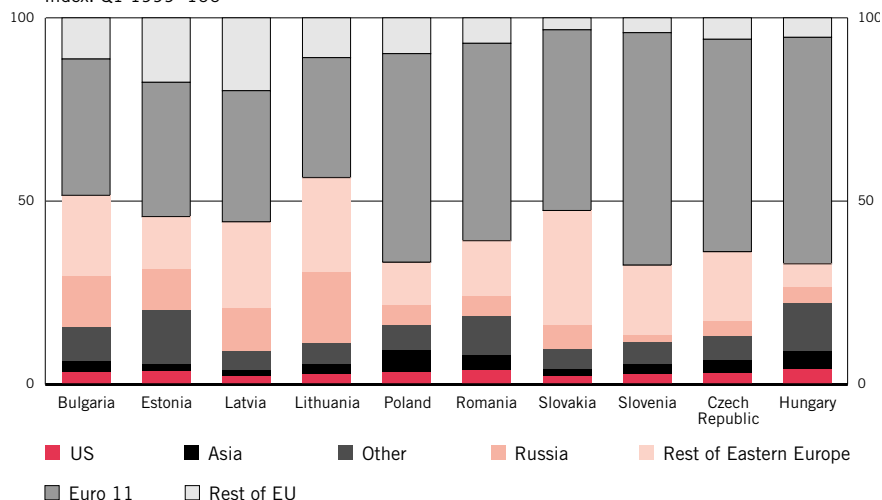
Source: EBRD.

- Here, however, the comparison is only being made with the euro zone, but for *Lithuania*, for example, *the USA is the relevant comparison*, since the currency board, at present at any rate, is pegged to the US Dollar, and for Latvia it is the currencies in the SDR currency basket (with a major proportion of the US Dollar as well as the euro). In Lithuania's case, and to some extent in Latvia's, there is, therefore, greater risk of asymmetric shocks against the euro zone. Although trade is to a large extent in US Dollars, trade with the US as such is not particularly important, and the appreciation of the US Dollar against the euro was an important factor in Lithuania's deep crisis in 1998–99, after the Russian collapse. Likewise, Latvia was hit when the SDR appreciated against the euro.
- A shock often affects a certain part of the economy, and for this reason *the spread between industries and sectors* is important in determining how great is the risk of an

[19] IMF (2000), Boone and Maurel (1998) and (1999) as well as de Grauwe and Lavrac (1999).

asymmetric shock. The more the economic structure of the accession countries resembles that in the euro countries, the less risk the accession countries run of being affected by shocks unlike those in the euro zone. Here, very large differences remain. All the accession countries have an agricultural sector significantly larger than the EU average; in Poland, agriculture's share of employment is several times greater than in any of the EU countries. The proportion of heavy and labour-intensive industries is also greater than in Western Europe, with steel and mining as lingering problems. But, at the same time, the general economic structure is converging rapidly with that of Western Europe. In all the accession countries, the service sector has grown rapidly and the agricultural sector has shrunk (especially in Poland) (see Diagram 19). A number of studies also indicate that the level of local specialisation has increased. At first sight this should suggest an increased risk of asymmetric shocks, but since it involves an increased specialisation among many individual companies, and not for the country as a whole, it means that, on the contrary, the industrial structure is becoming less uniform, more knowledge intensive and better at creating added value – and thus more like the euro zone. At present, the industrial structure in countries such as Hungary, the Czech Republic and Estonia is most like that in the euro zone, while Poland, Bulgaria and Romania exhibit relatively greater disparities. An example of the fact that the accession countries are not necessarily affected differently on the basis of their industrial structure is the Asian crisis. Although these countries would, perhaps, be expected to compete with other low-wage industries in Southeast Asia, the effects of the Asian crisis were felt rather through falling economic activity in the EU countries than through direct loss of market share to Southeast Asian companies which benefited from lower exchange rates. The effects of the Asian crisis were never particularly great in the accession countries. After a minor downturn, they recovered when the EU economies began to grow again.

- It was assumed above that the risk of an asymmetric shock primarily comes from factors beyond the control of those in power in the country. In actual fact, it has been alleged that countries such as Sweden have been hit on a number of occasions by shocks which originated in the country's own economic policies, for example a weak fiscal policy.[20] Such self-generated crises have also affected a number of the accession countries – Bulgaria's successive crises from 1994–97 are a clear example of this. As the accession countries have disciplined their economic policies, the risk of self-generated crises has however been reduced.

[20] Sveriges Riksbank (1997).

Diagram 19. Economic structure in the accession countries and EU

Percentage of GDP
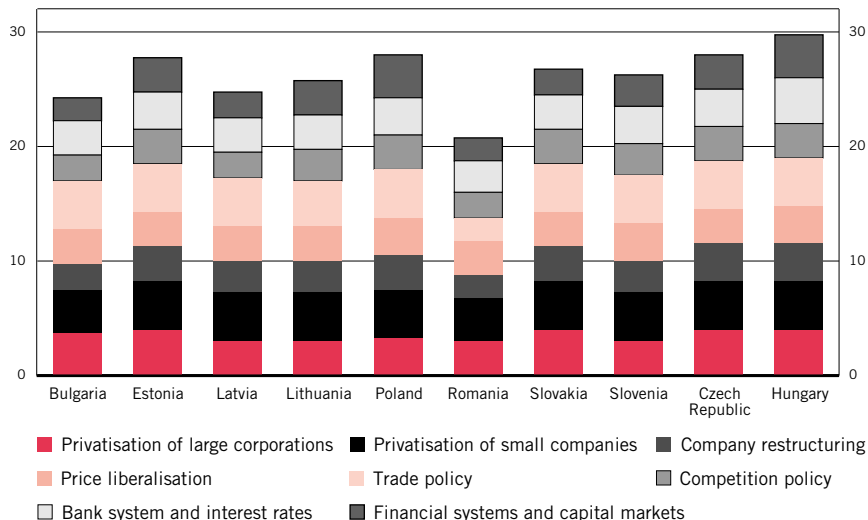

Agriculture ■ Industry ■ Services
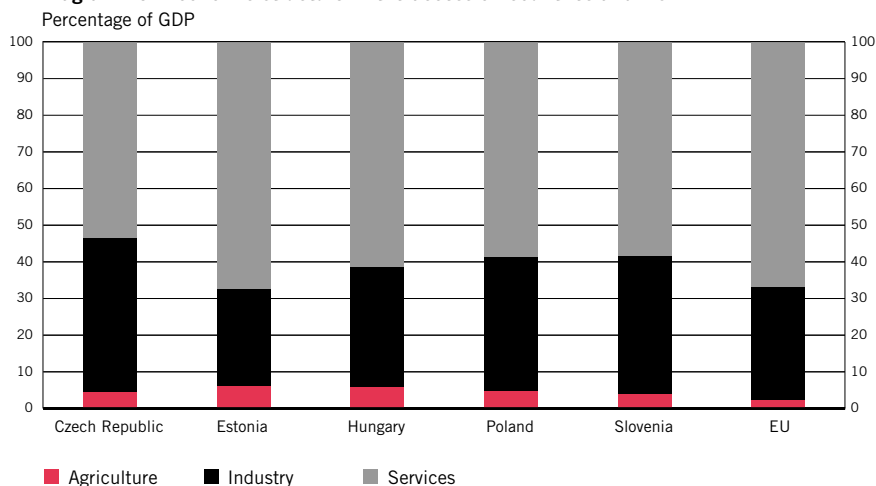
Source: IMF

- Perhaps the greatest risk of an asymmetric shock comes from the transition from a planned to a market economy in the accession countries. A fantastic transformation has already taken place since 1990, when virtually all the accession countries had a state-owned economy, regulated prices and a permanent shortage of the simplest basic goods. The process is not over. There are still heavy industries, including steel and mining, which continue to be supported by subsidies. As the last vestiges of price regulation and subsidies are phased out, the economies are hit by massive, often traumatic shocks. Although a fixed exchange rate or currency board does provide support for monetary policy in such a period of upheaval, it does not make the adaptation to the outside world easier. There have been discussions as to whether the actual process of trade integration with the EU can itself generate this kind of structural shock, when unprepared markets in the accession countries are exposed to competition from the euro zone. In reality, this risk is exaggerated. The adaptation to the EU's internal market has already been largely accomplished. Customs barriers have been phased out under the framework of the "Europe Agreements" which were concluded in 1993–94 with the accession countries, and, since the fall of the communist governments, countries such as Poland, Estonia and Latvia have had generally *lower* customs barriers towards the outside world than the EU has had. According to the European Bank for Reconstruction and Development, EBRD, which regularly makes rough estimates of the progress of these countries in the transition to a market economy, Poland, Hungary and Estonia have

Diagram 20. EBRD's index over the success of the reform work in transition countries, 2000

Index 1 to 4 in each category (8 to 32 in total)

- ■ Privatisation of large corporations
- ■ Privatisation of small companies
- ■ Company restructuring
- ■ Price liberalisation
- ■ Trade policy
- ■ Competition policy
- □ Bank system and interest rates
- ■ Financial systems and capital markets

Source: EBRD.

gone furthest in their efforts to reform, while Romania and Bulgaria are some way behind (see Diagram 20).[21]

The picture of the accession countries' vulnerability to asymmetric shocks is, accordingly, mixed. On the one hand, the countries are very open, and are closely linked to economic trends in the euro zone, particularly Germany. On the other hand, there are risks associated with the massive need for structural transformation on the road from the planned economy to the market.

The next question is how well countries in Central and Eastern Europe can *cope with an* asymmetric shock if one occurs. Examples of how accession countries have actually coped with such shocks are the Russian crisis of 1998 and the Balkan crisis of 1998–99.

> **The next question is how well countries in Central and Eastern Europe can *cope with an* asymmetric shock.**

When Russia, in August 1998, allowed its currency to fall after a futile interest rate defence, and simultaneously suspended payments on the foreign public debt, the Baltic States were affected on several levels (by this stage, the other

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[21] In the accession countries' negotiations with the European Commission, the need for reduced subsidies and greater structural transformation in heavy industry and agriculture was emphasised as a major residual problem.

accession countries had few economic ties to Russia). The collapse of the Russian currency made their exports to Russia, particularly of foodstuffs, drastically more expensive for Russian consumers, and the exports were partially knocked out by Russian producers. At the same time, a number of smaller banks which speculated in Russian government bonds became insolvent, and there were worries of a "Russian epidemic". In addition, this coincided with a weak economic situation in the Baltic States' most important export markets in the EU. At about the same time, Bulgaria was also hit by a similar crisis, when a number of land and fluvial routes for the country's exports were closed as a result of the war in the Balkans (Kosovo). Since all three of the Baltic States and Bulgaria had currency boards or arrangements similar to currency boards, it was not possible to allow the response to take place through the currency, and wages and prices were forced to adjust instead. Nevertheless, the downturn and recession in the Baltic States (see Diagram 21) and in Bulgaria were remarkably short-lived and benign. As early as the end of 1999, a relatively rapid recovery had taken place, with the exception of Lithuania, which suffered from serious problems in domestic politics, with a weak fiscal policy, and did not recover until the beginning of 2000. This recovery partly coincided with an upswing in the EU countries, but it does seem that there were still factors in the Baltic States and Bulgaria which allowed an unexpectedly rapid adjustment.
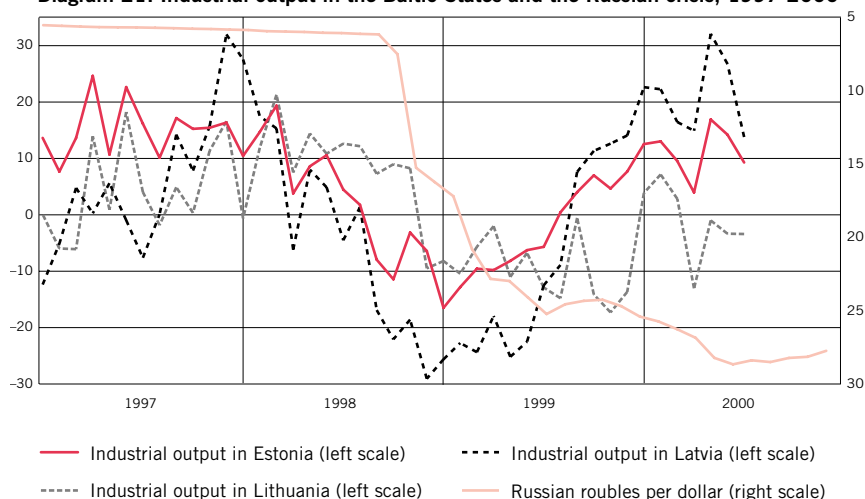
In the main, there are two ways of fending off an asymmetric shock without resorting to the exchange rate. The first is the most obvious, that wages and prices in the economy adjust themselves to the new conditions. Wage trend statistics in the accession countries are fairly unreliable (a large proportion of wages are paid black), but the data which are available, along with anecdotal evidence, suggests that there has been a rather high degree of flexibility in both real and nominal wages – probably greater than in the euro countries. In both the Baltic States and Bulgaria, there were nominal wage cuts in certain sectors in the beginning of 1999 (see Diagram 22 for the example of Estonia). In other sectors, which experienced rapid improvements in productivity, nominal wage growth slowed down. In all the countries affected, *real* wages reacted immediately or some time after the shock.[22]

The reason for this greater flexibility could be the significantly lower level of

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[22] In the background, a rapid restructuring of the business sector is also underway in the Baltic States and Bulgaria. There are indications that the Russian crisis and the Kosovo crisis increased mobility on the labour market, since many people looked for new jobs rather than accepting wage cuts. Unemployment rose in connection with the crises, but fell rapidly again in, for example, Latvia.
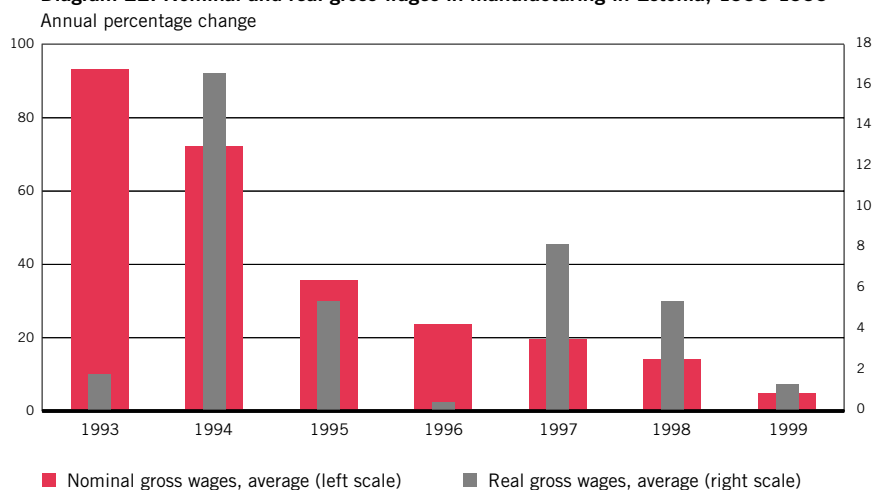
Diagram 21. Industrial output in the Baltic States and the Russian crisis, 1997-2000

| Industrial output in Estonia (left scale) | Industrial output in Latvia (left scale) |
| Industrial output in Lithuania (left scale) | Russian roubles per dollar (right scale) |

Sources: Government statistics agencies in Estonia, Latvia and Lithuania, and Hanson & Partner.

