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Contents

Guardian of financial stability  5

Recent developments  11

Asset price inflation on the equity and real estate markets: risks and policy implications  25

Globalisation prompts overhaul of international financial architecture  37

Currency crises in emerging markets: predictable or not?  43

The Dutch economy in 2000-2002: a forecast based on MORKMON  53
Guardian of financial stability

Financial stability is of vital importance for a sound and prosperous economic performance. A stable financial system is capable of absorbing shocks and allocating resources efficiently.

The core task of the Nederlandsche Bank – as the guardian of financial stability – stems from its combined role as part of the European monetary authority, as supervisor of the banking system and as overseer responsible for a well-functioning payments system. Against this background, financial stability has been made the core theme of this issue of the Bank’s Quarterly Bulletin.

This introduction discusses the concept of financial stability and the key role the Bank plays as its guardian. The importance of financial stability in the Netherlands is enhanced by the prominent position of financial institutions in the Netherlands. Although financial stability is often taken for granted in the Netherlands, the importance of safeguarding it can hardly be overestimated.
The significance of financial stability

One speaks of financial stability when a financial system is capable of efficiently allocating resources and absorbing shocks, preventing these from exercising a disruptive effect on the real economy or on other financial systems. Thus, in a situation of financial stability, money can properly carry out its function as a means of payment and hoarding and as a unit of account whilst, at the same time, the financial system can properly perform its role of mobilising savings, diversifying risks and allocating resources. In essence, financial stability is a vital condition for stability and growth in a developed economy, since transactions originate in the real economy and are settled through the financial system. The significance of financial stability can best be demonstrated by looking at situations of financial instability, for instance if banks are averse to financing profitable projects, asset prices are far removed from their intrinsic values, or payments are not – or not timely – settled. In extreme cases, financial instability may even spark a run on bank deposits, or may lead to hyperinflation, a currency crisis or a stock market crash. In other words, although the existence of financial stability is often taken for granted in the Netherlands, the importance of safeguarding it cannot be overestimated.

In safeguarding financial stability three factors need to be looked at: (1) the potential sources of shocks; (2) the channels by which shocks are transmitted to the real economy and other financial systems; and (3) possible institutional or other adjustments that may reinforce the financial system’s resistance to shocks.

Rather than predicting future crises, the first factor seeks to identify risks to the domestic and international financial system. The second factor concentrates on the transmission of possible shocks, with contagion effects such as herding behaviour meriting special attention. In addition to the solvency and liquidity of the different segments of the financial sector, a key aspect in this respect is the influence of (incomplete) information on the expectations and behaviour of financial market participants. Of importance to the third, more policy-oriented, factor is that the aim of reducing the vulnerability of the financial system should not constitute an impediment to an efficient operation of market forces. The instruments that play a role here are deposit insurance, supervisory guidelines, transparency standards and real time gross settlement systems.

The fact that financial stability is very important for the Dutch economy also has to do with the substantial size of its financial sector. For instance, the accumulated balance-sheet total of all credit institutions registered in the Netherlands at end-1999 (over NLG 3,000 billion) was nearly four times that year’s economic output. Internationally, the Dutch banking industry takes up a prominent position as well: the Netherlands ranks seventh on the world banking list (based on its share in the accumulated balance-sheet total of the world’s fifty largest banks). Measured by capitalisation of the national stock exchange, the Netherlands also figures among the top ten. The same applies in terms of financial external claims. While taking up ninth position worldwide in terms of outstanding portfolio investments, the Netherlands even ranks fifth in terms of outstanding direct investments. All of this emphasises the importance of financial stability and implies that safeguarding financial stability has a domestic as well as an international dimension in the Netherlands.

The role of the Nederlandsche Bank

The task of the Nederlandsche Bank as the guardian of financial stability stems from its combined role as part of the European monetary authority, as supervisor of the banking system and as overseer responsible for a well-functioning payments system. The Bank is therefore directly involved in all matters that have a bearing on financial stability. To illustrate this, an overview is given of the main threats to the stability of the financial system. These threats can, in the first instance, be subdivided into imbalances with a clearly macroeconomic background and disruptions that originate from problems at individual institutions. However, because of the danger of contagion and systemic risk, macroeconomic problems could spread unchecked across the financial system, thereby easily blurring the micro/macro distinction.

Macroeconomic shocks

Macroeconomically-induced shocks may have an internal or an external source. Internal shocks are, for instance, shocks arising from inadequate monetary policy. Excessive monetary easing leads, via excessive lending, to consumer price inflation and disruption of the price mechanism but often also to an excessive rise in asset prices such as share prices and house prices. Such developments undermine the soundness of the financial system and affect the growth potential of the real economy. In that respect, monetary policy aimed at price stability is an important contributor to financial stability. To prevent the improper use of monetary...
guardian of financial stability

Instruments it is important that the central bank is not subject to political influence, that monetary financing of public expenditure is ruled out and that price stability is defined as the primary objective of monetary policy. These elements are embedded in the Maastricht Treaty, the institutional basis of the European currency union of which the Netherlands is a member.

As part of the Eurolsystem, the Bank takes part in the preparations for the single monetary policy and thus contributes to maintaining financial stability in the euro area. Even though monetary policy is now a European affair, the Bank still has a national function in macroeconomic matters given its role in translating the single monetary policy into consequences for the national economy and national policy. As part of this role, the Bank conducts research into such items as the possible threats of surges in domestic lending and house prices (a survey of recent research by the Bank into financial stability is included at the end of this chapter). Closely related to both its position in the Eurosystem and its national role, the Bank further has an important task in compiling monetary and financial statistics based on reports from the Dutch banking system.

In addition to internal factors, financial stability in the Netherlands can also be threatened by external influences, mostly originating on international financial markets. These may be currency crises, excessive interest rate volatility or a global stock market crash. Because of the strong international interwovenness of the Dutch financial sector, this type of imbalance may present a direct threat to financial stability in the Netherlands. Possible angles may be the effects this will have on the profitability of the Dutch banking system, on the yield curve and on the euro exchange rate.

As for the effect of currency risks on financial stability, much has changed with the formation of EMU. Actually, several of the present EMU countries had already given up their monetary policy independence much earlier by pegging their currencies to the D-Mark. A major added advantage of the currency union is that speculative attacks against individual currencies of EMU Member States, as frequently happened in the 1980s and 1990s, are no longer possible. Also, the risks for the individual Member States in respect of foreign exchange developments are now smaller than before since the euro area as a whole is a relatively closed economy.

Although the cause of international imbalances is mostly beyond its direct control, the Bank is indirectly active through numerous international organisations and consultative bodies in the area of financial stability. For instance, together with the Ministry of Finance the Bank prepares the contribution of the Netherlands to the International Monetary Fund and is in this way involved in financial stability problems in other parts of the world. Similarly, the Bank is a contributor to consultations within organisations such as the Bank for International Settlements, the Financial Stability Forum and the OECD.

Problems at financial institutions

From a viewpoint of financial stability – and especially crisis prevention – the soundness of financial institutions is of paramount importance. By soundness is meant a sound economic performance of these institutions. In this respect, the banking system takes up a special position within the financial sector. A vital difference between banks and other financial institutions is that a bank’s claims consist for the most part of long-term loans which only at considerable cost can be converted into cash in the short term, whilst a bank’s debts consist mainly of immediately repayable, nominal liabilities. In the absence of safety nets, these typical features of a bank may, at the faintest whiff of problems at their banks, prompt depositors into an immediate and massive deposit-withdrawal run on their banks.

To safeguard confidence in the banking system, a system of deposit insurance was introduced in virtually all industrial countries after World War II. Another instrument is that central banks may provide liquidity support to individual institutions. While reducing the possibility of bank runs, these policy instruments may actually incite banks to take on new risks (moral hazard). Moreover, the mere existence of safety nets means that creditors will be less inclined to keep a close watch over their own banks. To some degree, the latter task has therefore been taken over by an independently established supervisory authority. Under the 1992 Act on the Supervision of the Credit System, the Bank is the competent supervisory authority of the banking system in the Netherlands. Bringing the banking supervisory function and the possibility to provide liquidity support under ‘one roof’ is a major prerequisite for a timely and smooth handling of possible crises.

An important principle in supervisory policy is that of securing a level playing field, with rules and regulations imposing equal requirements on equal parties. To that end, guidelines are being established during international consultations between supervisory authorities. A well-known example is the Basel Capital Accord of 1988, under which banks agreed to maintain a ratio of own funds vis-à-vis risk-weighted claims against the
private sector of at least 8%. However, as the risk-weighting method used is not fine-meshed enough, the amount of capital prescribed will often deviate from the amount of capital that is necessary from a microeconomic viewpoint. In the context of proposals to reform the Capital Accord, it is currently being examined how to narrow the gap between these two variables, in part by using banks’ internal models of risk analysis.

Besides an international dimension, the level playing field also has a cross-sector dimension. This is the result of despecialisation, i.e. the phenomenon that different types of financial institutions are increasingly offering similar products to the general public. In the Netherlands, intensive consultations are being held within the Council of Financial Supervisors, a consultative forum made up of the Bank, the Securities Board of the Netherlands and the Insurance Board. Yet, the Bank is responsible for the stability of the Dutch financial system as a whole.

Systemic risk
The most serious threat to financial stability arises if problems at individual institutions spread to other institutions. This so-called systemic risk is the risk that the failure of a market participant to (timely) meet its obligations may in turn cause other participants to default as well. Thus, a chain reaction is set in motion which may generate credit and liquidity problems affecting the entire financial system. Unexpected liquidity shortages are particularly problematic in this respect, certainly in light of the ever shorter processing periods for payments and securities transactions. Systemic risk not only entails credit risk, but often also operational risk. An important factor is, moreover, that the different national payments and securities systems have become increasingly interwoven, so that problems can easily be transmitted through the payments system.