Diagram 22. Nominal and real gross wages in manufacturing in Estonia, 1993-1999
Annual percentage change

| Nominal gross wages, average (left scale) | Real gross wages, average (right scale) |

Sources: Government statistics agency in Estonia, IMF and Riksbanken.

labour-market regulation than in the EU countries. According to the indexes used by the OECD and others, the level of labour-market regulation and unionisation in Central and Eastern Europe is considerably lower than in the euro zone – with less comprehensive rules and regulations for trade union affiliation and job security.[23]

[23] OECD (2000b).

Within the accession countries, however, there are large variations, from a relatively low level of labour-market regulation and unionisation in the Baltic countries, to a higher level in Poland and the Czech Republic. There are also indications that the labour market might not be as flexible after all in the accession countries. Unemployment figures in the majority of accession countries, including the Baltic States, have reached relatively high levels and then fallen only very slowly from these levels.

Alongside flexible wages, fiscal policy is the most obvious way of fending off an asymmetric shock with fixed exchange rates.

Alongside flexible wages, fiscal policy is the most obvious way of fending off an asymmetric shock with fixed exchange rates. The competitiveness of exporting companies can be strengthened by lowering payroll taxes, or domestic demand can be stimulated using tax cuts – depending on the type of shock which needs to be counteracted. The countries of Central and Eastern Europe in general have a rather limited ability to do this. The budget situation in most of the accession countries is precarious by the massive social adjustment costs of the transition to the market economy. On top of this, there are now new adjustment costs for essential and desirable, but still expensive, demands on infrastructure, the environment and health in preparation for EU membership. Even so, the Baltic States proved that relatively sound public finances can allow some degree of expansion in fiscal policy in a crisis situation – which contributed to the recovery after the Russian crisis.

THE ABILITY TO COPE WITH FINANCIAL SHOCKS

An evaluation of the exchange rate regime must take account of the ability to cope with sudden changes on the financial markets.

Just as an evaluation of the exchange rate regime must take account of the ability to cope with real shocks, it must also take account of the ability to cope with sudden changes on the financial markets. In a number of accession countries (the Baltic States, the Czech Republic and Slovakia, as well as Bulgaria), the last currency restrictions have been phased out, and there is now full convertibility for trade and capital movements (see Diagram 23). For all accession countries, the regulations must disappear on entry into the EU, when the countries will become part of the EU's internal market with free movement of labour, goods, services and capital. There will be no remaining foreign exchange barriers to rapid inflows and outflows of large and more or less short term portfolio investments. We have already discussed the risk of speculative attack, and the significance of the exchange rate regime for the credibility of monetary policy.

Diagram 23. Degree of liberalisation of capital market

Index: Fully liberalised=100
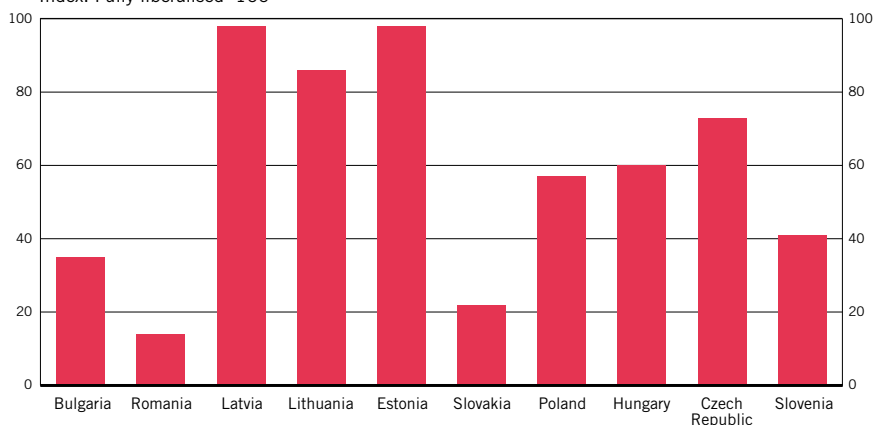
Source: Feldman and Temprano-Arroyo (1999).

What remains is the risk of rapid inflows and outflows unconnected with speculation on the credibility of exchange rates.

Studies of earlier EU entry by countries with welfare levels clearly below the EU average have shown that countries with relatively good macroeconomic data (Ireland, Spain and Portugal) have been the recipients of strong and large-scale inflows of both direct investment and portfolio investment immediately before and after EU entry.[24] Added to this is the growth in foreign exchange trade which develops in response to expectations of future EMU entry and expectations about the conversion exchange rate to the euro. This "convergence trade" can lead to higher volatility in exchange rates if optimism of an early entry alternates with pessimism.

While this in itself is very positive for real convergence, the inflows are not without risk. For countries which have adopted a fixed exchange rate or currency board, and where, consequently, the exchange rate cannot moderate the inflow through appreciation and the outflow through depreciation, there is a risk that the inflow will, in the short term, add to the monetary mass and drive up inflation. This actually happened during the late 1990s in Estonia. Conversely, outflows can generate deflationary pressures in an economy which, if left unchecked, may lead to demands that the currency be allowed to fall. The Asian crisis of 1997–98 showed how quickly re-evaluations of economic potential can take place, with rapid outflows as a result. If, as is often the case, capital inflows have also been accompanied

[24] Baldwin, Francois & Portes (1997).

by over-optimism in incurring debts in foreign currency, the impact of the financial shock may be intensified. It appears that banks and companies in Southeast Asian countries, such as South Korea, Thailand and Indonesia, exploited the fixed exchange rates to borrow more cheaply in foreign currency, without taking account of the exchange rate risk, expecting that the state would step in in the apparently extreme case that the exchange rate peg should fall.

Fixed but adjustable exchange rates appear to be appreciably more sensitive to financial fluctuations than currency boards and floating exchange rates.

For these reasons, and for those mentioned above in the introductory section on credibility, fixed but adjustable exchange rates may be appreciably more sensitive to financial fluctuations than currency boards (and, obviously, floating exchange rates). This makes it easy to envisage a scenario in which an accession country, eager to make a political mark in preparation for EU entry, pegs its currency to ERM2 during a period of strong capital inflows generated by precisely these hopes of membership, and which have driven up the exchange rate sharply. The inflows are reinforced when the stabilised exchange rates encourage domestic players to borrow in foreign currency. Then optimism declines, the flows turn negative, and the ERM2 bands suddenly turn out to be too narrow to cope with the rapid fall in the currency.

Given that there is no simple way of handling financial fluctuations, there are two safety measures which can reduce the risks:

- **Using fiscal policy actively to counteract large inflows.** By tightening its fiscal policy, a country with a fixed exchange rate can neutralise some of the inflationary effects of capital inflows, and create scope to stimulate the economy in the event of rapid outflows. The example of Estonia demonstrates that it is not impossible to handle inflows with a fixed exchange rate. Massive inflows in 1996-97 were neutralised to some extent by a sharp tightening of fiscal policy, and some outflows of portfolio investment could then take place without significantly disrupting the fundamental flow of long-term investment (see Diagram 24).
- **Transparent banking systems and effective supervision of financial stability**. In this area, the current situation is relatively good. All of the accession countries have, on one or more occasions during the transition to a market economy, been through serious banking crises which led to consolidations. In the majority of countries, with the exception mainly of the Czech Republic, Slovenia and Romania, the largest banks are partly or wholly-owned by foreign banks, usually based in an EU country. This applies in particular to the Baltic States, where almost 90 per cent of the banking system is owned by

Diagram 24. Capital inflows and fiscal policy in Estonia, 1995-2000
EEK million and per cent

Direct investment
in EEK million
(left scale)

Portfolio investment
in EEK million
(left scale)

Quarterly central government
expenditure, percentage change
(right scale)
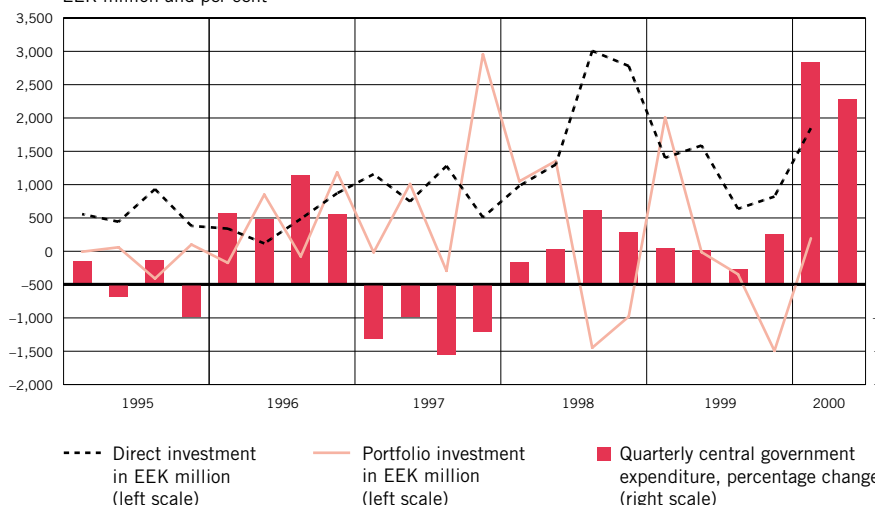
Sources: IMF and Estonian statistical agency.

Swedish banks. This means that the banks are subject to close scrutiny, both through the domestic authorities and in the EU countries in which their parent banks are based. Moreover it is – at least until the banks grow much larger – probably possible to recapitalise these banks through their parent banks. Both capital cover and bad loans in most of the accession countries, and again especially in the Baltic States, are now on considerably sounder levels than they were at the beginning of the 1990s.[25]

TRANSACTION COSTS

One aspect of the debate on exchange rates which is, perhaps, rather neglected, concerns the transaction costs which arise with different currencies, and which are often put forward as weighty arguments for currency

> **A neglected aspect of the debate on exchange rates concerns the transaction costs which arise with different currencies.**

unions. In general, these gains are usually estimated to be relatively small, in the order of a few tenths of a per cent of GDP. In the accession countries' case, where the exchange rates can be more volatile than in the EU countries, a fixed, predictable exchange rate may be rather more important, but the effects are difficult to assess. Studies of currency boards show, however, that the currency markets in

[25] Eesti Pank (2000b) and (2000a), OECD (2000b) and EBRD (1999).

these countries function considerably better than in countries with fixed or movable exchange rates in the sense that the spread between buying and selling rates is lower.[26]

Confidence in exchange rates is, however, especially important given that the financial systems in the accession countries are still undeveloped. Very rigid exchange rate arrangements, such as currency boards, reduce transaction costs and make a direct integration of the financial systems easier. An example of such an integration is that Estonia (with its euro-based currency board) has half of its domestic loan stock issued in euros, at interest rates considerably lower than on purely domestic loans. In line with what was said above, in such a situation it is important that the functioning of the banking system inspires confidence. The largest transaction gains can be expected from a direct euroisation of the economy, where the currency frontier between the country involved and the euro zone completely disappears.

> **Highly fixed exchange rate arrangements, such as currency boards, reduce transaction costs and make a direct integration of the financial systems easier.**

CONCLUSIONS ON REAL CONVERGENCE

It is likely that the accession countries with clear-cut exchange rate regimes will achieve the most rapid real convergence with the EU countries.

- The first alternative, a floating exchange rate with inflation target, gives scope both to cope with asymmetric shocks and financial shocks, at the same time as the inflation target can create credibility for monetary policy.
- The second alternative, a currency board, is more demanding on the ability to cope with shocks through flexibility in wages and prices, and provides scope for adjustment by means of fiscal policy. On the other hand, a currency board provides a simple and influential anchor for monetary policy, which it insulates institutionally from political pressures at the same time as it reduces transaction costs. In these respects, there is little difference between currency boards and pure euroisation, that is a unilateral introduction of the euro as coins and notes, apart from the fact that euroisation probably results in greater credibility and lower transaction costs.
- The intermediate position between floating exchange rates and currency boards, that is to say fixed but adjustable exchange rates, seems to be a more problematic alternative, since it gives lower credibility and higher risk premi-

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[26] Rivera Batiz and Sy (2000).

ums – in other words an even greater risk of falling prey to currency specula-tion. Experience from the ERM in 1992-93, the Mexican crisis of 1995-96, the Czech Republic in 1997, the Asian crisis of 1997-98, the Russian crisis of 1998 and Brazil in 1998-99 indicates unequivocally that such exchange rate arrange-ments are sensitive both to real and financial shocks.

Taken together, factors such as flexibility in wages and prices, as well as degree of openness, give an indication of which accession countries would have the greatest interest in each type of exchange rate arrangement:

- There is a group of larger economies, which are expected to have greater diffi-culty in coping with real shocks. These have a lesser degree of flexibility in wages and prices and in certain cases a considerable section of their economies which is not exposed to competition. There is, in addition, some risk that they will be exposed to asymmetric shocks relative to the euro zone during the catching-up phase, due to the major residual restructuring requirements in, for example, agriculture and heavy industry. For these countries, an exchange rate which is as flexible as possible would probably be the optimum choice to assist in achieving real convergence. The credibility essential to a stable macroeco-nomic climate can then be built around a monetary policy governed by infla-tion targets, and a medium-term balance in the public finances, in line with the EU's Stability Pact. This group comprises *Poland*, the *Czech Republic* and *Romania.*
- There is also a group of small and medium-sized economies, with a relatively high degree of openness, but which are also characterised by rigidity in wages and prices. Despite the fact that the risk of an asymmetric shock is smaller for these countries, the rigidity in the labour market and in certain product mar-kets means that these countries also benefit most from a floating exchange rate and a monetary policy based on inflation targeting. This group comprises *Hun-gary*, *Slovakia* and *Slovenia.*
- Finally, there is a group of small economies, with an extreme degree of open-ness (exports and imports are together equivalent to about or over 100 per cent of GDP, and a large proportion of trade is with EU countries or with neigh-bouring countries which are also applicants for EU membership), flexibility in wages and prices and a credibility for their macroeconomic stabilisation efforts, based on a nominal anchor, a currency pegged via a currency board, or an arrangement similar to a currency board. Due to their openness, these coun-tries run less risk of being hit by asymmetric shocks, but are at a higher risk of

being hit by a crisis of confidence if the nominal anchor is abandoned. For these countries, continuing with a currency board arrangement is preferable throughout the catching-up phase, with a fiscal policy aimed at alleviating the effects of capital inflows. A problem arises for those currency boards consisting of a currency or combination of currencies other than the euro. The risk of asymmetric shocks in relation to the euro zone is greater for these currency boards, and the transaction gains in exchanges with the euro zone are smaller – and it may, consequently, make sense to replace the currency board currency with the euro. To the extent that a liquidation of the currency board is not a realistic alternative anyway, there are substantial potential transaction gains to be obtained from the direct use of the euro as a means of payment, "euroisation", instead of detouring through a currency backed by a currency board. This should also reduce increases in interest rates in connection with speculation against the currency board. This category of countries comprises *Estonia*, *Latvia* and *Lithuania*, and possibly also *Bulgaria* (rather lower degree of openness).