Central banks help in some respects to mitigate these risks. For instance, they offer settlement systems through which payment obligations can be settled in risk-free money. The Bank is also active in this regard, both domestically and in a European context. An example of a European system is TARGET, which allows cross-border transfers between payments systems of the ECB and the other 14 national central banks that form part of the European System of Central Banks. It is a gross settlement system in which a bank’s payment order is processed directly so that the recipient may use the money immediately for another payment (real time gross settlement). From a viewpoint of financial stability, such systems are more attractive than those whereby banks first cancel out their bilateral or multilateral positions before settling on a net basis (net settlement systems). In net settlement systems there is also a certain time span between initiating the payment order, determining the resulting net obligation (clearing) and the actual payment (settlement), which creates uncertainty and generates credit and liquidity risks.

Furthermore, within the context of g-10, the Bank also helps to formulate the basic principles for the structuring of payments and securities systems. First, there are the Lamfalussy standards for netting systems to process payments, set up in 1990. This set of standards has recently been updated and four standards relating to efficiency and management have been added. Furthermore, a joint working group of central banks and securities industry supervisors has prepared specific core principles for securities settlement systems. In addition to formulating basic principles, central banks also check – in the so-termed oversight process – whether the payments and securities settlement processes actually meet preset conditions. The Bank carries out the oversight of systems that are based in the Netherlands. For securities settlement systems the Bank cooperates in this with the Securities Board of the Netherlands, which has primary supervisory responsibility for stock exchanges.

In short, the Nederlandsche Bank carries wide responsibility in a material sense for safeguarding financial stability in the Netherlands. Virtually all its core tasks are somehow linked to this objective. If, for whatever reason, the financial system comes under pressure, a central bank is mostly seen as the appropriate institution to perform crisis intervention.

Structure of this Bulletin
The Bulletin’s further contents are as follows. The next section describes in a nutshell the recent developments surrounding financial stability. International developments are discussed such as the imbalances between the major trading blocs and the events taking place on the financial markets. The picture that emerges is that prospects for the world economy remain favourable but that a number of emerging economies and some financial markets are faced with growing uncertainties. Further points of discussion are developments regarding financial stability in the Netherlands, with special focus on the mortgage and housing markets which have both recorded buoyant growth these past few years.
While there are indications that the boom is levelling off, the opposite is true for corporate lending which has recently seen some acceleration. However, despite these developments, the Dutch banking sector can be designated as very sound. The section concludes with a survey of recent developments in the area of payments and securities transactions.

Next come four articles, each highlighting a different aspect of financial stability, as discussed in this introduction. The first article focuses on the relationship between financial stability and asset prices, especially share prices. After giving a general outline of the phenomenon of asset price inflation, the article discusses recent movements in share prices in the Netherlands. The conclusion is that the continuing high level of share prices cannot be entirely explained by such underlying factors as interest rate and earnings expectations. The article goes on to describe by which channels a possible fall in share prices is transmitted to the real economy, and it lists the most important implications of asset price developments for central bank policy. As, in actual practice, the rate of asset price inflation is difficult to determine, the central bank will exercise restraint in its direct response to the development of asset prices. Its policy focuses especially on a private sector and a financial sector capable of absorbing a sharp decline in asset prices.

The second article discusses the changing international financial environment and its consequences for financial stability. After all, countries and markets have become increasingly interwoven in the last few years, especially because of a substantial rise in international capital movements. Although this process of globalisation is conducive to prosperity, it also entails risks as the recent financial crises in emerging markets have unequivocally demonstrated. To mitigate these risks, the IMF has taken a number of initiatives in the area of crisis prevention and crisis management. While the effectiveness of these initiatives has not really been tested yet, countries have greatly improved their information supply on financial developments, which helps market parties in their risk assessment. At the same time, measures have been taken to deal more effectively with IMF resources, with more emphasis on the fact that debtor countries and their external financiers have their own responsibility in a financial crisis. It is given fact that the financial environment will always remain subject to change, so that the reform process can never be considered complete.

A concrete threat to financial stability was no doubt the 1997 currency crisis in Asia, which came as a complete surprise for many parties concerned. Partly in response to this crisis, the Bank has worked on an early-warning method to detect vulnerabilities in emerging markets. This method is discussed in the third article, which concludes that distinct warning signals could indeed be observed in the runup to the Asia crisis. Besides, no evidence has been found for the statement that the risk of contagion of currency crises would have increased over time.

The last article in this issue presents projections for the Dutch economy in 2000-2002 based on M0, the Bank’s macroeconomic structural model. According to these projections, growth will stay at a relatively high level even though its pace will slacken from 4% in 2000 to about 3.5% in 2002. In 2001, inflation is projected to rise to a level (more than 4%) that has not been seen since 1982. Although account must be taken of the non-recurrent effects that result from increases in indirect taxes such as VAT and eco-tax, inflation in 2002 will still be high at 3%. A sensitivity analysis shows that there are both upside and downside price risks, for instance as a result of labour market tensions or a recovery of the euro. Also, the article analyses the macroeconomic effects of strong price declines on the Dutch housing market and international stock exchanges. The outcome is that these declines could have a substantial impact on the Dutch economy.

Finally, financial stability will, of course, be a recurring topic of discussion in the Bank’s Quarterly Bulletin. While no further issues will be entirely devoted to this topic, a next Bulletin will discuss related subjects such as the consolidation trend in the financial sector and its consequences for supervision as well as a new approach to foreign exchange risks.

Recent Nederlandsche Bank research on financial stability


Berg, C.C.A. van den and C.P.M. van Oorschot (2000), ‘Wie is de lender of last resort in de eu monitu’ (Who is the lender of last resort), *Maandscript Emu*, 64, pp 77-85.


instrument voor risicobeheer’ (The credit risk model: a new instrument for risk management), Onderzoeksreeks Toezicht, No 26, the Nederlandsche Bank.


Recent developments

*This article looks at recent developments in the Netherlands which have a bearing on financial stability. They are discussed from different perspectives, a distinction being made between macro-economic aspects (including asset prices), banks, and payments and securities transactions. The article begins by looking at international developments, notably the disequilibria between the three large trading blocs, and the development of asset prices, which could be of crucial importance as a source of shocks. Generally speaking, the world economy has grown markedly this year, while the prospects are favourable, although in some emerging economies and financial markets there is a growing uncertainty on this point. The Dutch house market again recorded exuberant growth figures over the past year, though it is beginning to show signs of levelling off. Furthermore, the number of second mortgages and mortgage renewals has fallen considerably, slowing down the growth rate of mortgage lending. The article then goes on to discuss Dutch banks and their relationship with the private sector. It is noteworthy that the rapid expansion of corporate lending in particular continues to persist, in spite of the major rise in interest rates since mid-1999. The capital buffer maintained by banks to absorb unexpected domestic and external losses continues to be well above the minimum standards set internationally. Finally, the current developments with regard to payment and securities settlement systems are discussed. In this context, attention is also paid to the merger of the Amsterdam, Brussels and Paris stock exchanges into Euronext; it is the intention that clearing is effected via a single central counterparty as from 1 January 2001 clearing (Clearnet S.A in France).*
Macro-economic conditions

Worldwide, economic growth picked up markedly this year. In its World Economic Outlook of September 2000, the IMF voiced expectations that the world economy will grow by 4.7% in 2000 (1999: 3.4%). The euro area is seeing a revival notably because Germany’s slump has come to an end. Following a long period of boom, the United States’ economy is showing some signs of slowing down. Finally, a cautious recovery seems to be setting in in Japan, while the emerging economies in South East Asia have overcome the financial crisis of the end-1990s. Several emerging economies continue to be vulnerable though because of the persisting fragility of their financial sector and their sensitivity to external developments such as oil price fluctuations and a further deceleration of growth in the US.

Consequent on the improved economic developments, interest rates have undergone a turnaround since mid-1999 (Charts 1 and 2). Since then short-term interest rates in particular have gone up, by nearly 250 basis points in the euro area and 150 basis points in the US, as a result of the tightening monetary policy pursued with a view to rising inflation. This also goes for Japan, where the danger of deflation in the medium term seems to have declined and the zero interest rate policy was abandoned in August of this year when interest rates were raised for the first time in ten years. In the euro area and especially the US, inflation has clearly been rising in the course of this year, under the influence of such factors as the marked rise in energy prices (Chart 3). There is a risk that higher energy prices will, apart from having a one-off effect on prices, exercise an upward influence on inflation for a longer period of time via second-order effects.

The current accounts of the most important currency blocs are subject to persisting disequilibria, the American deficit having risen to a record high (Chart 4). This reflects above all the considerable confidence in the American economy. Favourable prospects are making for a combination of a continuing inflow of foreign investment and a strong dollar. The vigour of the American economy has also made itself felt for some time now in the considerable growth rate of GDP (Chart 5).

The sustainability of this situation can, however, be questioned. If sentiments were to undergo a turnaround, a downward spiral could be set in motion of stock exchange adjustments, capital outflows and a depreciating dollar. Such a development took place in the 1980s, when the current account also showed a major deficit and the dollar was strong, and GDP growth exceeded that in Japan and in the euro area. The development in the second half of the 1980s shows how rapidly the tide can turn. Following vast interventions in the foreign exchange market, the dollar then depreciated markedly (Chart 6), after which the current account moved towards equilibrium. The chances of this happening, and the possible effect on the real economy, are highly dependent on the degree to which current asset prices and exchange rates are excessive. It has been pointed out in various quarters (such as the IMF and the ECB) that the depreciation of the euro against the dollar has gone too far. If it has, there is a danger of
a rapid adjustment which could set the above chain reaction in motion. The chances of such a development would be much smaller if the exchange rate underwent a gradual adjustment.

In this context, a gradual cooling of the American economy seems desirable. The latest developments do not present an unequivocal picture on this point. On the one hand, GDP growth has clearly decelerated in the third quarter, to 2.4%. On the other, the considerable consumer spending and labour market tensions are continuing unabated. Possible risks could be a further rise in oil prices or a downward adjustment of confidence in the American economy. After all, the capital inflow of recent years has been based in part on the euphoria surrounding the ‘New Economy’. If that euphoria were to prove unfounded, or if the new economy were to gain ground outside the US, the capital inflow could well decline.

The Japanese economy has been subject to a cautious recovery this year, partly as a result of the fiscal stimulation policy conducted by the Japanese government. Various indicators, including the increased order portfolio of the manufacturing sector, show that growth will persist during 2001. This recovery could, however, be thwarted by several factors. To begin with, the Japanese economy is intrinsically sensitive to oil price rises, which would have an extra effect because Japan’s main trading partners in South East Asia (such as Thailand, but South Korea, too) might also be hit hard. In addition, the financial sector in this region is
Still fragile so that shocks could easily be transplanted to the real economy. Experience in Asia in 1997 showed how a financial crisis can suddenly arise and spread. Several countries, notably in South America, are evincing growing concern, as evidenced by higher interest rate spreads compared to the United States. The article ‘Currency crises in emerging markets: predictable or not?’ elsewhere in this Quarterly Bulletin analyses to what extent potential crisis situations, and especially currency crises, can be identified in time via an early warning system.

Asset prices

Worldwide, stock exchanges are having to contend with persisting uncertainty. This goes especially for technology shares, which faced major adjustments early in the year, following large price increases in 1999 (see the charts in the article ‘Asset price inflation on the equity and house markets: risks and policy implications’). The marked price rises of technology shares, especially at the end of 1999, may have been excessive. In addition, the risk profile for notably telecommunication companies worsened in the course of 2000, as evidenced by downward adjustments of rating agencies’ credit ratings. This is due to such factors as the high amounts which had to be paid to European governments during the past year for umts licences. In addition, the development and implementation of new technology require vast additional investment. Finally, profit warnings by several large ICT companies have raised doubt about the future profitability of technology shares.

In spite of the price adjustments for several equities, the question remains to what extent current prices are overvalued. After all, the main indices have tripled since December 1994. Furthermore, the average price/earnings ratio continues to be fairly high from an historical perspective. With a view to financial stability, it is important to know the extent to which price movements – and hence price adjustments – affect the real economy. This subject is discussed extensively in the articles ‘Asset price inflation on the equity and house markets: risks and policy implications’ and ‘The Dutch economy in 2000-2002: a forecast based on MORKMON’.

In the Netherlands, the developments in the equity markets, which have manifested themselves worldwide, were attended by the specifically exuberant development of house prices (Chart 7). This boom can be attributed to a combination of factors, such as low interest rates, a booming economy, the limited supply of houses, demographic factors, an easing of the acceptance criteria of lenders and fiscal legislation. Given the turnaround in interest rate sentiments in 1999, the persisting rise in house prices is remarkable. Chart 8 shows an historically strong inverse link between the rise in house prices and mortgage rates. However, in the past year, mortgage rates were up by over 170 basis points, while house price rises continued to accelerate, to over 15% on an annual basis. This implies that notably first-time house buyers have seen their burden increase materially. House buyers purchasing their second, third etc. home are not necessarily facing this problem because they have sold their old home for much more than they paid for it and need not borrow much extra. It may be noted that even though house prices continued to rise this year, the house market is showing preliminary signs of cooling off. On average, houses are on
the market longer than a year ago. In addition, some of the causes underlying the boom of the past few years (such as the fact that second incomes are taken into account, the easing of other acceptance criteria and the development of types of mortgages which are subject to favourable tax treatment) are leading to a shift in the level of mortgage lending rather than to a permanently higher growth rate. When the level effect has subsided, for instance, because all double-income households wishing to do so put their greater borrowing capacity to use, these factors will no longer boost the expansion of lending and house prices.

As a result of the rise in house prices, in combination with the increased stock exchange prices, Dutch households have seen their net assets soar over the past few years (Table 1). The Dutch economy has consequently become more sensitive to shocks which are transmitted via the financial position of households. This is because, by contrast with indebtedness, asset prices are susceptible to major downward adjustments. If the housing market were to collapse, households would be confronted with a loss of capital, notably if they are compelled to sell (for instance, in the event of a change of job or a divorce). Dutch households’ indebtedness has, incidentally, also increased substantially over the past few decades, notably as a result of the steady increase in home ownership. Chart 9 presents the total mortgage debt of households (including non-bank debt) relative to GDP and disposable income. It shows a steady upward trend which has accelerated over the past few years. At the same time, household savings have clearly declined, and the share of non-contractual savings has even become negative (Chart 10).

Macro-economic simulations based on MORKMON, the Bank’s macro-econometric model, show that a 40% fall in house prices reduces the volume of real GDP by 2% on the base scenario (see the article ‘The Dutch economy in 2000-2002: a forecast based on MORKMON’). Micro-economic vulnerability to fluctuating house prices probably exceeds what the macro-economic figures suggest. It was noted earlier that notably first-time house buyers have been confronted over the past few years with sharply rising costs and have thus been compelled to resort to maximum financing. As these are mostly young households with few financial buffers, who on average also have a high consumption ratio, the expenditure effects of a turnaround in the housing market could be considerable.

Table 1 Development of net assets of Dutch households

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1995</th>
<th>1999</th>
<th>2000 June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equities</td>
<td>32</td>
<td>54</td>
<td>112</td>
<td>112</td>
</tr>
<tr>
<td>Home owned</td>
<td>166</td>
<td>213</td>
<td>306</td>
<td>331</td>
</tr>
<tr>
<td>Other</td>
<td>171</td>
<td>174</td>
<td>179</td>
<td>178</td>
</tr>
<tr>
<td>Total assets</td>
<td>369</td>
<td>441</td>
<td>597</td>
<td>621</td>
</tr>
<tr>
<td>Total debts</td>
<td>86</td>
<td>108</td>
<td>151</td>
<td>155</td>
</tr>
<tr>
<td>Net assets</td>
<td>282</td>
<td>332</td>
<td>445</td>
<td>465</td>
</tr>
</tbody>
</table>


Chart 9 Mortgage debt

Chart 10 Savings

Percentages disposable income
Banking system

The third essential factor in the risks to financial stability (next to macro-economic conditions, and asset price movements) is the behaviour of financial institutions, banks in particular. Generally speaking, the Dutch banking system can be considered very safe. This is also clear from the high ratings assigned to Dutch banks by commercial rating agencies, in comparison to many other internationally operating institutions (from Aaa to A1 for the largest four banks). In addition, the supervision on banks is being continuously improved and refined both nationally and internationally. The developments discussed below should be interpreted against this favourable background. Risk developments at individual Dutch institutions will be discussed first, which are dependent in part on developments regarding solvency, profitability and bank strategy. Systemic risk is also touched upon briefly, with special attention being paid to the channels through which contagion can take place within the banking system itself.

Exposures in the banking sector

The main risks in banking continue to attend lending, although their relative importance has declined now that banks are increasingly undertaking off-balance-sheet activities such as providing guarantees and advice. The most important category, which is also the easiest to quantify, is credit risk (the chances of incurring losses because creditors default). Credit risk is discussed below, broken down by businesses, households and external exposures. Then there is interest rate risk, which is determined by interest rate fluctuations and maturity mismatches between assets and liabilities. The fact that the percentage of total bank lending which is covered by longer-term funds raised has risen from 31% in early 1998 to 37% (measured in terms of deposits and savings which are not immediately withdrawable on demand, bonds and reserves made up of undistributed profits) indicates that the interest rate risk has declined in this period. This was notably thanks to the issue of new bonds.

Corporate lending

The growth of total bank lending to the private sector (businesses and households) remains at a high level, increasing even further in the course of 2000, to 15.4% in the third quarter (Chart 11). This is well above the rate recorded in the euro area as a whole, of around 10%. The rise in Dutch credit growth is wholly attributable to a growth acceleration of ‘other’ lending, which is made up almost entirely of corporate lending, to 18.2%. It is not easy to analyse the increase in corporate lending because there is no statistical breakdown of the purposes to which these loans are put. Nevertheless, various explanations can be given for the rapid expansion. From an historical perspective, interest rates continue to be low while the economic boom persists. Then there are indications that a large share of the loans is used to finance mergers and takeovers, of which there were a great many in the second half of the 1990s, both in the Netherlands and elsewhere. Finally, the recent acceleration of corporate lending may be partly due to increased lending to telecommunication companies. As a consequence of the umts auctions this year and the attending investment, this sector’s need for extra capital has soared.

Although the high growth rate of corporate lending cannot be explained in full by the above factors, there are no indications at the macro-economic level that the risks run are rash. It must be noted that the solvency (i.e. the ratio of own funds to total capital) of the Dutch business sector is even increasing slightly while profitability remains up to standard (Table 2). The number of bankruptcies continues to be fairly low (Chart 12), reflecting the current favourable cyclical conditions. Their number has furthermore been reduced by the introduction of new legislation on debt restructuring in 1998. It is pointed out that the the business cycle has a dual effect. On the one hand, businesses face fewer problems in times of boom. On the other, more businesses are set up when the economy is booming, while at the same time the number of bankruptcies among
young enterprises is relatively high. Chart 12 shows that the first effect predominates: during periods of boom, the number of bankruptcies clearly declines.

**Table 2  Dutch businesses’ profit ratio and solvency**

<table>
<thead>
<tr>
<th>Year</th>
<th>Profit ratio (of Dutch output)</th>
<th>Solvency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>10.2</td>
<td>42.9</td>
</tr>
<tr>
<td>1992</td>
<td>7.7</td>
<td>44.0</td>
</tr>
<tr>
<td>1993</td>
<td>5.7</td>
<td>45.4</td>
</tr>
<tr>
<td>1994</td>
<td>9.1</td>
<td>45.0</td>
</tr>
<tr>
<td>1995</td>
<td>10.1</td>
<td>45.7</td>
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<tr>
<td>1996</td>
<td>10.0</td>
<td>46.3</td>
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<td>1997</td>
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<td>47.2</td>
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<tr>
<td>1998</td>
<td>10.4</td>
<td>44.6</td>
</tr>
<tr>
<td>1999</td>
<td>9.6</td>
<td>45.0</td>
</tr>
<tr>
<td>2000</td>
<td>8(^3/4)</td>
<td>46(^3/4)</td>
</tr>
</tbody>
</table>


transactions dropped from 59% to 48% in that period. A Bank-commissioned survey held earlier this year shows that in the past few years a large proportion of the mortgage renewals of owner-occupied houses was converted into cash and used for spending; in 1999 this amount had reached around NLG 14 billion. This implies that if the number of mortgage renewals drops, spending may decline. The first indication is that the expansion of the consumption of durable goods has levelled off to 3.7% over the first nine months of this year on the same period in 1999. For 1999 as a whole, it had still been 7.4% (1998: 8.8%). Although the number of mortgage renewals has fallen dramatically, mortgage lending directly related to house purchases is still on the increase; here there is a clearly discernible link with the strong rise in house prices mentioned earlier. In spite of the significant effects which a sharp adjustment on the house market would have on the real economy, this does not imply that the stability of Dutch banks is under threat. A major conclusion of the study of bank lending made earlier by the Bank is that the soundness of the financial system is not at stake in the event of a turnaround on the house market.