Nominal convergence

THE FORMAL CONVERGENCE CRITERIA

If the accession countries could select their exchange rates purely on the basis of what would be most favourable for the transition to the market economy and to higher living standards in the long term, the conclusions mentioned above would apply. But for the accession countries there is a complicating factor; in the future it is possible that they will become part of the euro zone, with the potential economic and political gains this implies. It is not possible here to discuss the advantages and disadvantages of actual entry into the euro zone, other than the principles relating to fixed exchange rates mentioned above. But if we assume that the introduction of the euro is a goal for the accession countries, it is no longer possible to look solely at *real* convergence, we must also investigate the nominal requirements for entry into the euro zone as they were formulated in the Maastricht Treaty. This is usually called *nominal* convergence, since the nominal figures for inflation, interest rates, budget balance and so on listed in the requirements must converge with the corresponding nominal figures for the euro zone.

The requirements for *nominal* convergence for euro entry, the convergence criteria, as formulated in the Maastricht Treaty are four: (1) stable exchange rates corresponding to the bands laid down in ERM2, (2) low inflation, (3) low interest rates and (4) stable government finances in the sense that the deficit in public sec-

tor finances must not exceed 3 per cent of GDP, and government debt must be below 60 per cent of GDP, or be clearly heading in that direction.[27]

In the light of what has been said earlier in this article, and what has emerged in the EMU debate, it is fairly obvious that there is no guarantee that these nominal criteria

> **There is no guarantee that these nominal criteria actually contribute to real convergence.**

actually contribute to real convergence, quite the reverse, they may, in fact, lead away from real convergence. This becomes particularly clear when the convergence requirements are applied to rapidly-growing economies with large requirements for structural transformation, such as those in Central and Eastern Europe.

THE CRITERIA TO PARTICIPATE IN ERM2

The EU's exchange rate mechanism ERM, and its successor ERM2, is an exchange rate arrangement which is regarded as fixed, but which, since the currency crisis of 1992–93 has had broad bands, ±15 per cent. Fixed but adjustable exchange rates, and the risks associated with these have already been discussed above, but some formal questions remain. ERM2 is based on pegging floating

> **ERM2 is based on pegging floating exchange rates to the exchange rate mechanism at a central rate decided during the negotiations. Several of the accession countries, however, already have a considerably more fixed form of currency pegging, a currency board.**

exchange rates to the exchange rate mechanism at a central rate decided during the negotiations. Several of the accession countries, however, already have a considerably more fixed form of currency pegging, a currency board.[28] The European Commission, the ECB and the EU's finance ministers have, however, given the go-ahead for currency boards denominated in the euro, but have said that entry to ERM2 must be negotiated "on a case by case basis".[29] This lack of clarity on the requirements specifically placed on the currency boards can contribute

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[27] It should be mentioned in this connection that the majority of accession countries are now approaching or fulfilling the requirement for stable government finances, which has often been a problem for countries in the EU circle. Due to their limited access to international capital markets, few of these countries have been able to build up any substantial public debt. On the other hand, few of the countries have, at the time of writing, fulfilled the inflation criteria.

[28] During a period in 1999, a proposal circulated in the EU under which the accession countries' currencies in ERM2 must first be "market tested", that is the exchange rate must be tested under floating conditions within ERM2. This would have involved liquidating currency boards to find the "correct" level within ERM2. It soon emerged during the discussions, however, that currency boards by definition generate a "market test", since the fixed exchange rate governs the development of the economy over a number of years. Any liquidation of the currency board would at the same time be extremely risky for credibility. The proposal is no longer put forward as a serious alternative in the debate within the EU institutions.

[29] Noyer (2000).

to uncertainty. In addition, the currency board countries can only hope that the central rate negotiated together with the EU countries is the rate they have already chosen to peg to the euro at. The two countries which have pegged their currencies to the euro, Estonia and Bulgaria, have already subjected their economies to a much higher degree of real convergence towards a nominal anchor than that constituted by ERM2. To the extent that such convergence has taken place, and wages and prices have adjusted, as has been the case in Estonia and Bulgaria, this is a more extensive test than is ERM2. The currency board's pegged rate is, accordingly, the most natural central rate for ERM2, and the most natural conversion rate to the euro, in the event of negotiations with the EU countries on ERM2 entry. In fact, a currency board can be regarded as an exceptionally good substitute for full membership of EMU. This has led some commentators to the daring conclusion that all accession countries should introduce currency boards before EU entry.[30]

Nominal convergence in accordance with ERM2 also requires that countries which have chosen the US Dollar or SDR as their target must switch over to the euro – something which the EU's Council of Finance Ministers and the ECB have declared clearly and openly.[31]

For countries which have gone to the other extreme in their exchange rate strategy, free floating exchange rates with inflation targets, an excessively rigid interpretation of ERM2 would create problems for the reasons enunciated below.

THE CATCH 22 OF THE CONVERGENCE CRITERIA

It is not possible to combine the convergence criteria of stable exchange rates and low inflation with the rapid increase in productivity in export industries in rapidly-growing countries on low income levels.

For countries which are expected to grow faster than the EU countries, such as those in Central and Eastern Europe, there is something of a dilemma built into the nominal convergence criteria themselves. It is not actually possible to combine the two convergence requirements of stable exchange rates and the same low level of inflation as in the EU with the rapid increase in productivity in export industries, relative to the rest of the economy, which is expected in rapidly-growing countries on low income levels. This dilemma is expressed in the Balassa-Samuelson hypothesis, which is also similar to the Swedish EFO model.[32]

[30] Dornbusch (2000) and Coricelli (2000).
[31] Ecofin Council (2000).
[32] For a brief definition of and introduction to the EFO model, see Dickson et al (1986).

The principle is fairly simple, and it also has a bearing on rapidly-growing countries in the euro zone, such as Ireland and Portugal.

• The price level for those goods and services which are traded internationally (tradables) is determined to a great extent by the international price level, and is given for smaller countries – otherwise consumers would import tradables from abroad. With fixed exchange rates, therefore, the price trend for tradables is roughly the same as in the outside world.
• Simultaneously, productivity is increasing rapidly in the tradables part of the economy, more rapidly than in the surrounding world, when the country is trying to reach the welfare levels of the surrounding world. Incomes rise in the tradables companies, which pushes up wages faster than in the surrounding world, while the price level for tradables continues to follow the trend in other countries.
• The tradables sector competes for labour with the rest of the economy (non tradables), and the higher wage increases push up wage levels in the non tradables sector well. Unless productivity in non tradables (goods for the home market and services such as car washes and restaurant meals) rises equally fast, the price of these items must increase more rapidly than in the surrounding world to offset the wage pressure. The higher productivity in the tradables sector compared with externally then causes inflation in the country to be higher, when inflation rises for the relatively less abundant non tradable goods.

The overall effect on consumer prices of the two sectors is higher inflation. Given that the inflation rate is higher than in the surrounding world at the same time as the exchange rate remains fixed, there is a "natural" *real appreciation* even though no nominal appreciation takes place.

This Balassa-Samuelson Effect is considered by many people to be the main reason why the Baltic States, despite high productivity and fixed exchange rates, have experienced relatively high inflation, and why almost all accession countries with fixed exchange rates or currency boards have seen sharp real appreciation since 1992. Estimates by IMF economists show that the Balassa-Samuelson Effect can produce an inflation rate in countries with fixed exchange rates, as in the Baltic States, about 1 1/2 percentage point higher than the divergence in inflation against the euro countries permitted under the convergence criteria.[33] Balassa-Samuelson, consequently, generates an obvious conflict between two nominal

[33] IMF (2000a).

convergence criteria – the exchange rate requirement and the inflation require-ment. Either the exchange rate is locked, which means that a totally "natural" inflation increase and real appreciation must be permitted, or the exchange rate must float to cope with the real appreciation.

For countries with floating exchange rates, there is an obvious conclusion. It should be possible to accommodate the natural appreciation within the frame-work of the 15 per cent exchange rate variation permitted within ERM2 – but only on condition that the countries are *not* forced to remain in ERM2 for an excessively long period of time.

For countries with fixed exchange rates, the dilemma may be solved by focussing the *inflation assessment* on one specific year, during which the naturally higher inflation rate can be forced down without excessive cost to the real econo-my. A number of countries which subsequently became members of the euro zone demonstrated that tightening fiscal policy and reducing indirect taxes can temporarily lower the inflation level to the desired figure. This should be accept-able as long as those appointed to carry out the assessment realise that Balassa-Samuelson generates a small but "healthy", productivity-driven inflationary impulse.

With respect to the accession countries, there are in addition some reserva-tions attached to the effects normally expected from Balassa-Samuelson.

- A major part of the higher inflation figures and the real appreciation which have been characteristic of the Baltic States has been associated with the dereg-ulation of prices, especially in such areas as energy and housing, which were formerly highly subsidised. Consequently, they do not in part reflect a genuine Balassa-Samuelson Effect, nor "unhealthy" underlying inflationary impulses.
- Due to the socialist planned economy's disparagement of "unproductive ser-vices", the service sector was considerably smaller and less developed than in the majority of market economies. In the accession countries, therefore, a rela-tively strong increase in productivity can also be expected within the service sectors, which to some extent may create a balance in productivity increase between tradables and non tradables, and neutralise the Balassa-Samuelson Effect.

A possible sign that both these factors have come into play is that the sharpest real appreciation in the Baltic States came right at the beginning of the reform process in 1992–96, and the real appreciation tailed off in later years.

LIMITATIONS TO FISCAL POLICY

As has been mentioned several times above, fiscal policy provides, in many cases, the degree of freedom necessary to cope with fluctuations, given that the exchange rate is already locked or restricted by possible par-

ticipation in ERM2. The strict requirements on public sector deficits in the convergence criteria constitute, therefore, a powerful limitation, and almost certainly mean that many of the accession countries, if they are to cope with the transition, must run a fiscal policy with structural surpluses. At the same time, the governments in these countries, which very likely have massive investment requirements, not least in preparation for EU entry, are expected to have structural deficits. It may be possible to solve this dilemma with additional resources from the EU's structural funds. Under the plan adopted in Berlin in June 1999, 46 billion euros have been allocated for the accession countries for the period 2002–06.[34]

General conclusions

- In the accession countries' case, there are signs of a clear conflict of goals between, on the one hand, real convergence, the ability to catch up with the EU countries economically, and nominal convergence, with the nominal requirements laid down for participation in the euro zone. If conflicts do arise between the convergence criteria and the need for rapid growth in the accession countries, it is essential that the EU from its side signals a high degree of flexibility. This applies especially to the exchange rate criterion.

- Particularly for rapidly-growing countries, a definite goal for exchange rate policy is an advantage, either with exchange rates floating as freely as possible with inflation targets as norms, or arrangements which are as fixed as possible. In the latter case, currency boards seem to be a highly effective option, but from a purely economic viewpoint, the unilateral introduction of the euro in the form of notes and coins is clearly preferable, with lower transaction costs and lower interest rates. The intermediate option, fixed but adjustable exchange rates in various forms, appears to be vulnerable to expectations of devaluation in both the labour market and the financial markets.

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[34] Only a minor part of this sum, slightly more than 13 billion euros, is for agricultural subsidies, while the greater part consists of support from the structural funds and a range of support programmes. The agriculture component is, however, regarded as massively underestimated, and depends on discussions about the future of the Common Agricultural Policy.

• Just as with EMU, the advantages and disadvantages of various exchange rate systems depend on the conditions prevailing in each country. Quite simply, small, open and flexible countries are more suited to fixed exchange rates than are large, closed countries with widespread rigidity in prices and wages. Fortunately, it seems that those countries which chose fixed systems were small, open and flexible, while those which adopted floating exchange rates were larger and rather less flexible, even though they had fairly high levels of openness. Almost half of the accession countries, however, have adopted fixed but adjustable exchange rates. Although these have worked well so far, entry into the EU may involve some strains on their exchange rate systems. A policy aimed at increased labour market flexibility and a stable fiscal policy may, in that event, be one way to cope with the challenges which these economies will face.

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The wage spread between different sectors in Sweden

By Sara Tägtström
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Wage trends in Sweden have tended to show a large degree of similarity between the different sectors, although the sectors have differed considerably in terms of wage systems and elements of wage drift. However, there have been few attempts at empirical research into the wage spread between different sectors. This study indicates that the industry is a wage leader in relation to the central government and municipal sectors, while the central government sector is a wage leader in relation to the remainder of the business sector.

Models for wage spread

The analysis of wage spread between different sectors in Sweden has been largely influenced by the EFO model formulated by LO (the Swedish Trade Union Confederation), SAF (the Swedish Employers' Confederation) and TCO (the Swedish Confederation of Professional Employees) at the end of the 1960s.[1] The wage scope (central wage agreements, wage drift and payroll taxes) in the economy is defined in the model as the total of the development in international prices and the expected future increase in productivity within the sector subject to competition, which mainly comprises the export industry. The implication of this nominal wage model for policy is that the sector subject to competition should lead the way in terms of wages and therefore should sign its central wage agreement first. In practice, the EFO model was only applied within the private sector up to the mid-1970s. After

> The analysis of wage spread between different sectors in Sweden has been largely influenced by the EFO model formulated by LO, SAF and TCO at the end of the 1960s.

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[1] Gösta Edgren, Karl-Olof Faxen and Clas-Erik Odhner, (1973), *Wage Formation and the Economy*, Allen and Unwin, London.

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this, the changed economic conditions, with severe fluctuations in exchange rates and prices, made it difficult to use the model. However, the idea that the sector subject to competition should lead the way in terms of wages has lived on. Wage agreements in the private sector have usually been signed before the agreements in the central government and municipal sectors, where a requirement that wages should follow those in the private sector has been common. The wage policy of showing solidarity with workers in low-paid sectors has had a similar effect and wage trends in the different sectors have been similar (see Diagram 1).

Diagram 1. Nominal hourly wage increases in industry, other business sector, the central government sector and the municipal sector, 1972-1998

Index: 1972=100
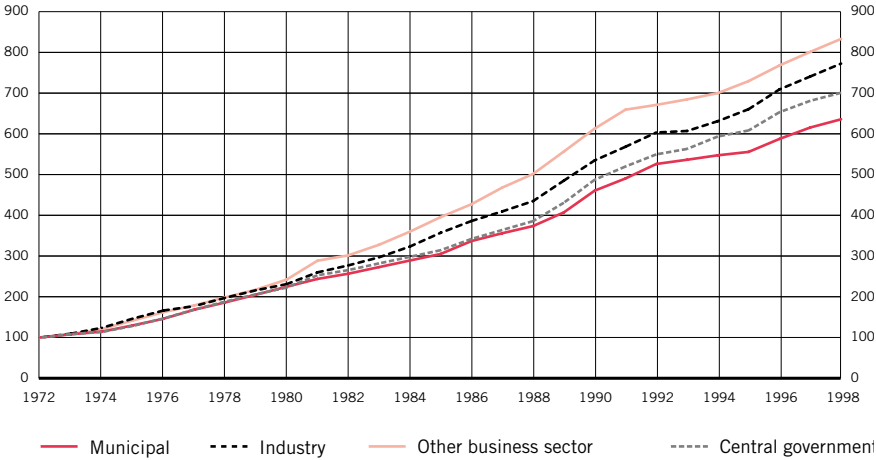
Source: National Institute of Economic Research.