**External position**

The Dutch banks’ total external claims have expanded by 12.4% since 1998, mostly thanks to considerable lending in 1998. Since mid-1999, this lending has been declining somewhat (second quarter 2000: –3.7%). Lending to regions entailing greater risk (measured by the countries from the three highest country risk categories) mirrors this development: in 1998 lending dropped –28.0%), only to pick up again since early 2000 (second quarter: 0.4%). The picture in the greater-risk-bearing regions is closely linked to the Asia crisis, which compelled the banks to withdraw from emerging economies in 1998. Now that the countries of South East Asia are recovering from the crisis, lending is again on the increase. In this light, the risk profile of external lending by the Dutch banking system seems more favourable than in the run-up to the Asia crisis, also given the fact that Dutch banks are lending more for relatively short periods of time (maturity < 1 year). The share of short-term lending has risen from 53% in early 1998 to nearly 62%. It must be remembered that shorter maturities, though understandably preferred by individual banks, could jeopardise these countries’ financial stability. After all, hot capital flows may be withdrawn at fairly short notice. It must also be kept in mind that notably Latin America is evincing increasing financial fragility.
Solvency
The capital buffer maintained by banks to absorb unforeseen losses is reflected in the solvency ratio. In accordance with the current Capital Accord from 1988, internationally active banks’ actual own funds are subject to minimum requirements. To determine the solvency ratio, credits with a relatively low risk are counted less heavily than credits with a higher risk. Thus categories have been drawn up; the four most important bearing weights of 0%, 20%, 50% and 100%. At this point in time, these apply only to credit risk and market risk (i.e. the chance that losses arise as a consequence of an unfavourable development of market prices), where the requirements for market risk form but a fraction of those for market risk (Dutch banks: 2.5% in the second quarter of 2000). As a result of the revision of the Capital Accord, however, other forms of risk, such as operational risk, will also come to play a role in the capital adequacy requirements through either a quantitative or a qualitative assessment. The minimum solvency ratio for internationally operating banks has been set at 8% of risk-weighted assets. In practice, most banks maintain a certain margin above this minimum.

In the third quarter of 2000 (Chart 13), the average solvency ratio at Dutch banks was 10.7%. At 10.1%, the large banks’ average ratio is slightly lower. Under normal circumstances, the large banks can afford to maintain a lower capital buffer because they are usually able to spread their risks more effectively than smaller institutions. The solvency of the Dutch banks gradually declined in the second half of the 1990s, to an internationally low level. This is largely due to the decrease of the Rabobank’s solvency ratio, which had been relatively high. In the meantime, the Rabobank has interrupted this trend by issuing members’ certificates in the first quarter of 2000.

The underlying development is that both the banking system’s (risk-weighted) assets and their total actual own funds have expanded since the early 1990s. In recent years, their growth rates have accelerated. Within assets, there has been a shift towards higher-risk categories, notably those with solvency requirements of 50% and 100% (Chart 14). The decline of the solvency ratio implies that the increase in actual own funds has not kept pace with the underlying risks in banking.

Provisioning
While actual solvency is intended to form a buffer for unforeseen losses, provisioning is intended to absorb known or very probable losses. In 1999, the provisions needed were relatively low, at 0.4% of the domestic

---

**Chart 13** Solvency of Dutch banks

<table>
<thead>
<tr>
<th>Year</th>
<th>Large banks</th>
<th>All banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>94</td>
<td></td>
<td></td>
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<tr>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>96</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td>98</td>
<td></td>
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<tr>
<td>99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Chart 14** Exposures of Dutch banks per risk category

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>1996</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>18%</td>
<td>17%</td>
</tr>
<tr>
<td>20%</td>
<td>27%</td>
<td>32%</td>
</tr>
<tr>
<td>50%</td>
<td>19%</td>
<td>15%</td>
</tr>
<tr>
<td>100%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Figures for 2000 relate to first six months.
balance sheet total for domestic activities and 1.6% of the external balance sheet total for external activities. It must be remembered though that, owing to accounting restrictions, provisions give an impression only of current – not future – losses. The provisions consequently follow a clearly cyclical pattern (Chart 15).

**Profitability and efficiency**

The extent to which banking risks can be covered also depends largely on the banks’ performance. Several variables indicate that the performance of the Dutch banks has improved over the past few years. During this period (a dip in 1998 apart) the profitability of the entire banking system increased materially, to 15.5% in the third quarter (Chart 16). This brings the Dutch banks near to banks in the US and UK, which usually realise much higher profitability than banks from the countries on the European continent. Two remarks are in order here. To begin with, profitability is influenced by cyclical conditions, as evidenced by the chart. Secondly, the shift within assets towards higher risk categories may have played a role. After all, higher risk should go hand in hand with higher profit.

Another indicator of the banks’ performance is the cost-benefit ratio. On average, costs have gone down over the past few years relative to earnings, from 69% at end-1997 to less than 67% in mid-2000 (this corresponds with a rise in the ratio of 1.44 to 1.50). This does not hold for the costs of personnel; these fluctuate at around 37-38% of total earnings. It must be noted that although the costs of information technology (domestic operations) have risen by nearly 40%, they still make up but a fraction of total costs (about 2%).

**Banks’ strategy**

Finally, the individual risks run by Dutch banks are also influenced by the strategic choices which banks make in reaction to various structural developments in the financial sector which are more global in nature. These include, first of all, the trend towards disintermediation. With businesses turning increasingly to the capital market for external financing, banks have come to engage ever more in off-balance-sheet activities, to the detriment of lending. This is clear from the rising share of earnings from trading and commission in total earnings. In the Netherlands, this share rose from 26% at end-1990 to 38% in the third quarter of 2000 (in the same period, the share of interest earnings dropped from 71% to 52%). The banks’ risk profile has consequently shifted from credit risk to, among other things, market risk and reputation risk. The latter has to do with the fact that off-balance-sheet activities are often innovative in nature, and thus entail a greater risk of negative results, which tarnish a bank’s reputation. The above shift does not necessarily mean an increase in risks. Proper diversification can make for lower overall risk.

The second basic trend is the increasing use of electronic media such as the Internet, which boost electronic banking. This is probably leading to sharper competition among banks, both among the existing suppliers of banking products and among new entrants from the non-banking sector such as ICT firms and new electronic intermediaries. Banks will adjust their strategies accordingly – and some have already begun to do so – by for instance offering more tailor-made products.

---

**Chart 15 Banks’ provisions**

Percentages of domestic and external balance sheet totals, respectively

![Chart 15](image)

**Chart 16 Profitability of Dutch banks**

![Chart 16](image)

1 First six months.

Explanatory note: Profitability is understood to be: post-tax profits divided by average own funds, the own funds consisting of capital, reserves, undistributed profit and interest of third parties.
and services, seeking to reduce costs by, for instance, restructuring their office networks, and forming strategic alliances with ICT firms. As described in the previous Quarterly Bulletin, electronic banking is attended by, among other things, various operational risks as well as reputation risk. Both nationally and internationally, much effort is being put into ensuring adequate supervisory rules for the e-banking era (Box 1).

**Box 1 Rules on electronic banking**

The spreading use of electronic media by banks is compelling policy-makers both nationally and internationally to review the existing rules. This process is expected to take two to three years to complete.

The Basel Committee for Banking Supervision (set up by the G10) is working on the development of general guidelines for the supervision of electronic banking. To this end, the implications for banks’ risk management and the cross-border aspects of electronic banking were first analysed. The results of this analysis were published on the BIS’s Website. The intention is that standards for banks’ risk management be published in early 2001.

The European Community is currently discussing a number of concrete guidelines or has already completed them. These guidelines contain notably rules aimed at giving consumers more protection and legal certainty with respect to electronic services offered by banks. For instance, suppliers of electronic services are obliged to make information about their own identity, as well as about prices and conditions, available to users; consumers are given the right to recall an agreement if the supplier has not made the conditions available in writing beforehand; and electronic signatures are given the same status as hand-written signatures. A guideline is furthermore being prepared which allows non-banks to issue electronic money. Take, for instance, telecommunication companies. Such non-banks will, when issuing electronic money, be made subject to a limited form of supervision. Minimum requirements will be imposed on initial capital and own funds, while the investment policies of such companies will be subject to restrictions.

Dutch rules on this point are also being adjusted with a view to the increasing use being made by banks of electronic media. The Nederlandsche Bank will be replacing most rules concerning banks’ administration and organisation, including the rules on automated data processing, by rules on organisation and management. This new guideline states explicitly that the use of open networks by credit institutions is attended by specific risks and that these institutions are expected to take security measures aimed specifically at countering such risks. In 1999, the Bank already issued policy rules on electronic media, which set out the internet activities (be they of foreign or domestic origin) which are subject to Dutch supervision (see the Bank’s Annual Report for 1999).

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Recent developments

Payments and securities transactions

As a result of, for instance, the monetary union, the European stock exchanges are undergoing progressing consolidation. This consolidation is a new step in a longer process towards the cheaper and more efficient organisation of securities transactions. This process is boosted by technological developments, globalisation and increased competition. The main feat is the merger of the stock exchanges of Amsterdam, Brussels and Paris, into Euronext, which became operational on 22 September 2000. Their trading floors will be integrated in 2001. The increasing interweaving of stock exchanges and markets in Europe raises the question whether the current rules and regulations still make for an adequate institutional framework. In July, the European Council of Ministers therefore asked a committee of ‘wise men’ chaired by the Belgian Mr Lamfalussy to scrutinize the rules governing the European securities trade. Its first report recently appeared, calling for rapid adjustment of European rules to market developments, if the fruits of an integrated market for financial services and capital are to be reaped. Agreement will have to be reached about the general principles at the political level. A new securities committee, to be supported by a committee of securities supervisors, would have to see to implementation. The Member States will then be asked to incorporate these rules adequately into their national legislation as soon as possible, while the European Commission must contribute to free and fair competition. The committee of wise men has asked the parties involved to comment on the report. An adjusted and definitive version will follow in February 2001.

Developments with regard to securities settlement systems are following those in the (securities) markets: internationalisation, increases in the scale of operation and electronic data processing. On Euronext Amsterdam, the turnover in equities in the first ten months of 2000 was 73% up on the same period in 1999. In October the monthly turnover was EUR 141 billion. These increases also made themselves felt in the numbers of transactions. In 1999, the number of securities transactions grew by 30% to 15.6 million, and in October 2000 alone the number of transactions was 1 million up on October 1999. The absolute record daily turnover of 697,000 contracts was achieved on Friday, 20 October, expiration date (in 1998 the highest daily turnover was recorded in April: 660,000).

Given the increase in the numbers of transactions and in turnover, risk control is gaining in importance. In order to be able to guarantee financial stability in the longer term, an adequately organised securities settlement system is called for, as is supervision on that system. The committee of wise men mentioned earlier notes that the further internationalisation and integration of securities settlement systems offer opportunities for considerable cost reductions. At the same time, it is pointed out that fair and easy access to the systems and prudential safety are in the public interest.

As noted above, the banking system as a whole is deeply involved in payments. Attention was drawn to the banks’ indirect and direct financial interdependence. This interdependence also manifests itself with regard to (securities) settlement systems. For instance, banks often act as clearing members for securities settlement systems (processing options and securities transactions and offering them to the clearing house which functions as the central counterparty for each transaction effected by clearing members). With a view to risk control, (the role of the central counterparty function of) the clearing house and the clearing members should meet certain requirements.

In order to minimise the risks which might ensue from the way settlement systems operate, standards have been drawn up internationally with a view to financial stability (Box 2). Settlement systems must be adequately organised so as to prevent liquidity and credit problems as well as systemic risk. The safety, reliability, integrity and efficiency of these systems and products are consequently checked in order to determine whether the settlement processes for payments and securities transactions are actually organised in accordance with the international standards. This process is known as oversight, as distinct from prudential supervision. The overseer checks the system as a whole, the integral chain of clearing and settlement (securities and payments) and the links between them. The Bank exercises oversight on payment and securities settlement systems in the Netherlands, in conjunction with the Securities Board of the Netherlands when it comes to assessing securities settlement systems (see Scheme 1 for a survey of the tasks inherent in oversight). The Bank’s prudential supervision aims to safeguard...
Recent developments

Box 2 Standards for testing (securities) settlement systems

Lamfalussy standards
The Lamfalussy standards were initially drawn up with a view to reducing the systemic risk of international netting systems. Testing implies assessing the legal basis, the adequacy of the risk management policy, the transparency of risks and ascertaining whether final settlement takes place on a daily basis. Systems are furthermore required to take provisions to ensure that the settlement process can be rounded off in time when the participant with the largest net position defaults. The systems also need to meet requirements with respect to efficiency, security and operational reliability, and must operate objective and public conditions for access and withdrawal. Securities settlement systems must meet the minimum conditions based on the Lamfalussy standards. In the Netherlands, these standards have been given shape in the oversight framework for Amsterdam Clearing & Depository (acd). In recent years, the settlement systems of Amsterdam Exchanges, united in Amsterdam Clearing & Depository, were tested by the Bank in conjunction with the Securities Board of the Netherlands with the aid of the above framework. Consequent on the merger into Euronext, the acd oversight framework was renamed the oversight framework Clearing & Settlement Euronext (csb).

Core principles for Systematically Important Payment Systems
The Lamfalussy standards have also been declared applicable to other (netting) systems. The principles relevant to payment systems have recently been updated by the central banks of the g10 in the Core Principles for Systematically Important Payment Systems report. Four standards relating to efficiency and management were added, of which the most important is that a system must operate irrevocable settlement on the value date, preferably several times a day and in any case at the end of the day. In addition, settlement must preferably take place in central bank money.

Recommendations aimed specifically at securities settlement systems
In addition, a joint working party of the g10 (central banks) and iosco (the securities supervisors) is currently working out recommendations aimed specifically at securities settlement systems. The intention is to supplement the core principles for payments with recommendations designed specifically for the settlement of securities transactions. With a view to, among other things, the need to minimise systemic risk, several specific issues are addressed, viz. the legal sustainability of the systems, transparency, systems access, governance, rules and regulations, and oversight. The recommendations will have to be incorporated in national legislation and other rules and regulations.

Scheme 1 Oversight tasks relating to securities clearing and settlement

<table>
<thead>
<tr>
<th>Transaction/trade form</th>
<th>Clearing/processing</th>
<th>Settlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock exchange transactions</td>
<td>Options and securities clearing</td>
<td>Net settlement</td>
</tr>
<tr>
<td>orc transactions</td>
<td>Processing (via Necigef)</td>
<td>Delivery-versus-payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Free-of-payment</td>
</tr>
</tbody>
</table>

1 Retail as well as wholesale securities and derivatives transactions.
2 Only wholesale securities and derivatives transactions.
3 Such as Euronext Amsterdam Stock Clearing nv and Euronext Amsterdam Derivatives Clearing nv.
4 The stock-exchange-related net settlement of clearing members active on the stock exchange on the basis of netting results in one transaction per clearing member, per security type or options series. With regard to the clearing member’s net position, both the securities and the money leg are settled after three working days (for options this is one working day) on the basis of the Delivery-versus-payment principle.
5 Delivery-versus-payment: the money is transmitted when the presence of the securities has been established.
6 Free-of-payment: the delivery of the securities is not linked to the payment of the transaction.
public confidence in banks and hence determines whether financial institutions have a sound financial basis. Individual credit institutions (which, for example, function as clearing member) and their subsidiaries are examined on a consolidated basis.

Securities settlement systems: Euronext
Consequent on the merger between Amsterdam Exchanges, the Belgian bxs exchange and Parisbourse into Euronext, the settlement structure will change as well. The cross-border nature of settlement imposes requirements on risk management and on the legal and operational sustainability of (national) systems and rules. Preparations for the establishment of a single clearing system (Clearnet 21) are currently in full swing. As from 1 January 2001, the French clearing house Clearnet SA will function as central counterparty for all transactions effected on the stock exchange floors. This means that the assets and liabilities of the national clearing houses (in the Netherlands, this used to be aex-optieclearing (aex Options Clearing) and aex-effecten-clearing (aex Securities Clearing)) will be transferred to Clearnet SA. It is important that as from the above date the new central counterparty function meets the requirements of legal sustainability, risk management and operational reliability, and whether the possible risks are transparent. An assessment is currently being made by the Bank in conjunction with the Securities Board of the Netherlands as overseers, together with the relevant overseers from France and Belgium. When the Rule book, effective for all clearing members as from 1 January 2001, is introduced, which includes three ‘national’ chapters, requirements will also be imposed on the correct interpretation and implementation of the legal instruments, given the cross-border character of the rules. This is to be assessed by the relevant overseers. As from 1 October 2001, an entirely new Rule book will be in force, containing a single set of rules, providing for a uniform risk management structure, leading to the definitive implementation of the Clearnet 21 clearing system. Until then the national clearing methods will remain operational. The securities leg will take place in the country where the clearing member is established. Complete integration of settlement activities is planned for 2003. Where risk management is concerned, the Bank has been acting as settlement bank of aex Options Clearing since 10 July 2000 for the settlement of payments; it has been doing so for aex Securities Clearing since 1 March 1999. It is Euronext’s intention that in the future payments continue to be settled in the systems of the central banks involved.

The continuity of a system as a whole must be guaranteed at all times as well as on a cross-border basis. That goes for Euronext too. Oversight rules therefore need to be harmonised. The Bank is consequently consulting with the other overseers and supervisors involved about the shape to be given to oversight on settlement systems with an international character, such as Euronext. Together with the Securities Board of the Netherlands, the Bank was given the formal competence to exercise oversight on the Dutch-based securities settlement systems of the Dutch stock exchange. This competence is the consequence of one of the conditions set by the Minister in 1997 when the stock exchange was officially recognised under the 1995 Act on the Supervision of Securities Trade. The shape of this oversight competence has been formulated in greater detail in the oversight framework for aex Clearing & Depository.

The Minister recently ‘issued’ a new stock exchange recognition for the establishment of Euronext. The new organisation is recognised with the proviso that, with a view to controlling systemic risk, the settlement systems of Euronext and Euronext Amsterdam nv must, in respect of the transactions effected from the Netherlands, meet the requirements of the oversight framework for Clearing & Settlement Euronext. This means that the Bank and the Securities Board of the Netherlands combined have the formal competence to exercise oversight in the new situation too. Plans for changes to clearing and settlement activities, i.e. risk management, operational reliability and legal sustainability must consequently be verified.