In the EFO model, wages are spread between the different sectors by means of the wage negotiation system. Within the class of negotiation models where the parties negotiate the wage, while the employer one-sidedly determines the employment, the wage increase tends to depend on the wage the employee could expect to receive outside of the company/sector if the negotiations should fail.[2] Comparisons with others' wages may also be a consequence of what the individual perceives to be a fair wage.[3]

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[2] Richard Jackman, Richard Layard and Stephen Nickell, (1991), *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford University Press, Oxford.

[3] See for example Alan Carruth and Andrew Oswald, (1989), *Pay Determination and Industrial Prosperity*, Oxford University Press, Oxford, and Eva Uddèn-Jondal, (1991), "Wage Formation and the Impact of Envy", Working paper 96/1991, the Trade Union Institute for Economic Research (FIEF), Stockholm.

Holmlund and Ohlsson (1992) have investigated the spread of wage increases between the different sectors during the period 1966–1991.[4] The study provides empirical support for the hypothesis that the private

Earlier studies show that the private sector is wage leader in relation to the central government and municipal sectors.

sector is wage leader in relation to the central government and municipal sectors. They find that wage increases in the private sector have preceded wage increases in the central government and municipal sectors. This corresponds well with the fact that the private sector has usually signed its central wage agreements before the public sector. With regard to the latter sector, the results also indicate that there is a link from the municipal sector to the central government sector. The authors also find some indicators of a return link with regard to wage increases from the central government sector to the private sector.

Jacobson and Ohlsson (1994) have also investigated whether there is a long-term correlation between wages in the private sector, the central government sector and the municipal sector.[5] The period under investigation is 1968–1988. Unlike Holmlund and Ohlsson, they do not compare two sectors against one another at any one time, but extend the analysis to cover all three sectors simultaneously. The authors find that the rate of wage increase in the central government sector is mainly determined by the deviation of its own wage level from the level in the municipal sector, although it is also affected by the wage level in the private sector. A similar pattern appears for the municipal sector, where the municipal wage increases are affected by the relative wage situation compared with the private sector. On the other hand, the effects of wage trends in the municipal and central government sectors on wage trends in the private sector is minimal.

Wage spread investigated using the Granger causality test

This article describes a study of the sector wage spread using a four-sector model that includes the following sectors: the industry sector, other business sector, the central government sector and the municipal sector (primary and country council

[4] Bertil Holmlund and Henry Ohlsson, (1992), "Wage Linkages Between Private and Public Sectors in Sweden", *Labour* 6 (2), pp. 3–17.
[5] Tor Jacobson and Henry Ohlsson, (1994), "Long-Run Relations Between Private and Public Sector Wages in Sweden", *Empirical Economics* 19 (3), pp. 343–360.

municipalities). This study, unlike the afore-mentioned studies, divides the private sector up into industry and other business.

The data used comprises six-month data on nominal wages within the four sectors from the period 1972–1998. Hourly wages are calculated as the ratio between the payroll expense and the number of hours worked within the respective sector. The payroll expense includes the amounts that comprise remuneration for work carried out during a period of time, regardless of whether the payment is made during that period or not. This also includes retroactive wage payments. The figures for the number of hours worked in the industry sector and the rest of the business sector also include self-employed persons, which means there is a risk that the hourly wage can be underestimated. However, self-employed persons comprise only a small percentage of the total number of hours worked.

One method of investigating whether a sector is a wage leader is to test whether the wage level within the sector precedes the wage level in another sector in time.

One method of investigating whether a sector is a wage leader is to test whether the wage level within the sector precedes the wage level in another sector in time. This is done by implementing a Granger causality test on the wage levels in the respective sectors.[6] The argument in favour of using wage levels and not the rate of wage increase, as in the two previous studies, is that economic theory indicates that it is the wage level outside one's own sector that is important to one's own wage demand rather than the rate of wage increase.

Table 1 shows the results of the Granger causality test. The symbol * means, for instance, that the zero hypothesis "no Granger causality from the wage level in industry to the wage level in the municipal sector" can be discarded at the 1 per cent level. This means that industry is the wage leader in relation to the municipal sector. The symbols ** and *** respectively mean that the zero hypothesis can be discarded at 5 per cent and 10 per cent respectively, while ¤ means that the zero hypothesis cannot be discarded and thus there is no Granger causality.

The results indicate that industry is wage leader in relation to the central government and municipal sectors, while the central government sector is wage leader in relation to other business. Unlike the two earlier studies, there was no result indicating that the municipal sector was wage leader in relation to the central government sector. The Granger causality test has also been carried out on the rates of wage increase. It can be concluded that the results of these tests differ

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[6] It can be difficult to interpret the results of statistical tests carried out for a model that uses integrated data in levels. If there is a long-term connection between the wages in the different sectors, i.e. they are cointegrated, the problem is often less serious. The cointegration test indicates that the wage levels in the different sectors are cointegrated.

Table 1. Test for Granger-causality

Independent	Dependent	Wage level
Central government	Municipal	¤
Municipal	Central government	¤
Central government	Industry	¤
Industry	Central government	**
Central government	Other business	***
Other business	Central government	¤
Industry	Other business	¤
Other business	Industry	¤
Municipal	Industry	¤
Industry	Municipal	*
Other business	Municipal	¤
Municipal	Other business	¤

to some extent from the results obtained in the test on wage levels. When the rate of change is used, the municipal sector appears to be wage leader in relation to the central government sector, while other business is wage leader in relation to the municipal sector. The fact that the results were different is

The results indicate that industry is wage leader in relation to the central government and municipal sectors, while the central government sector is wage leader in relation to other business.

due to the fact that there is a long-term correlation between the wages within the different sectors that cannot be picked up by a model using the rate of change.

To summarise, all three studies indicate that the private sector, or in this study industry, is wage leader in relation to the central government and municipal sectors (see Figure 1).

However, the results should be interpreted with some caution, even though they are relatively unequivocal. The reason for this caution is based on two factors. Firstly, the public sector has only signed central wage

However, the results should be interpreted with some caution, even though they are relatively unequivocal.

agreements before the private sector on a few occasions. Secondly, the analyses

Figure 1. Causality orientation
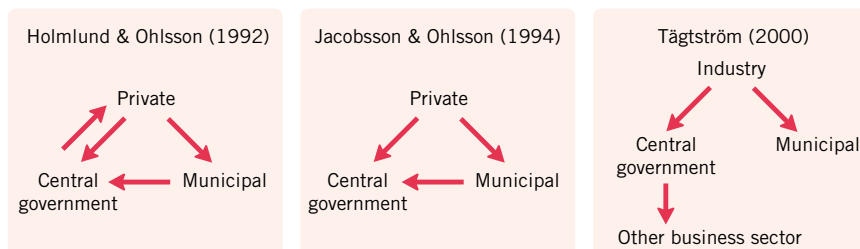
above do not check for variations in the sectors' relative labour market situations, which increases the unreliability.

The wage spread in future

Large sections of the Swedish labour market are to renegotiate their central wage agreements by the first quarter of next year.

Large sections of the Swedish labour market are to renegotiate their central wage agreements by the first quarter of next year. However, some wage agreements covering several years have been signed within the municipal sector (including the nurses). There was also an ambition to sign longer agreements between the negotiating parties with regard to teachers. However, the members of both of the teachers' unions rejected this proposal. There has previously been some concern that these groups of public employees, who must be regarded as having a favourable labour market situation, could set the norm for the coming wage agreement negotiations. The results reported above indicate that this has not been the case before, but naturally there is always a possibility that this type of pattern could arise in the future.

However, there are several reasons why the sector subject to competition can be expected to continue to be wage leader.

However, there are several reasons why the sector subject to competition can be expected to continue to be wage leader. During the previous round of central wage agreements in 1998, the industrial parties expressed the view at an early stage that the export industry, which is subject to competition, should set the standard for the coming round of central wage agreement negotiations. This was largely successful and the wage agreements outside of 'Industriavtalet' (the central wage agreement for unions in the manufacturing industry) were also signed at roughly the same level.[7] Now it appears that the fundamental principles of 'Industriavtalet' are also spreading to other sectors. The central wage agreement signed by parties in the municipal and county council sector has now also established that the sector subject to competition should be wage leader.

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[7] The 'Industriavtalet' is a cooperation agreement on the development of industry and wage formation. The agreement was signed in March 1997 by the parties within industry. A special, partly appointed 'industrial committee' monitors and promotes the application of the agreement. The committee in turn appoints the 'industrial financial advisory board', which consists of four independent economists. In addition, there are between five and ten persons to act as impartial chairpersons. These people will come in and assist during the central wage agreement negotiations the month before the current agreement expires on 31 January 2001. A special appendix, the 'industrial negotiation agreement' regulates how the negotiations should proceed. For instance, the negotiations must begin three months before the existing agreement expires.

Trends in Swedish Public Finances – Past and Future

By Yngve Lindh and Henry Ohlsson

Yngve Lindh, Ministry of Finance and Henry Ohlsson, professor at Göteborg University

Swedish public finances have shown considerable cycles, in response to economic activity, during the last decades. The budget cycles have been asymmetric in the sense that surpluses during expansions have been smaller than deficits during recessions. This has led to a trend increase in public debt. The crisis in Swedish public finances at the beginning of the 1990s has been solved in the short term. It is less clear that the long-term trend has changed. The EMU convergence criteria and the "peer pressure" within the union comprise restrictions on public debt and budget balance. The medium-term target of a general government net lending of 2 per cent of GDP is a response to this. Our first main conclusion is that this target is not ambitious enough in the short term, while it is too ambitious in the long term – the trend will be excessively reversed in the long term. A "top-down" budget process and expenditure ceilings are intended to help in reaching the target. Our second main conclusion is that, while measures like these may be effective in reducing expenditure in the short term when they are introduced, the long term efficiency is less clear. In the long term there needs to be strong political commitment to the necessity of fiscal discipline. "Straitjackets" cannot work alone, and particularly not against the intentions of the political decision-makers.

Introduction

Swedish public debt has shown a strong increasing trend over the past three decades. The degree of variability is high and also increasing. After a rapid upturn during 1978–1981, public debt declined considerably in the late 1980s. The improved public finances in the late 1980s were not sustained in a longer perspective. The most severe fiscal crises during the whole century followed in the early 1990s. Public debt has, however, been reduced in the late 1990s. Debt will probably be reduced further in the coming couple of years.

Why should we care about public debt? A high and volatile debt may lead to higher taxes in the future. Debt today and higher taxes tomorrow may cause higher welfare losses than would otherwise be necessary. These welfare losses may show up as negative incentives for labour supply, savings, higher education, and international capital flows. There could also be a threat to price stability. This is the reason why the Stability and Growth pact was introduced when the European Monetary Union started.

The fundamental question is therefore: Can we expect a sustainable path for public debt in the long term following the current episode of debt reductions?

There are two main policy alternatives to keep the public debt-GDP ratio stable in the long term. The first is to have annual deficits of a size so that the growth of the debt is equal to GDP growth. This will keep the public debt ratio *constant*. The second is to compensate for deficits during recessions by surpluses during expansions, so that the public debt ratio is *stationary* in the long term but not necessarily constant in the short term.

During the last few decades, Sweden has most often chosen the first alternative during expansions and the second during recessions. This is not a sustainable combination in the long term.

One may, however, ask why a stable long-term public debt ratio should be a policy objective. What is really the optimal public debt ratio? This separates into several different questions. Two of them are:

- What is the optimal level of the public debt ratio?
- What is the optimal variability of the public debt ratio?

Our interpretation is that the first question has very much to do with public investment and the public stock of real capital. The development of the public sector's assets will affect the optimal public debt.

The second question is related to public consumption and public transfers. An important dimension of this question is that there are several different theoretical models suggesting that it is desirable to keep tax rates constant over time. A consequence of this may be that the public debt ratio will fluctuate.

The policy environment is important. Besides general differences in the macroeconomic conditions and in the size and structure of the public sector, public finances in Sweden are now put into a Straitjacket.[1] This consists of a medium-term target of budget balances, a "top-down" budgetary process, and expenditure ceilings. In addition there is a "peer pressure" from abroad due to the Swedish membership of the European Union. The medium term target is a response to this.

> **Public finances in Sweden are put into a Straitjacket; that is a medium-term target of budget balances, a "top-down" budgetary process, and expenditure ceilings.**

Our *first* main conclusion is, however, that in the short term this target is not ambitious enough, while it is too ambitious in the long term – the trend will be excessively reversed in the long term. The top-down budget process and the expenditure ceilings are intended to help in reaching the target. Our second main conclusion is that, while measures like these may be effective in the short term when they are introduced, the long term efficiency is less clear. In the long term there will need to be a strong political commitment to the necessity of fiscal discipline. Straitjackets cannot work alone and particularly not against the beliefs of the political decision-makers.

This paper is structured as follows: First basic facts concerning the development of the Swedish public debt over more than a century are presented followed by policy instruments and policy implementation. Thereafter, policy objectives are presented followed by a discussion of how the optimal public debt can be determined.

Facts – patterns and episodes

Figure 1 shows the development of the Swedish central government debt-GDP ratio over more than a century.[2] The debt ratio was almost constant at 20 per

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[1] OECD (1998) presents the budget process of the central government in Sweden.

[2] The general public sector also includes the local governments (county councils and municipalities) and the old-age pension system. The implicit pension debt of the pay-as-you-go pension system is, however, not included. There are, however, no long time series easily available for these sectors. We therefore concentrate on the central government. The development in the general government debt-GDP ratio is to a large extent dominated by the development of the central government debt-GDP ratio.

cent during the period 1890–1930, except for a small drop at the beginning of the 1920s. Debt rose somewhat in the middle of the 1930s when the Swedish government pursued an activist fiscal policy. During World War II, the debt ratio more than doubled for obvious reasons. After the war, however, the debt ratio showed a trendwise decline until the 1970s. This was a decade when the public sector continued to expand at the same time as international influences on the Swedish economy, for example the oil price hikes, affected the economy much more than before.

Figure 1. Central government debt—GDP ratio, 1895-1999

Percent
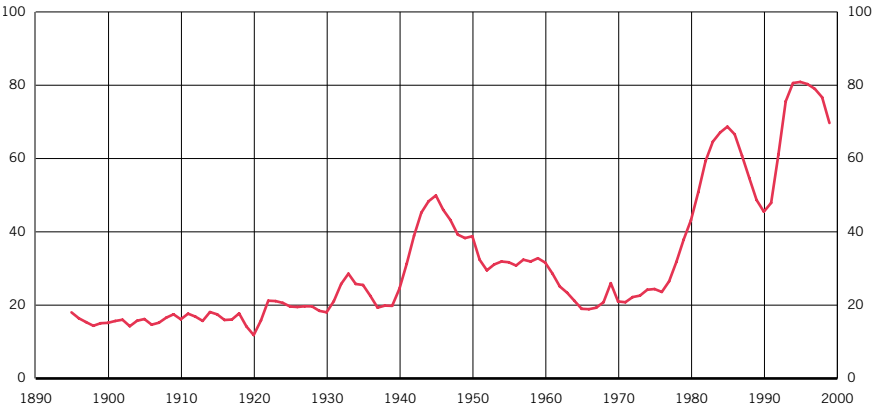
Source: The Swedish National Debt Office.

Over the past few decades, the debt ratio has shown a strong increasing trend.

Over the past few decades, the debt ratio has shown a strong increasing trend. At the end of the 1990s, the debt ratio was almost four times that of the ratio during the 1970s. But in addition there has also been a high, and increasing, degree of variability. After fast upturns during 1978–81 and in the early 1990s, public debt declined considerably in the late 1980s and has been reduced in the late 1990s. Public debt can be expected to be cut further in the coming years.

Figure 2 shows central government real revenue and real expenditure 1969–1999. It is very much standard to relate nominal fiscal variables to GDP, that is to compute expenditure or public debt as shares of GDP. A potential drawback with this is that it is difficult to know whether trends and cycles in these shares depend on trends and cycles in the fiscal variables or trends and cycles in GDP. As an alternative, in this figure we have instead deflated the fiscal variables

with the price index for central government consumption from the National Accounts. The main part of this index depends on wage costs, as labour is by far the most important part of central government expenditure. Our computations also mean that we evaluate how much central government consumption could have been bought for the actual expenditure on central government investment and transfers.

Figure 2. Central government real revenue and real expenditure, 1969-1999
1995 SEK billion
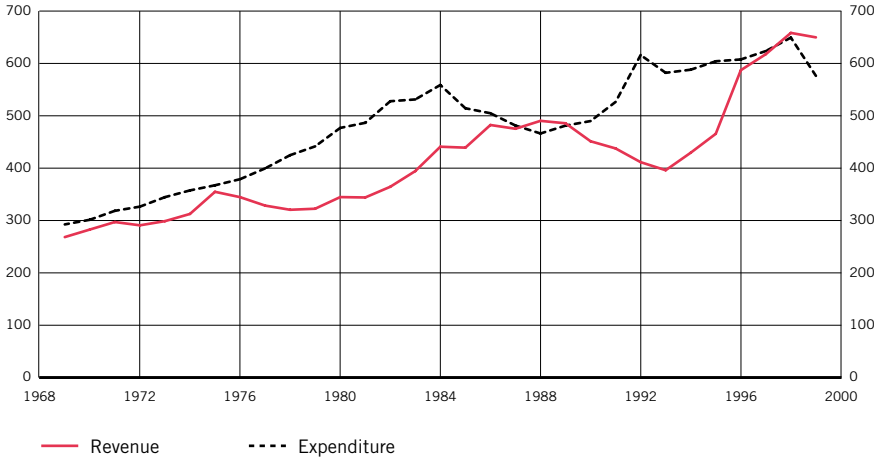
Source: Own calculations based on data from the Swedish National Audit Office and the Swedish National Financial Management Authority.

It is interesting to note that real expenditure (dotted line) has been higher than real revenue (solid line) almost every year during the three decades shown in the figure. The

> **Real expenditure has been higher than real revenue almost every year during three decades.**

development of real revenue and real expenditure shown in Figure 2 is consistent with a clear decline in the expenditure-GDP ratio and an almost constant revenue-GDP ratio for the period 1993–1999. This development will continue during 2000–2003, according to the projections in the 2001 Budget Bill presented in September 2000. The expenditure ratio for the general government will decline from 58.7 per cent of GDP 1998 to 52.9 per cent in 2003.[3]

By looking at Figures 1 and 2, two conclusions can be drawn. In the first place, it is clear that the improved public finances in the late 1980s were not sus-

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[3] Interest costs are expected to decline from 6.2 to 3.0 per cent of GDP during the period.

tained in the longer term. The most severe fiscal crises in the whole century followed during the beginning of the 1990s. Second, the ensuing fiscal consolidation process was different from that of the 1980s.

The fiscal consolidation started in 1982 was initially based on a tax increase strategy. Real expenditure did not start to decrease until the mid 1980s. The final steps to budget balance were based more on expenditure cuts than revenue increases.

During the 1990s the order was reversed. The fiscal consolidation started with a stop in the expenditure increases in 1992. Revenue started to increase later. Budget balance, contrary to the situation in the 1980s, was exclusively based on revenue increases, while real expenditure was not cut.[4]

As soon as there was a fiscal surplus, expenditure started to increase. Hence, the policy became procyclical.

There is another interesting observation to be made from Figure 2, a detail. After four years of decreases, real expenditure started to increase in 1989. Was it because of a recession? No. The previous year was the first year with a fiscal surplus. When the surplus came, the control of costs decreased. Central government expenditure started to increase long before the crisis of the 1990s. As soon as there was a fiscal surplus, expenditure started to increase. Hence, the policy became pro-cyclical.[5]

This type of fiscal policy behaviour was not particular to Sweden. Pro-cyclical reactions in good times have been common in a number of countries and seem to have caused an asymmetric pattern in fiscal policy so that discretionary expansion of expenditure has offset the effect of automatic stabilisers. This difficulty in allowing automatic stabilisers to work without restriction during upswings of the business cycle has been an important reason behind the problem in reducing government debt.[6]

So far, we have focused on particular episodes concerning revenue and expenditure. It is instead possible to seek common patterns for the last three decades. Table 1 reports some regression results, where we try to track down the impact of economic activity, as measured by GDP, on central government revenue and expenditure. The sample is very small from an econometric viewpoint and it is therefore not possible to obtain answers to difficult questions from this

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[4] Alesina & Perotti (1996) compare the fiscal consolidation in industrialised countries.

[5] Ohlsson & Vredin (1996) use these data to test whether there are election and partisan effects on expenditure and revenue. They find partisan effects but no signs of political business cycles.

[6] For international evidence see Mélitz (1997).

data. We therefore prefer to keep the specifications simple and interpret the results with care.

We start by taking logarithms of the central government revenue and expenditure, and GDP. As is clear from Figure 2, the fiscal variables are trend dominated. We detrend by taking first differences to obtain revenue growth, expenditure growth, and GDP growth which all are stationary variables.

Table 1. Fiscal sensitivity to economic activity, 1969–1999

	Central government Revenue growth		Central government Expenditure growth	
GDP growth	1.13	0.68	−1.57	−1.80
	(1.65)	(0.97)	(3.13)	(3.24)
GDP growth, previous year		1.62		0.15
		(2.36)		(0.28)
Constant	0.009	−0.012	0.051	0.051
	(0.51)	(0.65)	(4.11)	(3.76)
R^2	0.09	0.25	0.26	0.30
SEE	0.064	0.060	0.046	0.047
F, sign level	0.110	0.025	0.004	0.010
DW	1.70	1.58	1.78	1.82
Number of observations	30	29	30	29

Notes. Absolute t-values within parentheses. All variables are in logarithms.

As is clear from Table 1, revenue is positively related to GDP. The elasticity with respect to

Revenue is positively related to GDP.

current GDP is estimated at 1.1. The estimated coefficient is borderline significant. However, there seem to be time lags in the effects of GDP on revenue. Including lagged GDP improves the fit considerably. Time-lagged GDP has a greater impact than current GDP. The combined elasticity is estimated to 2.3 over a two-year period.[7]

The impact on expenditure of GDP is negative and significant. The elasticity with respect to current GDP is estimated to –1.6.

The impact on expenditure of GDP is negative and significant.

Introducing lagged GDP does not add to the specification, the estimation suggests that there are no lagged effects.

Suppose that we evaluate these estimates at 1999 central government revenue, expenditure, and 1999 GDP. The estimations without lagged GDP suggest that the budget balance as a share of GDP increases by 0.75 percentage points if GDP increases by 1 per cent. The estimations including time-lagged GDP suggest a higher number, 1.25 percentage points. It should be stressed that this is

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[7] We compute the combined effect simply by adding together the estimated coefficients, 0.68 + 1.62 = 2.30.

> **Variations in the central government budget, and consequently the variations in central government debt, have been very much connected with variations in economic activity.**

only a partial effect. To obtain the total effect of economic activity on general government finances, it is necessary to add the impact on local government finances. Regardless of this, the conclusion is that the variations in the central government budget, and consequently the variations in central government debt, have been very much connected with variations in economic activity during the last three decades.

> **The strong sensitivity of the Swedish budget balance to variation in economic activity has also been documented in several studies.**

The strong sensitivity of the Swedish budget balance to variation in economic activity has also been documented in several studies by international organisations. The European Commission (2000) reports the estimate 0.8. In a recent OECD study by Dalsgaard & de Serres (1999), the estimate is 0.7. The Swedish Ministry of Finance assesses the sensitivity to 0.75 in the 2001 Budget Bill.

Assarsson et al (1999) estimated the sensitivity at 1.0 using a disaggregated method. The authors point out that the estimate is an historical average over the period 1980–97. Reforms in the tax system and effects of the compensation rules on transfers during the 1990s are seen as reasons to assume that sensitivity has decreased somewhat. The strong fall in GDP in the early 1990s probably also has an influence on the initial estimate. The estimates of budget sensitivity are lower – approximately 0.8 – when extreme episodes of reduction in GDP (annual decreases of GDP more than 2 per cent) are excluded. This adjustment is in line with the rules of the Stability and Growth Pact.

> **There is no strong empirical evidence of any major changes in budget sensitivity to economic activity.**

All in all, both our own estimates and a number of other studies give clear indications that the Swedish budget is highly sensitive to economic activity. This sensitivity could have weakened somewhat in recent years because of structural reforms in the public sector and in the economy in general. Nevertheless, there is so far no strong empirical evidence of any major changes in budget sensitivity to economic activity.

The fiscal cycles have, however, not been symmetric. Budget surpluses during expansions have been smaller than the budget deficits during recessions. This has led to a trend increase in debt. Table 2 illustrates this. During the last almost three decades there have been 12 years of below average GDP growth. During

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these years real central government debt has grown by on average 8.2 per cent per year. We have used the GDP deflator to convert nominal debt to real. During expansion years annual real debt growth has been slightly lower, at slightly more than 4 per cent on average. This has not been low enough to keep overall debt growth on a par with the average annual GDP during the period, amounting to 1.7 per cent. Debt has increased by an average annual rate of 5.9 per cent. The debt to GDP ratio has therefore grown by an average of 4 per cent per year.

Table 2. GDP growth and debt growth, 1971–1999

	Number of years	GDP growth Mean	Public debt growth Mean
Recession years, GDP growth below overall mean	12	0.2	8.2
Expansion years, GDP growth above overall mean	17	2.8	4.2
Total	29	1.7	5.9

The crucial fiscal variables for the Convergence Programme concern the general government and not the central government. More specifically, the programme focuses on

Developments in net lending and budget balance are similar, the same applies to consolidated gross debt.

the net lending of the general government and the consolidated gross debt of the general government. As is clear from Table 3, the developments in net lending and the budget balance are similar except for a difference in levels. The same applies to consolidated gross debt. Our discussion of fiscal variables for the central government is, therefore also a good approximation of the development of the fiscal variables for the general government.

Table 3. Fiscal convergence variables, per cent of GDP, 1995–1999

	1995	1996	1997	1998	1999
Net lending, general government	−7.9	−3.6	−1.8	2.3	1.9
Budget balance, central government	−8.1	−1.2	−0.3	0.5	4.2
Consolidated gross debt, general government	76.3	76.0	74.9	72.4	65.6
Debt, central government	80.9	80.3	79.0	76.7	69.7

The conclusions from this section are, firstly, that public budget balance and public debt have shown considerable cycles during the last decades. Secondly, these cycles are strongly and positively related to economic activity. Thirdly, the fiscal cycles have been asymmetric in the sense that budget surpluses during expansions have been smaller than budget deficits during recessions. This has, fourthly, lead

to a trend increase in public debt. These conclusions are valid for the central government as well as the general government.

Policy instruments and policy implementation

In the previous section, we pointed out similarities and differences in fiscal policy behaviour during the two consolidation episodes in the second halves of the 1980s and the 1990s. Changes in the budget process may, however, also be important for breaking negative debt developments.[8] Following the severe deterioration of the Swedish public finances in the early 1990s, the government believed that the budget process in itself was an important factor behind the crisis. Substantial reforms were introduced. The budget process went from being rather loose to becoming more robust.

The most important innovations were the introduction of a top-down budgetary process, multiyear expenditure ceilings, and medium-term targets for the budget balance of the general government. Have these reforms contributed to consolidation so far? Are they, together with the external surveillance of Swedish public finances due to membership of the European Union, sufficiently strong mechanisms to reverse the unsustainable long-term trends?

The Ministry of Finance plays a clearer role in the top-down budget process, compared with the previous process. In an initial phase, the Ministry of Finance is responsible for updating the multiyear framework. The framework contains projections of key macroeconomic figures for the three coming years. The projections are discussed and approved by Parliament. This is an important change compared with the earlier system. The multiyear framework also includes the expenditure ceilings for three years, the coming year and the two following years. These binding aggregate ceilings constitute a frame for the budget process and hence could have improved budgetary discipline.

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[8] The description of the budget process is based on Molander (2000), OECD (1998), and the Swedish Ministry of Finance (1999).

The expenditure ceilings are nominal. In the 2001 Budget Bill[9], for instance, the expenditure ceilings for the general government sector are set to SEK 1,107, 1,148 and 1,200 billion for 2001–2003. The government projects that this will correspond to 50.7, 50.5, and 50.7 per cent of GDP.[10] These maximum levels of total government expenditure are approved by parliament. In cabinet meetings there are also set indicative levels of expenditure for 27 different expenditure areas. The cabinet's decisions are based on recommendations from the Ministry of Finance. The sum of these expenditure levels is less than the ceiling of total expenditure. The difference constitutes the "budget margin" which forms a buffer against forecasting errors. In a final phase, individual ministers are responsible for the allocation within each area.

Parliament has approved the Government's *medium-term goal* of a surplus in general government net lending corresponding to an average of 2 per cent of GDP over the business cycle. According to the *Updated Swedish Convergence Programme for the year 1999*[11]:

The Government's *medium-term* goal: a surplus in general government net lending corresponding to an average of 2 per cent of GDP over the business cycle.

"After a phase-in period, the targets for the surplus will come into effect as of the year 2000. The surplus targets for 2001 and 2002 remain unchanged at 2 per cent of GDP. If for cyclical reasons growth were to be significantly stronger or weaker, an equivalent deviation for general government net lending would be tolerated."[12]

The Government announced a short-term target for the year 2001 of 2 1/2 per cent of GDP in the 2001 Budget Bill. The motivation was that there exists some risk of an overheated economy if the policy was directed towards a target of 2 per cent of GDP.