Settlement via gross and net payment systems
With a view to boosting the well-functioning of payments and reducing systemic risks, the ECB and the central banks have developed gross settlement systems for large-value payments at the EU level. These are payments which are settled via systems where the average amount per transaction is relatively high. In the Netherlands, large-value payments are settled by the banks via TOP, the Nederlandsche Bank’s gross settlement system (Real-Time Gross Settlement System (RTGS)). TOP is part of TARGET, the RTGS system linking all EU countries. TARGET is a fast, efficient and safe European payment system which works real-time. Apart from these gross systems, large-value payments are also settled via netting systems, such as the Euro 1 (EBA) system, Euro Access Frankfurt (EAF) and Paris Net Settlement (PNS). It is characteristic of net systems that the debit and credit positions are netted out (clearing). This is done once or several times a day.
The figures on target and Euro 1 (Tables 3 and 4) show that target accounts for the largest share in terms of turnover and numbers of transactions. The highest growth rate was, however, recorded by Euro 1.

Banks lead the largest payments via target. Medium-sized payments are also routed via Euro 1 in particular. It may be assumed that banks opt to lead their largest payments via target because of its greater rapidity, security and efficiency. That is because target engages in gross settlement, which means that individual payments are effected in the system upon receipt. A gross payment system thus contributes materially towards reducing systemic risk and boosting financial stability.

As netting systems can in principle entail larger risks than gross systems, criteria were drawn up in the past for the testing of these systems in terms of adequate risk management and reduction (the Lamfalussy standards mentioned earlier). The current netting systems are adequate in terms of risk management in that debit and credit caps have been installed, and requirements are imposed on collateral. The settlement of amounts which have been cleared also meets the requirements towards reduction of systemic risk because settlement is in central bank money; in the case of Euro 1, settlement is effected in the books of the ecb.

**Legal base for oversight**

Also with a view to the management of systemic risk, and hence the maintenance of financial stability, it is recognised that the Bank’s formal competences with respect to checking payment and securities settlement systems be laid down in statutory instruments governing its oversight tasks. An Act on the supervision of settlement systems is now being prepared, providing for the assessment of payment and settlement systems.

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**Table 3 Number of payment via target and Euro 1**

<table>
<thead>
<tr>
<th></th>
<th>TARGET total</th>
<th>TARGET cross-border</th>
<th>TARGET domestic</th>
<th>Euro 1 (eba)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>9.8</td>
<td>1.6</td>
<td>8.2</td>
<td>3.3</td>
</tr>
<tr>
<td>II</td>
<td>10.3</td>
<td>1.8</td>
<td>8.5</td>
<td>4.3</td>
</tr>
<tr>
<td>III</td>
<td>10.8</td>
<td>2.0</td>
<td>8.8</td>
<td>4.7</td>
</tr>
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<td>IV</td>
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<td>2.1</td>
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<td>5.4</td>
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<td><strong>2000</strong></td>
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<td></td>
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<tr>
<td>I</td>
<td>11.7</td>
<td>2.4</td>
<td>9.3</td>
<td>5.8</td>
</tr>
<tr>
<td>II</td>
<td>11.9</td>
<td>2.6</td>
<td>9.3</td>
<td>6.2</td>
</tr>
<tr>
<td>III</td>
<td>11.9</td>
<td>2.6</td>
<td>9.3</td>
<td>6.1</td>
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</tbody>
</table>

Source: Nederlandsche Bank, ecb.

**Table 4 Turnover via target en Euro 1**

<table>
<thead>
<tr>
<th></th>
<th>TARGET total</th>
<th>TARGET cross-border</th>
<th>TARGET domestic</th>
<th>Euro 1 (eba)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1999</strong></td>
<td></td>
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</tr>
<tr>
<td>I</td>
<td>60.7</td>
<td>22.0</td>
<td>38.7</td>
<td>11.0</td>
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<tr>
<td>II</td>
<td>58.9</td>
<td>22.8</td>
<td>36.0</td>
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<td>IV</td>
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<td><strong>2000</strong></td>
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</tr>
<tr>
<td>I</td>
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<td>26.9</td>
<td>38.4</td>
<td>12.2</td>
</tr>
<tr>
<td>II</td>
<td>66.2</td>
<td>28.1</td>
<td>38.1</td>
<td>12.8</td>
</tr>
<tr>
<td>III</td>
<td>65.0</td>
<td>27.6</td>
<td>37.4</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Source: Nederlandsche Bank, ecb.

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3. Named thus for the German Bankhaus Herstatt; the risk described came true when Herstatt failed in 1974.
Asset price inflation on the equity and real estate markets: risks and policy implications

In the past, the financial stability of countries was seriously endangered at times by crises on the markets for financial assets and real estate. The crash of 1929 and – more recently – Japan’s real estate crisis in the nineties are but two examples from a series of bubbles that, on bursting, rocked the foundations of the financial system, dragging along the real economy into a downward spiral. In recent years, sharp rises of equity and house prices in the Netherlands – as elsewhere – have raised the question whether these price developments are still underlain by economic fundamentals or whether they are the result of so-called asset price inflation. In addition to examining the latter possibility, this article explores the economic consequences of asset price inflation and how the monetary and supervisory authorities might act in response. The article consists of three sections. The first shows that asset price inflation is hard to establish with precision, explaining that, at best, statistical analysis helps ascertain the likelihood of the existence of asset price inflation in the Netherlands. The second section deals with the relationship between asset price inflation, the real economy and financial stability. The third and final section briefly dwells on the possible policy implications of asset price inflation.
A closer look at asset price inflation

What is asset price inflation and what makes measuring it so hard?
Asset price inflation may be defined as price rises of financial assets not underlain by the level and development of their underlying or intrinsic value. This definition applies to equity as well as other assets, such as real estate. From this definition it follows that asset price inflation – or a bubble – is in evidence when equity prices are on the increase while these prices (or price/earnings ratios) already exceed their intrinsic value. This is why, in actual practice, asset price inflation is so hard to measure, for a share’s intrinsic value is determined by the normal profit expectations for the enterprise concerned and by normal rate of return required by investors. What is normal and what is not, is debatable. The complexity of arriving at an exact measure is compounded by the dynamic of the asset price inflation process. After all, in practice, new facts continually keep coming up that may alter market expectations and investor demands.

A measure for asset price inflation should therefore serve to ascertain whether the expectations on which the price rises are based, are supported by developments in the real economy. If it turns out they are not, then the price rises must be considered economically irrational. Investors are also guided in that case by criteria other than the intrinsic value of equity. For example, investors may go by extrapolations of equity prices or by decisions of reputedly well-informed market parties.

Economic irrationality according to the definition used here does not imply that investors make the wrong decisions. In the first place, the calculation of the intrinsic value of equity is a time-consuming process attended by a great deal of uncertainty and, hence, involves costs. Therefore, simple rules of thumb may yield considerable cost savings, especially for small-scale investors. Secondly, an economically irrational investor may in practice well realise price gains. If a share’s current price exceeds its intrinsic value and the investor buys it in anticipation of a further price rise – and rightly so, as later turns out – then the transaction is profitable with hindsight. However, this does not alter the fact that, initially, the transaction was economically irrational, because the expectation was founded on market psychology rather than on economic grounds. Displayed on a larger scale, this behaviour generates a bubble on the equity market. The resulting situation is one characterised by instability, because the bubble is sensitive to a sudden reversal of market sentiment. Such a sudden reversal is not, however, inevitable, for a period of asset price inflation may just as well end with a ‘soft landing’. In that case, actual stock price prices rise less sharply than the intrinsic value until equilibrium is restored.

Economically rational explanations for recent equity price rises
There are two seemingly plausible, but less well verifiable explanations for the stock price rises in recent years. These price rises might in the first place be attributable to investors being less wary of risks entailed by equity than in the past. In economic terms: the modern-day investor is willing to settle for a lower risk premium. The risk premium is the yield difference between equity and risk-free investments as expected by investors. It compensates for the uncertainty of the expected equity yield, on the plausible assumption that investors are averse to risk. A lower risk premium implies that, at a given risk-free rate of interest, investors settle for a lower expected rate of return on equity. Consequently, at a given corporate earnings level, this may justify a higher equity price. In other words, a lower risk premium is attended by a higher price/earnings ratio.

There are various possible reasons why the risk premium may have decreased. For one, the public has grown more familiar with investing in equity. Also, their increased wealth enables more people to engage in long-term investment. Research has shown that risk aversion declines as incomes rise. Finally, the strong growth of collective investment schemes has increased the opportunities for portfolio diversification and has reduced transaction costs and, thus, the risk for the individual investor.

While these factors may serve to account for a lower equity risk premium, it cannot be directly ascertained if the risk premium has actually decreased. In retrospect, only the actual difference between the yield on equity and that on bonds can be established. This difference is not necessarily equal to the ex ante risk premium expected by investors. Only if a sufficiently long period is considered, is it reasonable to assume that the average actual difference between the yield on equity and the risk-free interest rate will be approximately equal to the average expected risk premium. If it were not, this would mean that, over a long period, investors’ expectations would be consistently surpassed or frustrated, which does not seem plausible.

The other economically rational explanation – besides a lower risk premium – for the current high price/earnings ratios is that investors have raised their
Asset price inflation on the equity and real estate markets

expectations as to corporate profit growth. There are three factors that potentially support this explanation. First, cyclical effects may have come into play. During the initial phase of a cyclical upturn, short-term expectations are for above-average economic growth and, consequently, for relatively high corporate profits. As a result, price/earnings ratios will be higher than just before a cyclical downturn. Second, the growth of corporate profits may outpace that of the economy as a whole, causing corporate profits to account for a larger share of national income. This situation may arise, for example, when real wage increases lag behind economic growth.

A third possibility is that the expected economic growth – and thus the growth of corporate profits – attains a high level and stays there for a prolonged period. In the current situation this might be explained with the aid of the notion of the ‘new economy’. In this view, a period has dawned in which the growth of labour productivity has reached a sustainable higher level, permitting higher economic growth without kindling inflation. This situation is underlain, among other factors, by the ICT revolution and its attendant new goods and services – like mobile telecommunication devices and Internet applications – which potentially lead to enhanced efficiency in the ‘old’ sectors. In addition, labour productivity growth speeds up as globalisation and deregulation progress, bringing increased price competition and greater transparency of markets.