The Swedish Government has to submit an updated convergence programme annually under a Council regulation. The programme is evaluated by the Council. In this

The Swedish Government has to submit an updated convergence programme annually.

way the fulfilment of the fiscal goals is supervised by an external body and exposed to peer pressure.

[9] Presented by the government in September 2000.
[10] The central governments expenditure ceilings are set to SEK 789, 814 and 844 billion during 2001–2003.
[11] November 1999.
[12] The Updated Convergence Programme, p 2.

Has the introduction of the new budget process with it targets – the strait-jacket – contributed to fiscal improvements during the most recent budget consolidation episode? And, looking forward, is the process strong enough to reverse the increasing gross debt trend?

In the short term it seems clear that the new budget process has contributed to consolidation.

In the short term it seems clear that the new budget process has contributed to consolidation. Firstly, the multiyear expenditure ceilings, decided by parliament, have introduced a kind of inertia in nominal expenditure increases. At each annual decision about the expenditure levels it is only possible to freely set the expenditure level for the last of the three years without a political cost. The levels for the first and second years are restricted by previous decisions. This mechanism seems also to have strengthened the minority government in its budget negotiations with supporting parties. In parliament, it is – of course – also difficult for opposition parties of different political leanings to unite over an alternative budget. We believe that these mechanisms of targets are important, at least in the short term.

The first years of the 21st century will probably reveal whether the new budget process will confirm the improvements in Swedish public finances.

However, the success of debt reduction in the longer term has to do with other things. Most important are the political preferences and the political opportunities to deal with fiscal policy. Within the economic research on fiscal discipline there are results suggesting that minority governments may be bad for budget discipline, while coalition governments may be better (Edin & Ohlsson 1991). The first years of the 21st century, with a substantially better economic situation than most of the 1990s, will probably reveal whether the new budget process will confirm the improvements in Swedish public finances.

External pressure by the Maastricht convergence has been helpful in the consolidation process.

It also seems obvious that the external pressure put on Swedish public finances by the Maastricht convergence criteria, following Sweden's membership of the EU in 1994 has been helpful in the consolidation process. The medium term budget target in particular makes concrete demands of consistency upon the expenditure ceilings and plans for tax policies. Again, in the short term the value of this external pressure has been clear.

However, in a forward-looking perspective, with Sweden still in the convergence phase or as a member of EMU, the system has not been tested in a severe recession. At least the question could be asked as to how strong the incentives

would be for the "club" to fully impose corrective measures on a small country like Sweden with only a marginal influence on the whole union's economy.

We have made some attempts to estimate the quantitative effects of the reformed budget process. We cannot find any effects on the growth of expenditure. Table 4 reports some estimations where we instead

try to estimate the impact on the level of expenditure. The specifications build on the assumption that the effects of the budget reform came gradually during three years 1995–1997. According to the point estimates, the reformed budgetary process has reduced the expenditure level by slightly less than 2 per cent. The standard errors of the estimated coefficients are high, resulting in very small t-statistics.

Table 4. Effects of budgetary reform, 1969–1999

	Central government expenditure growth	
GDP growth	−1.57	−1.80
	(3.08)	(3.17)
GDP growth, previous year		0.17
		(0.30)
Reformed budget process	−0.019	−0.017
	(0.21)	(0.19)
Constant	0.052	0.051
	(3.97)	(3.46)
R^2	0.26	0.27
SEE	0.047	0.048
F, sign level	0.017	0.029
DW	1.77	1.81
Number of observations	30	29

Notes. Absolute *t*-values within parentheses.

Policy objectives, forecasts, and targets

There are two main policy alternatives to keep the public debt ratio stable over time; two long term fiscal policy strategies. The *first* strategy is to have a constant public debt ratio. The annual budget deficits should be of

such a size that the growth in debt corresponds to the GDP growth. The public debt ratio will then be constant.

The *second* alternative is to have a stationary public debt ratio. This means that we allow the public debt ratio to vary, but around a constant expected value.

Deficits during recessions are compensated by surpluses during expansions so that the public debt ratio becomes stationary in the long term, but not necessarily constant in the short term. The fiscal deficit will equal GDP growth in this case too, not every year but over the whole business cycle.

A strategy that, on the other hand, is not sustainable in the long term is to have a growing debt ratio during bad times and a constant debt ratio during good times. However, during the past few decades, Sweden has chosen a rapidly growing debt ratio during bad times and a slowly growing debt ratio during good times, as was shown in Table 2. Since 1978, central government surpluses have only materialised a few years during the late 1980s and in 1998 and 1999. The central government budget balance showed deficits for the other years. This is not a sustainable combination in the long term. It is necessary to settle for one of the two possible sustainable strategies.

There are two lessons to be learned for fiscal consolidation. The first is to reduce the fiscal deficit. Both at the beginning of the 1980s and at the beginning of the 1990s, it became the task for incoming Social Democrat governments to reduce deficits. The first lesson has been learned. The second lesson is to have budget balances during better times so that the debt ratio decreases. It is to early to be sure that this lesson has been learned.

Figure 3 shows the trend increase in the public debt ratio since 1974. We have also included the forecasts according to the budget bill for the year 2001 for the coming years until 2003.

When studying Figure 3 it is clear that the public debt ratio is not stationary. The debt ratio increases trendwise. It has declined cyclically in recent years and is expected to continue to do so. But, are there really signs that the long-term trend is broken?

At first glance, the consolidation process in the second part of the 1990s looks impressive. The budget balance has improved some 15 per cent of GDP from 1993 to 1999. Approximately half of the improvement has been of a structural nature, resulting from permanent reductions in social security benefits, tax increases and cuts in government

Figure 3. The central government gross debt ratio, the general government gross debt ratio and forecasts, 1974-2003
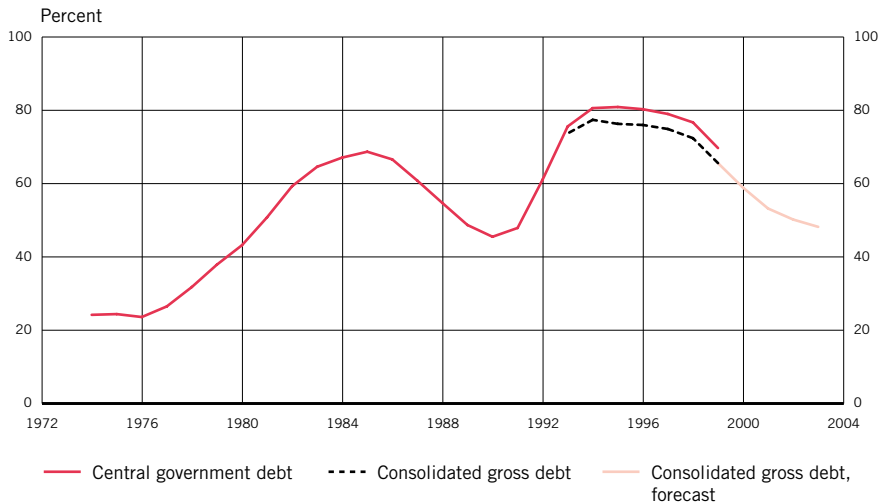
Percent

Sources: The Swedish National Debt Office and the Budget Bill.

consumption. The second half has been a result of the improved cycle. The gross debt of the general government sector ceased growing in 1994 at a peak of 76.5 per cent of GDP and has been reduced to approximately 60 per cent of GDP in 2000.[13]

The Swedish Parliament has decided on a medium-term target for net lending by the general government of 2 per cent of GDP on average over the business cycle. The objective is to fulfil the convergence criteria for joining the European Monetary Union, that is to keep general government consolidated gross debt below 60 per cent of GDP. Judging from Figure 2, this criterion will be met in 2000. The question is whether, if this is to a large part due to cyclical reasons, the criterion will still be met in a coming recession.

The plans for the future path of fiscal policy are presented in the 2001 Budget Bill. In 2001, the target is a surplus of 2 1/2 per

> **In 2001, the target is a surplus of 2 1/2 per cent of GDP.**

cent of GDP. For 2002 and 2003, no decision to diverge from the medium term target has been taken. Since most forecasters predict that economic growth will be higher than potential growth during these years, there will probably be scope for higher surpluses than the medium-term target. It has already been decided to reduce income taxes in 2001. Whether there will be further tax cuts in the com-

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[13] Forecast in the Budget Bill for the year 2001.

ing years will depend on the development of public finances, how wage formation functions, and the general cyclical position of the Swedish economy.

With further relaxation of fiscal policy after 2001, the risk of a pro-cyclical fiscal policy in good times cannot be ruled out.

The measure of fiscal stance that is presented in the 2001 Budget Bill also indicates that fiscal policy stance will be relaxed by 1.3 per cent of GDP in 2001. Such a relaxation could be well motivated after an unusually tough consolidation period. According to the Riksbank's measure of cyclically-adjusted budget surplus, given the uncertainty of such a measure, the relaxation could result in a cyclically adjusted budget surplus slightly above the medium-term target.[14] A tentative conclusion is that with further relaxation of fiscal policy after 2001, the risk of a pro-cyclical fiscal policy in good times cannot be ruled out. What will then happen in the next recession? Will the budget be compensated by consolidation measures, pro-cyclical policy once again, but now in a recession, or will fiscal policy deteriorate? Neither alternative is attractive.

In line with the analysis above, there could still be some uncertainty related to Swedish fiscal policy in a long-term perspective. As can be seen in Figure 3, the gross debt to GDP ratio in 2000 (60 per cent of GDP) was clearly above the ratio at the turning point after the consolidation period in the second half of the 1980s (45 per cent of GDP in 1990). This later proved to be an unsustained ratio. Additionally, including the forecasts for the gross debt ratios of the general government up to the year 2003, the ratios will still be higher than in 1989.

The long-term problems may be overshadowed by strong public finances for cyclical reasons.

The long-term problems may be overshadowed by strong public finances partly for cyclical reasons. The situation during the next recession may, however, become very unpleasant. To be forced, in such a situation, to make far-reaching cuts in public activities may lead to severe problems on the labour market, with lower employment and higher unemployment. This may mean that we will have to dismantle the welfare system as we know it today under disordered forms and not to reform it carefully.

Reducing the debt at a faster rate now, would make it possible to avoid the risks of being forced to do so. The possibilities to reduce debt are at hand now. It could be argued that the 2 per cent medium term target may lead to timing problems. It may not be ambitious enough. At least, the budget target is not ambitious enough in the short term in a situation where the economy experiences a high degree of resource utilisation.

[14] See Sveriges Riksbank (2000), p 30, figure 30.

Optimal debt

The discussion has so far implicitly assumed that a stable long term public debt ratio is desirable. But why should this be the policy objective? Why, or in what sense, is this optimal? Taken in isolation, a stable debt ratio is simply an arbitrary objective.

Optimal public debt management has several dimensions. Some of the issues that need to be addressed are:[15]

Optimal public debt management has several dimensions.

- What is the optimal level of the public debt ratio?
- What is the optimal variability of the public debt ratio?

The role of public debt must comprise the starting point for a discussion of these issues. The fundamental role has to do with intertemporal considerations resulting from decisions on public expenditure. The first question has very much to do with public investment and the public stock of real capital. Changes in debt may coincide with changes in the value of assets, that is the stock of real capital. But it is also possible that net worth is affected. In general, the development of the other items on the public sector balance sheet is important for public debt.

The intertemporal considerations in this case can be viewed as follows. Public real capital yields a flow of services during many time periods for many cohorts. Financing the capital by debt is a way of letting each cohort pay for their flow of services by paying the interest on the debt. With this approach the optimal debt level increases if there is public investment increasing the public stock of capital.

Figure 4 shows the ratio of central government debt to assets from the mid 1980s and thereafter. There are two important things to be noted from the figure. The first is

The debt to asset ratio is almost constant during both of the fiscal consolidation phases.

that the ratio is almost constant during both of the fiscal consolidation phases in the mid 1980s and the mid 1990s. This means that value of assets decreased almost at the same rate as debt decreased.

Secondly, the debt to asset ratio more than doubled during the fiscal crisis at the beginning of the 1990s. Debt increased at a much faster rate than assets did. Another way

The debt to asset ratio more than doubled during the fiscal crisis at the beginning of the 1990s.

[15] Two other issues are: What is the optimal maturity structure of public debt? What is the optimal mix between nominal and real debt?

Figure 4. Central government debt—asset ratio, 1984-1998
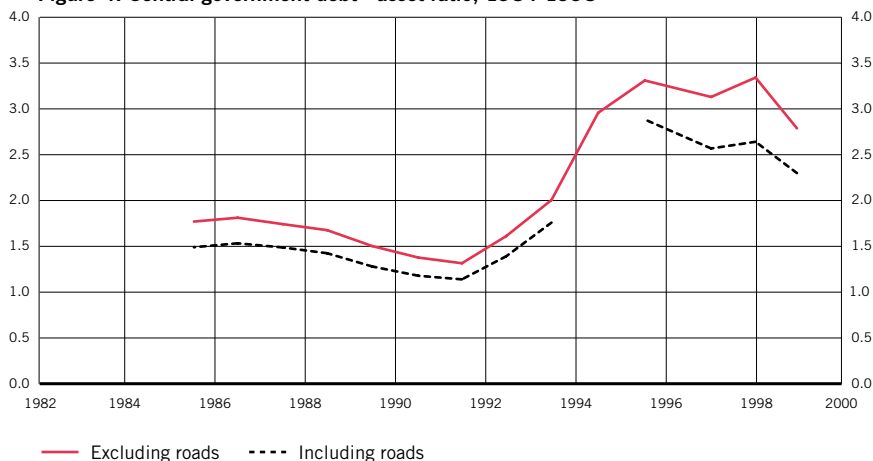
— Excluding roads   ···· Including roads

Sources: The Swedish National Audit Office and the Swedish National Financial Management Authority.

to put this is to say that the central government borrowed not for public invest-ment but for public consumption and public transfers.

Central government assets corresponded to 24 per cent of GDP in 1997. If we add the assets of county councils and municipalities, the general government asset GDP ratio was 50 per cent.[16]

The second question is related to public consumption and public transfers. Should outlays on public consumption and transfers always be matched by tax revenue on an annual basis? Or should the paths differ so that variations in debt will occur? An important aspect of this second question of the optimal variability of the public debt ratio is that there exist several different theoretical models sug-gesting that it is desirable to keep tax rates constant over time.

Theories of optimal taxation tell us that tax rates should be constant over time. This is a way of avoiding variations in private consumption over time. This result is more robust for consumption taxes than for income taxes and labour income taxes (Barro 1995).

It has also been argued that different economic agents want stable rules, for example through stable tax rates. This is a means of reducing uncertainty. It is not because of a belief in activist Keynesianism.

Regardless of the motivation, stable tax rates may lead to a public debt ratio that fluctuates. This is because we can expect cyclical variations in tax revenues

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[16] Here local government is narrowly defined. If firms owned by these authorities were included the general govern-ment asset GDP ratio would be higher.

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when the tax base varies with economic activity. For the public debt this would not necessarily mean that it could not be stationary.

Conclusions

Swedish public budgets and public debt have shown considerable cycles, in response to economic activity, during the last decades. The budget cycles have been asymmetric in

The crisis for Swedish public finances at the beginning of the 1990s is solved in the short term.

the sense that surpluses during expansions have been smaller than deficits during contractions. This has lead to a trend increase in public debt. The crisis for Swedish public finances at the beginning of the 1990s is solved in the short term. It is less clear that the long-term trend has changed. These conclusions are valid for the central government as well as the general government.

The EMU convergence criteria and the "peer pressure" within the union comprise restrictions on public debt and budget balance. The medium term target of a general

In the short term the medium run target is not ambitious enough, while it is too ambitious in the long term.

government net lending of 2 per cent of GDP is a response to this. Our *first* main conclusion is that in the short term this is not ambitious enough, while it is too ambitious in the long term – the trend will be excessively reversed.

A substantially more robust budget process has been implemented in Sweden in the latter part of the 1990s. In the short term it has contributed to debt reduction through increased transparency, inertia in expenditure increases and a strengthened position of the (minority) government in the budget process in relation to supporting parties and to the opposition. In the longer term we see other things as political preferences as being decisive. The good times during the first years of the new century could prove critical for the system's ability to further reduce the debt level.

Our *second* main conclusion is that, while measures like these may be effective in the short term when they are introduced, the long term efficiency is less clear. In the long term there will need to be a strong political commit-

While measures like these described may be effective in the short term when they are introduced, the long term efficiency is less clear.

ment to the necessity of fiscal discipline. Straitjackets cannot work alone and especially not in the opposite direction of the beliefs of the political decision makers.

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Notices

Kerstin Hessius will not stand for re-election to the Executive Board

Deputy Governor of the Riksbank Kerstin Hessius, whose mandate period expires on 31 December 2000, notified the Chairman of the Governing Council, Sven Hulterström, on 27 September that she will not be available for re-election.

First meeting of the Payment System Committee

The Payment System Committee, initiated by the Riksbank as a forum for discussing payment system issues at a general policy level, held its first meeting on 29 September 2000. The Committee currently comprises executive representatives from Föreningssparbanken, Merita Nordbanken, SEB, Svenska Handelsbanken, OM and the Central Securities Register (VPC), as well as the Riksbank. The Committee is chaired by Deputy Governor Lars Nyberg

Unibank terminates its foreign exchange primary dealer agreement with the Riksbank

As Unibank A/S and Nordbanken AB (publ) have been part of the same group, Nordic Baltic Holding, since 13 April 2000, a decision has now been taken to coordinate their activities on the foreign exchange market. As a result, Nordic Baltic Holding has elected to transfer the primary dealer undertaking towards the Riksbank to Nordbanken AB, Stockholm. The decision came into force on 16 October 2000.

There are eleven primary dealers on the foreign exchange market: ABN

AMRO Bank N.V., Amsterdam; Chase Manhattan Bank NA, London; Citibank N.A., London; Crédit Agricole Indosuez, London; Den Danske Bank A/S, Copenhagen; FöreningsSparbanken AB; HSBC Midland, London; Nordbanken AB; SEB; Svenska Handelsbanken and UBS AG, London and Zürich.

There are seven primary dealers on the money and bond market: ABN AMRO Bank N.V., London; Danske Bank Consensus; E. Öhman J:or Fondkommission AB; FöreningsSparbanken AB; Nordbanken AB and Unibank A/S, Stockholm and Copenhagen; SEB and Svenska Handelsbanken.

The Riksbank's Governing Council proposes a reduction in the Executive Board

On 19 October 2000, the Riksbank's Governing Council resolved to propose to the Riksdag that the number of members on the Riksbank's Executive Board be established at a maximum of six and a minimum of three members, with effect from 1 January 2001. If the Riksdag adopts the proposal, the Governing Council intends to initiate a review of how many members the Board should comprise during the spring of 2001. The Governing Council intends to report back to the Riksdag in good time before the autumn parliamentary session convenes in 2001, and to present a more detailed analysis. Therefore, the Governing Council currently has no intention of refilling the sixth post as member of the Executive Board when it becomes vacant at the beginning of 2001.

The new Riksbank Act has been in force for almost two years now. According to this act, the Executive Board shall consist of six members. The Riksbank's operations have already been adapted to the new act, and the bank's work on maintaining price stability has gained considerable support in Swedish society. In addition, the Riksbank's organisation has been reduced from 750 to 450 employees since 1999. Given these developments, the Governing Council considers it appropriate to review the size of the Executive Board.

Riksbank to go on exchanging currency on behalf of National Debt Office

During 2001, the Riksbank will continue to practise the method that has been in use since 1997 for exchanging currency on behalf of the National Debt Office.

In the course of 2001, the National Debt Office is to repay government debt denominated in foreign currency for a net amount of approximately SEK 35 billion. For deviations from this figure, there is an interval of SEK ±15 billion.

Besides the net repayment of SEK 35 billion, interest payments on foreign currency debt will total the equivalent of about SEK 18 billion. This means that during 2001, the Riksbank will be purchasing foreign currency for about SEK 53 billion in the market.

As previously, the Riksbank will be exchanging currency on behalf of the National Debt Office each trading day between 8.30 and 8.45 a.m. The Riksbank intends to spread the transactions evenly over time. The Riksbank intends to handle the currency exchanges completely transparently, as previously.

The currency exchanges will be arranged with the institutions that have a primary dealer agreement with the Riksbank for the Swedish foreign exchange market.

Monetary policy calendar

1998-01-02   The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1998-04-01   The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1998-06-04   The *fixed repo rate* is lowered by the Riksbank Governor from 4.35 per cent to 4.10 per cent as of 9 June 1998.

1998-07-01   The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.0 per cent as of 2 July 1998.

1998-11-03   The *fixed repo rate* is lowered by the Riksbank Governor from 4.10 per cent to 3.85 per cent as of 4 November 1998.

1998-11-12   The Riksbank lowers its *deposit* and *lending rates*, in each case by 0.5 percentage points, as of 18 November 1998, thereby setting the deposit rate at 3.25 per cent and the lending rate at 4.75 per cent.

1998-11-24   The *fixed repo rate* is lowered by the Riksbank Governor from 3.85 per cent to 3.60 per cent as of 25 November 1998.

1998-12-15   The *fixed repo rate* is lowered by the Riksbank Governor from 3.60 per cent to 3.40 per cent as of 16 December 1998.

1999-01-04   The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.5 per cent as of 5 January 1999.

1999-02-12   The *fixed repo rate* is lowered by the Riksbank to 3.15 per cent as of 17 February 1999. The Riksbank also lowers its *deposit* and *lending rates*, in each case by 0.5 percentage points. The deposit rate is set at 2.75 per cent and the lending rate at 4.25 per cent. The decision takes effect on 17 February 1999.

1999-03-25   The *fixed repo rate* is lowered by the Riksbank from 3.15 per cent to 2.90 per cent as of 31 March 1999.

1999-04-01   The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.0 per cent as of 6 April 1999.

1999-07-01   The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.0 per cent (unchanged).

1999-10-01   The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.5 per cent as of 4 October 1999.

1999-11-11   The *repo rate* is increased by the Riksbank from 2.90 per cent to 3.25 as of 17 November 1999.

2000-01-03   The *reference* (official discount) *rate* is confirmed by the Riksbank at 2.0 per cent as of 4 January 2000.

2000-02-03   The *repo rate* is increased by the Riksbank from 3.25 per cent to 3.75 as of 9 February 2000.

2000-04-03   The *reference* (official discount) *rate* is confirmed by the Riksbank at 2.5 per cent as of 4 April 2000.

2000-12-07   The *repo rate* is increased by the Riksbank from 3.75 per cent to 4.0 per cent as of 13 December 2000. The Riksbank also increases its *deposit* and *lending rates* in each case by 0,5 percentage points. The deposit rate is set at 3.25 per cent and the lending rate at 4.75 per cent. The decision takes effect on 13 December 2000.

Statistical appendix

Statistics from Sveriges Riksbank are to be found on the Internet (http://www.riksbank.se). Dates of publication of statistics regarding the Riksbank's assets and liabilities including foreign exchange reserves plus financial market and the balance of payments statistics are available on the homepage of the International Monetary Fund, IMF (http://dsbb.imf.org). Dates of publication can also be obtained from the Information Centre at Sveriges Riksbank.

1

Riksbank's assets and liabilities

Assets. Period-end stock figures. SEK million

		Gold	Government securities	Lending to banks	Fixed assets	Other	Total
1999	Sept	13 834	31 932	31 122	136 565	3 053	216 506
	Oct	13 834	31 728	31 929	135 222	2 220	214 933
	Nov	13 834	31 579	27 577	143 963	1 647	218 600
	Dec	14 774	28 998	45 633	137 967	1 393	228 765
2000	Jan	14 774	29 584	38 039	132 133	3 164	217 694
	Feb	14 774	28 833	39 558	126 231	2 984	212 380
	March	14 774	27 333	37 591	134 970	1 376	216 040
	April	14 774	27 087	35 410	139 563	2 817	219 651
	May	14 774	24 675	27 158	139 493	1 825	207 925
	June	14 774	23 672	34 045	133 170	1 979	207 640
	July	14 774	22 935	40 460	126 133	1 397	205 699
	Aug	14 774	22 691	38 197	132 165	1 933	209 760
	Sept	14 774	21 610	40 730	134 464	1 089	212 667
	Oct	14 774	21 610	36 054	140 628	3 422	216 488

Liabilities

		Notes and coins in circulation	Capital liabilities	Debts to monetary policy counterparts	Debts in foreign currency	Other	Total
1999	Sept	85 070	60 487	97	14 395	56 457	216 506
	Oct	86 161	60 487	61	11 421	56 803	214 933
	Nov	88 375	60 487	86	12 113	57 539	218 600
	Dec	98 450	60 487	4 457	10 173	55 198	228 765
2000	Jan	90 463	60 487	469	9 616	56 659	217 694
	Feb	88 257	60 487	392	6 507	56 737	212 380
	March	88 737	60 487	454	9 185	57 181	216 044
	April	89 456	60 487	55	10 261	59 392	219 651
	May	89 202	63 466	56	9 186	46 015	207 925
	June	89 044	63 466	114	8 092	46 924	207 640
	July	88 355	63 466	73	6 295	47 510	205 699
	Aug	88 947	63 466	237	7 731	49 379	209 760
	Sept	89 732	63 466	19	10 751	48 699	212 667
	Oct	88 981	63 466	1 999	11 116	50 926	216 488

2 Money supply

End-of-month stock

		SEK million		Percentage 12-month change		
		M0	M3		M0	M3
1998	Jan	70 751	821 712	Jan	4.8	3.8
	Feb	70 434	806 800	Feb	4.4	3.0
	March	69 560	802 877	March	1.3	–0.6
	April	70 181	807 368	April	4.0	2.4
	May	70 783	814 796	May	4.8	2.6
	June	71 118	829 968	June	4.4	2.8
	July	71 369	835 079	July	6.9	5.5
	Aug	73 042	835 199	Aug	6.4	3.9
	Sept	71 954	838 568	Sept	5.6	4.8
	Oct	73 041	846 579	Oct	6.5	5.9
	Nov	73 929	852 805	Nov	6.0	5.6
	Dec	78 139	843 416	Dec	5.1	2.1
1999	Jan	74 940	855 180	Jan	5.9	4.1
	Feb	74 621	853 298	Feb	5.9	5.8
	March	75 302	853 557	March	8.3	6.3
	April	75 533	861 790	April	7.6	6.7
	May	76 532	868 965	May	8.1	6.6
	June	76 413	879 740	June	7.4	6.0
	July	77 050	872 884	July	8.0	4.5
	Aug	78 080	889 817	Aug	6.9	6.5
	Sep	78 479	900 077	Sept	9.1	7.3
	Oct	79 413	930 834	Oct	8.7	10.0
	Nov	80 681	915 960	Nov	9.1	7.4
	Dec	87 510	926 983	Dec	12.0	9.9
2000	Jan	82 625	929 003	Jan	10.3	8.6
	Feb	81 421	930 806	Feb	9.1	9.1
	March	81 352	925 590	March	8.0	8.4
	April	81 853	947 427	April	8.4	9.9
	May	82 113	966 041	May	7.3	11.2
	June	81 666	933 672	June	6.9	6.1
	July	81 637	924 288	July	6.0	5.9
	Aug	82 499	929 259	Aug	5.7	4.4
	Sept	83 167	945 502	Sept	6.0	5.0

3   Interest rates set by the Riksbank

Per cent

	Date	Repo rate	Deposit rate	Lending rate		Date	Discount rate
1996	09-25	5.05			1994	01-04	4.50
	10-09	4.95				07-04	5.50
	10-23	4.85				10-04	7.00
	10-30	4.60	4.25	5.75	1995	07-04	7.50
	11-27	4.35				10-06	7.00
	12-10		3.75	5.25	1996	01-03	6.00
	12-18	4.10				04-02	5.50
1997	12-17	4.35				07-02	4.50
1998	06-10	4.10				10-02	3.50
	11-04	3.85			1997	01-03	2.50
	11-18		3.25	4.75	1998	07-02	2.00
	11-25	3.60			1999	01-05	1.50
	12-16	3.40				04-06	1.00
1999	02-17	3.15	2.75	4.25		10-04	1.50
	03-31	2.90			2000	01-04	2.00
	11-17	3.25				04-04	2.50
2000	02-09	3.75				07-01*	2.00
	12-13	4.00	3.25	4.75			

* 1 July 2000 the National Debt Office took over the Riksbank's task of setting and publishing the discount rate.