To what extent is the notion correct that more favourable earnings expectations have justified the sharp increase in equity prices of recent years? There can be no denying that cyclical effects have boosted the intrinsic value of equity in the nineties, when a relatively high economic growth rate was recorded for a prolonged period. Given the recent growth forecasts of such institutions as the Nederlandsche Bank and the Netherlands Bureau for Economic Policy Analysis, the impact of this positive cyclical effect should now be levelling off somewhat. It is in any case evident that now – after many years of booming economic conditions – it can no longer be argued that we are in the initial phase of a cyclical upturn. The sustained increase in corporate profits as a percentage of national income recorded since the eighties may equally well have contributed to the recent rise of equity prices. However, going by the latest economic projections, this effect, too, may have ebbed away now.

As regards the ‘new economy’, it is plausible that ICT, just as the application of electricity, is to be seen as a breakthrough technology, i.e. a technology with the potential to innovate and support the economic development process. At this juncture, there is no clear evidence, though, that the Netherlands is really witnessing a sustainable, higher productivity growth at the macro-economic level, which would justify expectations of higher profit growth. It may well be that the impact of ICT on macro-economic labour productivity takes long to materialise, e.g. because the costs of adjustment are high and the necessary learning processes are complex and time-consuming. This does not alter the fact that there are Dutch businesses that bear all the marks of a ‘new economy’, with strong ICT-driven productivity growth. For the Netherlands as a whole, however, it is too early to conclude that a ‘new economy’ with a sustainable, higher growth path has emerged. This means that rational investors may reasonably reckon with higher-than-usual profit growth at specific enterprises, which might warrant a higher equity price. On the whole, there is insufficient ground, though, for a strong price boost for Dutch equity on the basis of expectations of a sustainable, higher profit growth.

Explanations for asset price inflation based on economically irrational behaviour

While the foregoing shows that there may be an economic rationale for the recent price rises, it is also possible that the equity markets are characterised by irrational exuberance. Well-known examples are the euphoria prevailing on the equity markets in the twenties, which was followed by the crash of 1929, and the sanguine mood on the stock exchange in the eighties, which ended in Black Monday in 1987. The ‘proof’ of economic irrationality preceding these crashes lies not so much in the fact that these substantial downward price adjustments took place, but rather in the absence at the time of events warranting corrections of that magnitude.

Asset price inflation, or a bubble, may evolve in the aftermath of economic developments – be it monetary, be it real – that boost equity prices. Irrational exuberance is what ensues if these initial, often rational, price rises spark off a process of further price rises that are no longer economically rational. This process may thrive on the uncertainty about the intrinsic value of equity. Here, psychological factors play a crucial part. For example, the most recent equity price tends to become a ‘nominal anchor’ for decision-making, in the sense that this price is often regarded as a basis in assessing the equity price level. Besides, price gains often evoke regret
and envy among non-investors, who are thus induced to invest as well.

The process by which investors and market analysts shape their expectations, is another catalyst in generating irrational exuberance. First, expectations are often adaptive; in other words, investors use results from the recent past as a criterion for expected future results. As a consequence, recent price rises contribute to further price rises. This also emerged from a recent survey held by the Nederlandsche Bank among homeowners, which showed that 60% of households expected house prices to rise further, whereas at the same time 57% thought houses were overvalued. A second aspect of the way in which expectations are formed is that investors often rely on the views of other people who in their eyes have access to better information. This is not necessarily a poor strategy. As – especially for the small investor – it is not feasible to judge the abundance of information on its merits, it may be sensible to copy the behaviour of others with more time or means for investment analysis.

Asset price inflation in the Netherlands?
From a historical analysis of Dutch stock exchange prices it appears that the rise has been quite steep since the eighties. Chart 1 shows that after the depression in the thirties it took about half a century for prices to increase tenfold, whereas current stock exchange prices are already almost ten times those obtaining in 1983. Stock exchange prices in other industrialised countries show a similar pattern.

The increase in the average price/earnings ratio of Dutch equity points to asset price inflation (see Chart 2). Whereas in the period 1973-93, price/earnings ratios over 12 or 13 were exceptional, in 1999 this ratio attained an average value of almost 30. This sharp rise is to be attributed mainly to technology, media and telecom (tmt) stocks (see Chart 3), which also accounted for much of the increase in the Dutch stock market price index until 1999 (see Chart 4). It should be noted in this connection that it is hard to determine the intrinsic value of these stocks, also because the present corporate profits in this sector (often, losses) are not a reliable indicator of expected yield. Furthermore, tmt is the...
very sector where stock prices have fallen sharply since the end of 1999, causing price/earnings ratios to drop.

Besides the price/earnings ratio proper, Chart 2 shows the development of the two main underlying determinants of this ratio. gdp growth is a gauge for the development of earnings, while capital market rates may be regarded as the risk-free yield. Roughly, a higher gdp growth rate should have a positive effect on the price/earnings ratio, while the reverse should hold for capital market rates. The striking increase in price/earnings ratios in recent years, however, is not consonant with the relatively stable gdp growth in that period and the no more than moderate decline in capital market rates.12 The high price/earnings ratios can only be rationally explained if the future profit growth can be reasonably assumed to exceed today’s, or if the risk premium required for equity has dropped.

A second indicator of asset price inflation is provided by yield gap analysis; such analysis suggests that at present bonds are a better investment than equity. The yield gap, which is defined as the difference between dividend yield (expected dividend divided by price) and bond interest rates, is indicative of the relative valuation of the equity and the bond market (but does not measure the over- or undervaluation of the individual markets). In the past, a yield gap between 0.52 and 0.62 used to be typified by analysts as neutral.13 Below 0.52, bond investments are relatively attractive; above 0.62, equity is preferred. Chart 5 shows that, in the eighties, bonds were almost continuously less attractive than equity. In the nineties, this was just the other way round.

Since the end of 1999, the measure of overvaluation of equity has somewhat declined, because prices have barely risen since, if at all. This might suggest that the stock exchange is in for a soft landing, air being gradually released from the bubble. However, alternative scenarios, in which downward price corrections occur, or the bubble resumes its growth, are equally well conceivable.

**Equity prices, the real economy and financial stability**

It is known that booms and busts in equity prices may be attended by significant changes in the real economy. During a boom, the economy is thriving, but during a bust it may be finding itself in a period of deep and protracted recession. This section seeks to answer the question whether there is a causal connection between asset prices and real economic variables, such as consumption and gross domestic product.

Economists usually distinguish between three channels through which asset prices may influence the real economy. The first is the wealth effect on consumption. As the wealth of households grows, e.g. owing to a rise in equity or house prices, consumption will grow, too, because consumers will spend part of that extra wealth. The impact of this wealth effect will depend on such factors as the amount of the equity holdings and its distribution among households. The second connection between asset prices and the real economy is determined by the costs and availability of loans, i.e. the so-called balance sheet channel. Due to imperfec-
tions on credit markets, financially strong borrowers find it easier to obtain low-cost funding. A third channel between asset prices and the real economy is constituted by the effect of capital costs on investment. An increase in equity prices enables an enterprise to finance new investment at relatively low costs by issuing new equity. However, in practice there is little empirical support for the existence of the latter relationship. Therefore, this article will not pursue this issue further.

Wealth and equity holdings of households
Chart 6 shows that, at the end of the nineties, family households in a number of industrialised countries had accumulated wealth varying from 4.5 to 6.5 times their disposable incomes. Between 1994 and 1999, Dutch households saw their wealth increase from approximately 3.5 to 5 times their disposable incomes. Such an increase basically arises from two sources: savings from income and net capital gains. Illustrating the relative importance of the two components, Table 1 presents a breakdown of the increase in wealth between 1995 and 1998. There appear to be considerable differences between countries. In the United States, almost 90% of the increase in wealth is accounted for by higher asset prices and only 10% by savings from income. In the Netherlands, too, the increase in wealth was primarily the corollary of price developments on the equity and real estate markets. Only a quarter of the increase came from savings from income. This implies that particularly in the United States and the Netherlands the wealth of households is sensitive to changes in equity and real estate prices. By the same token, a rapid correction of these prices might reduce household wealth drastically in a short period.

Equity prices and consumption
Capital gains will eventually induce households (if not the present, then successive generations) to step up consumption. If this effect is substantial and makes itself felt in a short time span, fluctuations on stock exchanges may influence consumption behaviour considerably. As, in practice, many households hardly invest in equity, if at all, for them the direct wealth effects will probably be limited. It is conceivable, though, that stock exchange developments yet have an impact on the expenditure of these households, by way of enhanced consumer confidence. Those not holding equity can benefit from the function of equity prices as a useful indicator of the level of economic activity. Growing confidence in future developments, such as expectations of more favourable real wage movements, a lower risk of unemployment or higher yields on investments will boost expenditure on durables in particular.

Estimations based on macroeconomic time series for the United States and the United Kingdom indicate that a 100-dollar increase in absolute terms boosts consumption by 4 dollars. Supposing an equally strong effect in the Netherlands, a rise in equity prices by 10% would lead to 0.4% higher consumption. A recent analysis using the macroeconomic model of the Nederlandsche Bank indicates a more limited effect: after four years, a rise in equity prices by 10% makes consumption go up by 0.3%. For that matter, recent evidence in the United States points to a less strong impact of the equity market boom in the nineties than had been expected on the basis of earlier estimates of

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wealth effects. One explanation adduced for this phenomenon is that investors take a future drop in equity prices into account. Another plausible explanation lies in the fact that much of the wealth of American households is invested in long-term savings schemes, such as pensions.17

Equity prices, lending and financial stability
The second relationship between asset prices and the real economy is the balance sheet channel. This term refers to the costs and availability of external finance for households and enterprises. Credit is essential for the economy to operate efficiently. A diminishing propensity on the part of banks to grant loans will have a negative impact on economic activity. The balance sheet channel is based on the fact that lenders and borrowers do not have the same information. For example, an enterprise will always be better informed about the profitability of its investment projects than will the banks, bondholders and shareholders providing the external funds. The same reasoning applies to households. These imperfections in the financial markets in general cause external funding (loans and equity) to be more expensive than internal funding (retained profit).