4   Capital market interest rates

Effective annualized rate for asked price. Monthly average, per cent

		Bonds issued by:				Housing	(Caisse)
		Central government				2 years	5 years
		3 years	5 years	7 years	9–10 years		
1999	Jan	3.38	3.59	3.87	4.02	3.59	4.14
	Feb	3.36	3.67	4.01	4.18	3.52	4.13
	March	3.39	3.80	4.25	4.44	3.55	4.29
	April	3.12	3.53	3.99	4.24	3.26	3.99
	May	3.30	3.80	4.26	4.50	3.47	4.54
	June	3.72	4.28	4.67	4.87	3.82	5.09
	July	4.17	4.81	5.12	5.26	4.64	5.75
	Aug	4.43	5.09	5.39	5.49	5.02	6.15
	Sept	4.51	5.29	5.60	5.69	5.08	6.22
	Oct	4.70	5.53	5.83	5.92	5.22	6.33
	Nov	4.52	5.17	5.46	5.56	4.99	5.89
	Dec	4.61	5.26	5.49	5.59	5.05	5.93
2000	Jan	5.20	5.68	5.87	5.95	5.61	6.22
	Feb	5.36	5.76	5.86	5.90	5.81	6.35
	March	5.17	5.44	5.49	5.51	5.66	6.11
	April	5.04	5.36	5.41	5.42	5.50	6.04
	May	5.02	5.34	5.37	5.34	5.48	6.13
	June	4.94	5.16	5.17	5.13	5.39	5.94
	July	5.05	5.32	5.34	5.31	5.48	6.06
	Aug	4.91	5.25	5.32	5.31	5.31	5.97
	Sept	4.69	5.08	5.21	5.26	5.05	5.74
	Oct	4.56	5.01	5.18	5.23	4.90	5.66

5 Overnight and money market interest rates

Monthly average, per cent

		Repo-rate	Inter bank rate	SSVX			Company certificates	
				3 months	6 months	12 months	3 months	6 months
1997	Jan	4.10	4.20	3.79	3.84		3.95	4.00
	Feb	4.10	4.20	3.96	4.03		4.13	4.20
	March	4.10	4.20	4.16	4.26	4.45	4.34	4.43
	April	4.10	4.20	4.06	4.18		4.24	4.35
	May	4.10	4.20	4.12	4.23		4.30	4.40
	June	4.10	4.20	4.08	4.18	4.47	4.28	4.37
	July	4.10	4.20	4.09	4.24		4.36	4.46
	Aug	4.10	4.20	4.20	4.36		4.45	4.60
	Sep	4.10	4.20	4.13	4.28	4.66	4.37	4.53
	Oct	4.10	4.20	4.26	4.44		4.49	4.68
	Nov	4.10	4.20	4.33	4.54		4.59	4.79
	Dec	4.19	4.29	4.45	4.73	5.09	4.70	4.99
1998	Jan	4.35	4.45	4.44	4.58		4.67	4.84
	Feb	4.35	4.45	4.36	4.54		4.56	4.73
	March	4.35	4.45	4.51	4.59	4.72	4.68	4.76
	April	4.35	4.45	4.50	4.61		4.66	4.76
	May	4.35	4.45	4.52	4.54	4.49	4.67	4.72
	June	4.16	4.28	4.23	4.23	4.29	4.39	4.38
	July	4.10	4.20	4.14	4.14		4.29	4.30
	Aug	4.10	4.20	4.23	4.26		4.37	4.39
	Sept	4.10	4.20	4.22	4.21	4.29	4.36	4.36
	Oct	4.10	4.20	4.20	4.18		4.36	4.34
	Nov	3.83	3.93	3.82	3.75		4.00	3.96
	Dec	3.51	3.61	3.45	3.51	3.53	3.65	3.69
1999	Jan	3.40	3.50	3.27	3.25		3.45	3.46
	Feb	3.30	3.40	3.14	3.16		3.31	3.35
	March	3.14	3.24	3.13	3.18	3.17	3.30	3.33
	April	2.90	3.00	2.87	2.90		3.04	3.07
	May	2.90	3.00	2.92	2.96	3.24	3.11	3.15
	June	2.90	3.00	2.97	3.03	3.37	3.18	3.22
	July	2.90	3.00	3.01	3.16		3.30	3.57
	Aug	2.90	3.00	3.00	3.20		3.32	3.77
	Sept	2.90	3.00	3.05	3.28	3.91	3.27	3.75
	Oct	2.90	3.00	3.23	3.55		3.87	4.00
	Nov	3.06	3.16	3.38	3.63	4.28	3.83	3.91
	Dec	3.25	3.35	3.41	3.73	4.24	3.71	3.95
2000	Jan	3.25	3.35	3.57	3.86		3.77	4.05
	Feb	3.61	3.71	3.90	4.22		4.11	4.43
	March	3.75	3.85	4.06	4.29	4.74	4.27	4.53
	April	3.75	3.85	3.99	4.16		4.21	4.45
	May	3.75	3.85	3.96	4.09	4.57	4.21	4.43
	June	3.75	3.85	3.94	4.04	4.56	4.15	4.44
	July	3.75	3.85	4.03	4.21		4.31	4.66
	Aug	3.75	3.85	4.00	4.21	4.59	4.23	4.50
	Sept	3.75	3.85	3.94	4.04	4.51	4.14	4.36
	Oct	3.75	3.85	3.99	4.09		4.15	4.31

6 Treasury bills and selected international rates

Monthly average, per cent

		3-month deposits					6-month deposits				
		USD	DEM	EUR	GBP	SSVX	USD	DEM	EUR	GBP	SSVX
1997	Jan	5.58	3.13		6.47	3.79	5.67	3.14		6.66	3.84
	Feb	5.50	3.19		6.35	3.96	5.60	3.19		6.49	4.03
	March	5.62	3.29		6.42	4.16	5.79	3.30		6.54	4.26
	April	5.81	3.25		6.48	4.06	5.99	3.29		6.74	4.18
	May	5.80	3.20		6.54	4.12	5.97	3.26		6.72	4.23
	June	5.77	3.16		6.77	4.08	5.89	3.22		6.91	4.18
	July	5.72	3.16		7.05	4.09	5.81	3.23		7.24	4.24
	Aug	5.69	3.28		7.25	4.20	5.82	3.42		7.37	4.36
	Sep	5.67	3.34		7.29	4.13	5.80	3.48		7.43	4.28
	Oct	5.73	3.65		7.36	4.26	5.80	3.78		7.46	4.44
	Nov	5.83	3.78		7.71	4.33	5.87	3.89		7.77	4.54
	Dec	5.89	3.76		7.69	4.45	5.94	3.84		7.77	4.73
1998	Jan	5.52	3.45		7.42	4.44	5.58	3.54		7.41	4.58
	Feb	5.51	3.41		7.38	4.36	5.52	3.48		7.38	4.54
	March	5.56	3.46		7.41	4.51	5.60	3.58		7.42	4.59
	April	5.57	3.58		7.39	4.50	5.62	3.66		7.39	4.61
	May	5.57	3.54		7.34	4.52	5.64	3.65		7.32	4.54
	June	5.59	3.49		7.59	4.23	5.63	3.59		7.65	4.23
	July	5.57	3.47		7.66	4.14	5.64	3.56		7.71	4.14
	Aug	5.56	3.43		7.57	4.23	5.60	3.52		7.56	4.26
	Sept	5.39	3.42		7.32	4.22	5.30	3.48		7.18	4.21
	Oct	5.18	3.48		7.05	4.20	4.97	3.45		6.83	4.18
	Nov	5.24	3.56		6.79	3.82	5.06	3.51		6.55	3.75
	Dec	5.14	3.26		6.27	3.45	5.00	3.22		5.97	3.51
1999	Jan	4.88		3.04	5.74	3.27	4.89		2.99	5.52	3.25
	Feb	4.87		3.02	5.38	3.14	4.93		2.97	5.25	3.16
	March	4.89		2.98	5.26	3.13	4.97		2.93	5.17	3.18
	April	4.87		2.63	5.17	2.87	4.94		2.62	5.12	2.90
	May	4.90		2.51	5.20	2.92	5.01		2.51	5.18	2.96
	June	5.09		2.57	5.08	2.97	5.28		2.63	5.09	3.03
	July	5.22		2.61	5.03	3.01	5.53		2.81	5.21	3.16
	Aug	5.37		2.64	5.13	3.00	5.78		2.97	5.43	3.20
	Sept	5.48		2.66	5.29	3.05	5.87		3.03	5.68	3.28
	Oct	6.11		3.29	5.85	3.23	6.02		3.33	5.95	3.55
	Nov	6.01		3.38	5.72	3.38	5.96		3.40	5.88	3.63
	Dec	6.07		3.38	5.91	3.41	5.09		3.46	6.10	3.73
2000	Jan	5.93		3.28	6.00	3.57	6.14		3.50	6.25	3.86
	Feb	5.99		3.47	6.09	3.90	6.24		3.67	6.27	4.22
	March	6.12		3.70	6.10	4.06	6.34		3.89	6.29	4.29
	April	6.24		3.88	6.16	3.99	6.48		4.02	6.32	4.16
	May	6.66		4.29	6.16	3.96	6.93		4.48	6.31	4.09
	June	6.70		4.43	6.09	3.94	6.87		4.61	6.20	4.04
	July	6.63		4.52	6.05	4.03	6.83		4.76	6.16	4.21
	Aug	6.59		4.72	6.08	4.00	6.74		4.95	6.20	4.21
	Sept	6.58		4.78	6.05	3.94	6.67		4.96	6.15	4.04
	Oct	6.65		4.98	6.01	3.99	6.63		5.04	6.12	4.09

7 Krona exchange rate: TCW-weighted index and selected exchanges rates

Annual and monthly averages; annual highs and lows

			SEK per				USD per	
		TCW-index	USD	100 DEM	EUR	100 JPY	DEM	JPY
1997	Jan	118.02	7.06	440.02		5.99	1.60	117.83
	Feb	119.55	7.40	442.22		6.02	1.67	122.93
	March	122.20	7.65	450.95		6.25	1.70	122.57
	April	121.85	7.68	449.31		6.12	1.71	125.56
	May	122.40	7.67	450.73		6.47	1.70	118.61
	June	122.79	7.74	448.77		6.78	1.73	114.29
	July	121.06	7.81	436.41		6.78	1.79	115.24
	Aug	120.63	8.00	433.89		6.78	1.84	117.91
	Sept	118.62	7.70	430.56		6.38	1.79	120.73
	Oct	118.36	7.57	430.99		6.26	1.76	120.96
	Nov	119.62	7.56	436.58		6.04	1.73	125.18
	Dec	120.44	7.78	438.03		6.01	1.78	129.49
1998	Jan	121.66	8.00	441.19		6.18	1.82	129.50
	Feb	122.89	8.08	445.30		6.43	1.81	125.69
	March	120.65	7.97	436.38		6.18	1.83	129.00
	April	118.81	7.82	431.28		5.93	1.81	132.13
	May	118.17	7.69	433.46		5.70	1.77	134.96
	June	120.47	7.91	441.36		5.62	1.79	140.15
	July	121.22	7.99	444.30		5.68	1.80	140.63
	Aug	123.41	8.13	447.56		5.61	1.79	144.68
	Sept	124.88	7.91	464.26		5.88	1.70	134.57
	Oct	128.03	7.85	479.02		6.49	1.64	120.78
	Nov	127.97	7.99	475.49		6.64	1.68	120.35
	Dec	129.83	8.05	482.79		6.86	1.67	117.24
1999	Jan	125.46	7.82	464.45	9.0838	6.92	1.69	113.16
	Feb	124.00	7.95	455.54	8.9096	6.82	1.75	116.72
	March	125.43	8.22	457.34	8.9447	6.87	1.80	119.64
	April	125.75	8.32	455.88	8.9162	6.97	1.83	119.72
	May	126.87	8.44	458.97	8.9766	6.93	1.84	122.05
	June	125.69	8.51	451.67	8.8338	7.05	1.88	120.76
	July	124.40	8.46	447.31	8.7485	7.07	1.89	119.54
	Aug	124.17	8.26	447.81	8.7584	7.29	1.84	113.25
	Sept	123.42	8.22	441.40	8.6330	7.67	1.86	107.01
	Oct	124.35	8.15	446.30	8.7289	7.69	1.83	106.03
	Nov	124.14	8.34	441.27	8.6305	7.96	1.89	104.70
	Dec	124.42	8.48	439.16	8.5892	8.27	1.93	102.59
2000	Jan	124.54	8.47	439.49	8.5956	8.07	1.93	105.10
	Feb	123.81	8.65	435.17	8.5112	7.91	1.99	109.45
	March	122.71	8.69	429.23	8.3950	8.16	2.03	106.38
	April	121.70	8.72	422.84	8.2700	8.28	2.07	105.53
	May	122.00	9.09	421.24	8.2388	8.41	2.16	108.28
	June	121.56	8.74	424.98	8.3118	8.24	2.06	106.11
	July	123.20	8.93	429.89	8.4080	8.28	2.08	107.90
	Aug	124.26	9.27	429.29	8.3962	8.58	2.16	108.13
	Sept	125.57	9.66	430.10	8.4121	9.05	2.24	106.76
	Oct	128.05	9.96	435.96	8.5266	9.19	2.29	108.45

Note. The bas for TCW-index is 18 November 1992.

8

Nominal effective TCW exchange rate
Index: 18 November 1992=100
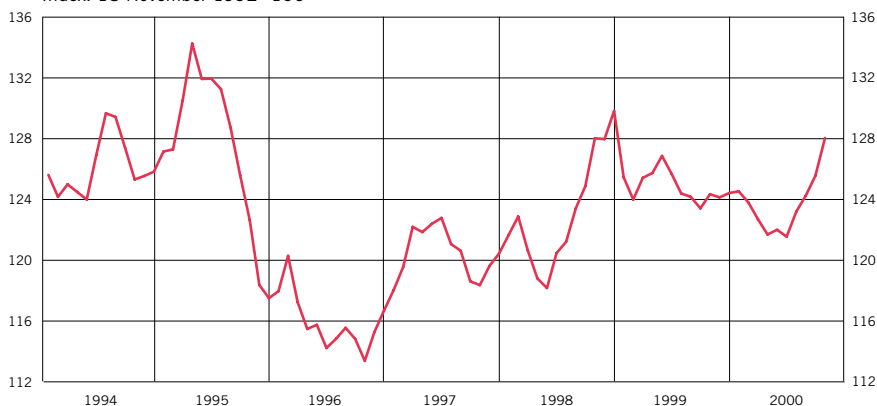
9   Forward foreign exchange market

Forward net position with authorized currency dealers. SEK million, period ends

		Non-bank public		Bank abroad	Riksbank	Total
		Resident (1)	Non-resident (2)	Net (3)	Net (4)	(1+2+3+4)
1998	July	–218 997	–22 052	129 587	0	–111 462
	Aug	–284 131	–27 586	201 845	0	–109 872
	Sept	–239 370	–26 312	178 740	0	– 86 942
	Oct	–283 253	–29 446	157 158	0	–155 541
	Nov	–304 235	–26 910	158 008	0	–173 137
	Dec	–274 469	–16 164	129 535	0	–161 098
1999	Jan	–251 675	–11 774	117 395	0	–146 054
	Feb	–252 950	–12 878	93 133	0	–172 695
	March	–272 142	–11 752	131 858	0	–152 036
	April	–274 127	– 9 540	127 642	0	–156 025
	May	–289 324	– 4 744	150 131	0	–143 937
	June	–283 220	– 1 091	129 813	0	–154 498
	July	–279 761	– 2 317	147 386	0	–134 692
	Aug	–271 051	4 393	143 815	0	–122 843
	Sept	–262 300	–11 669	156 294	0	–117 705
	Oct	–258 628	– 6 778	174 294	0	– 91 112
	Nov	–272 818	327	185 332	0	– 87 159
	Dec	–285 131	5 843	182 019	0	– 97 269
2000	Jan	–316 818	14 641	186 082	0	–116 095
	Feb	–311 986	12 019	198 174	0	–101 793
	March	–305 951	7 131	201 270	0	– 97 550
	April	–308 822	10 696	190 084	0	–108 042
	May	–344 256	8 940	214 764	0	–120 552
	June	–333 512	8 125	198 414	0	–126 973
	July	–337 305	10 218	206 364	0	–120 723

Signed articles in earlier issues

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