The difference in costs between internal and external funding also depends on the financial position of the enterprise or household. Enterprises or households that are already in a favourable financial position in terms of liquidity and solvency, can raise funds more easily and at lower cost. For example, they are better able to use assets, such as equity or real estate, as collateral for a loan. A strong financial position or the provision of collateral also serves as a safeguard for lenders that the borrower will not assume undue risk, since he stands to lose more if the project fails. For enterprises and households, depreciation of financial and real assets implies not only a loss of wealth, but also a loss of creditworthiness. This may have a restraining effect on lending and thus on the real economy.18

Plummeting asset prices may also affect the soundness of financial intermediaries (like banks) and, consequently, constitute a potential hazard for financial stability. First, there is the direct effect: many banks invest for their own account on securities markets or derive income from securities transactions and equity issues for others. If equity prices tumble, they must take losses on their investment portfolios while issuing activity will drop sharply. The second channel is indirect. An asset price drop may get households and enterprises into payment problems, because they may be tempted to take greater risks, since the value of their loan collateral has declined and, consequently, a lower amount of their wealth is at stake. As a result, banks and other financial intermediaries may be faced with irrecoverable loans. If these two effects erode the financial positions of financial intermediaries to the extent that doubts arise as to their solvency, the stability of the financial system is in jeopardy.

The actual seriousness of the risk of financial instability depends on a number of factors. The principal factor is the financial starting position of banks, enterprises and households. The healthier their financial

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Table 1 Breakdown of increase in household wealth (1995-1999)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total increase in wealth¹</th>
<th>Of which² 'capital gains³ savings</th>
<th>Equity³</th>
<th>House prices³</th>
</tr>
</thead>
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<tr>
<td>United States</td>
<td>152</td>
<td>93</td>
<td>7</td>
<td>192</td>
</tr>
<tr>
<td>Japan</td>
<td>-23</td>
<td>-295</td>
<td>395</td>
<td>27</td>
</tr>
<tr>
<td>Germany</td>
<td>43</td>
<td>43</td>
<td>57</td>
<td>209</td>
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<td>France</td>
<td>68</td>
<td>44</td>
<td>56</td>
<td>243</td>
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<tr>
<td>United Kingdom</td>
<td>94</td>
<td>78</td>
<td>22</td>
<td>105</td>
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<tr>
<td>Netherlands</td>
<td>155</td>
<td>77</td>
<td>23</td>
<td>258</td>
</tr>
</tbody>
</table>

Source: authors’ calculations based on data of OECD and Netherlands Bureau for Economic Policy Analysis.

¹ Change in percentage points of the wealth (net real and financial wealth including houses) expressed as a percentage of nominal disposable household income.
² As a percentage of the total change.
³ Cumulative percentage change.
positions, the smaller will be the risk of a price fall having serious consequences. For that matter, at a capital adequacy ratio of approximately 11%, i.e. well over the Basel minimum of 8%, the Dutch banks are fairly well capitalised. The second factor is the impact of the above-mentioned direct and indirect effects. The direct risk run by banks on the equity market seems limited, although there are appreciable differences between countries (Table 2). In the United States and Belgium, banks scarcely invest for their own account, whereas in France, Japan, Germany and Sweden stock exchange investments account for a much higher percentage of total assets. The Netherlands is somewhere in the middle. The indirect risk depends, among other factors, on the criteria observed by banks in granting loans. As long as credits to households and enterprises are granted on the basis of their current and conservatively estimated future cash flows, the risks of payment problems will probably be contained. Things take a different turn if loans that take up too much of these cash flows are nevertheless granted, because they are collateralised (e.g. by a securities portfolio). In that event, there is a serious risk of payment problems arising the moment the value of the collateral drops.

Without financial stability being directly endangered, weakening financial positions of banks may have direct negative consequences at the macro-economic level. As banks must meet capital adequacy requirements, weaker financial positions may diminish their propensity to grant loans and, eventually, result in a credit crunch, with financial intermediation so disturbed that production processes are impeded by shortages of working capital, and profitable investment projects performed not executed owing to lack of money.

Where house prices are concerned mortgage lending is an important link in the transmission to the real economy. Compared to price gains on equity, an increase in the value of a house is less easily converted into consumption. For one, the transaction costs are high, and, secondly, a seller will need to buy a new home, at least if he is not going to rent accommodation. However, to benefit from the value increase, people may take out a new or a second mortgage. In recent years, Dutch households have increasingly opted for this possibility. In 1995, 56% of the newly concluded mortgages were not related to a house transaction, compared to only 36% in 1999. From a survey conducted by the Nederlandsche Bank, it emerged that 34% of the roll-overs or second mortgages concluded served to realise excess value.

In this way, expenditure in the period 1996-99 was boosted by an estimated 1.5 percentage points of GDP. In 1999, 0.6 to 0.7 percentage point of the 3.6% real GDP growth was directly attributable to households spending the realised excess value of their owner-occupied homes. Recently, a turning point was reached in this development, under the influence of higher mortgage interest rates (see the article entitled Recent developments elsewhere in this Quarterly Bulletin).

Table 2 Equity holding of the banking system, 1997

<table>
<thead>
<tr>
<th>Country</th>
<th>In percentages of total financial assets</th>
<th>In percentages of gross domestic product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>0.3</td>
<td>1.9</td>
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<td>Canada</td>
<td>2.9</td>
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<td>8.0</td>
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<td>France</td>
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<td>3.5</td>
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<tr>
<td>Japan</td>
<td>5.3</td>
<td>9.2</td>
</tr>
<tr>
<td>Netherlands</td>
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<td>9.3</td>
</tr>
<tr>
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<td>0.5</td>
</tr>
<tr>
<td>Sweden</td>
<td>7.7</td>
<td>7.2</td>
</tr>
<tr>
<td>Switzerland</td>
<td>4.0</td>
<td>11.7</td>
</tr>
</tbody>
</table>

Source: National ‘Flow of Funds’ figures and annual reports.

Simulations of the consequences of lower asset prices).
In the foregoing, the principal channels were outlined along which equity prices may influence the real economy. These are partial analyses that only cover the effects on consumption or investment behaviour. Besides, the international dimension of the problem has been left out of consideration. Table 3 gives an impression of the correlation between the price movements on the various national equity markets in the period 1985-99. The movements in the Dutch equity market prove to be highly correlated with those in its European and Anglo-Saxon counterparts. This roughly indicates that the Dutch equity market may be relatively sensitive to international developments. Having been calculated for a prolonged period, these correlations apply under ’normal’ circumstances. At times of serious tensions, such as a stock exchange crash, the correlation between markets seems to increase dramatically. An equity price collapse in one market provokes a massive run away from equity in other countries, causing a sharper fall of prices than would be expected on the basis of the historical pattern.
While the increased correlation during volatile periods may reflect the integration of economies (trade relations, similar production structures) and, consequently, have a fundamental cause, it may also be a mark of economically irrational behaviour (herd instinct) of investors.

The strengthened correlation between equity markets observed during a crash signifies that a realistic analysis of a stock exchange crash should proceed from a worldwide price fall. Using its MORKMON model, the Nederlandsche Bank has calculated the effects of a worldwide equity price fall by 40%. The resulting scenario is extensively described elsewhere in this Quarterly Bulletin (see: The Netherlands economy in 2000-2002: a forecast based on MORKMON). The principal transmission channel in this scenario is the wealth effect on consumption, which contributes to a 1.2% lower spending level in four years’ time. As, outside the Netherlands, economic activity also contracts, Dutch exports decline sharply. Due to lower consumption and exports, besides other factors, after four years the crash leads to a real GDP decrease by 1.4%.

The OECN presents a scenario in which stock exchange prices in the United States drop by 30% and those in the other 67 countries by 15%. In the absence of a policy response by the central banks, the impact of the crash on real GDP is considerable (Table 4). The transmission channels are the negative wealth effects on consumption and investment. Measured over a period of three years ahead, the American GDP loss is 2.4%, the Japanese 1.2% and the European 0.9%. However, a great deal of the economic damage may be prevented by an accommodating monetary policy, consisting of interest rate cuts in the United States and Europe (Table 4). The attendant costs – in terms of additional inflation –

### Table 3 Correlations between equity prices, 1985-99

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>UK</th>
<th>JP</th>
<th>DE</th>
<th>FR</th>
<th>IR</th>
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<td>0.20</td>
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<td>Netherlands</td>
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<td>0.30</td>
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<tr>
<td>Sweden</td>
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<td>0.19</td>
<td>0.26</td>
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</tbody>
</table>


### Table 4 Effects of a worldwide fall of stock prices

(Cumulative changes in percentages)

<table>
<thead>
<tr>
<th></th>
<th>year 1</th>
<th>year 2</th>
<th>year 3</th>
<th>year 4</th>
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<tr>
<td><strong>A. Equity prices in US –30%; in other countries –15%, Monetary policy not eased</strong></td>
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<tr>
<td><strong>Real GDP</strong></td>
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<td>-2.0</td>
<td>-2.4</td>
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<tr>
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<tr>
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<tr>
<td>Japan</td>
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<tr>
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<tr>
<td><strong>B. Equity prices in US –30%; in other countries –15%, Monetary policy eased</strong></td>
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<tr>
<td><strong>Real GDP</strong></td>
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<tr>
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<td>-0.2</td>
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<tr>
<td><strong>CPI</strong></td>
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<td>Japan</td>
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<td>Euro area</td>
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<td>-0.1</td>
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Source: Authors’ calculations based on OECN (1999).
are lower than might be expected. Measured over a period of three years, the American GDP loss is now as little as 0.6% – a quarter of the outcome of the first scenario. The same pattern applies to the euro area: measured over a period of two years, GDP declines by 0.3% instead of 0.8%, while inflation does not rise appreciably.

Given the considerable weight of owner-occupied homes in household wealth and the strongly risen house prices since 1997, it is also interesting for the Netherlands to gain an impression of the consequences of a sharp fall of house prices. This is also analysed in The Netherlands economy in 2000-2002: a forecast based on MORKMON. The scenario proceeds from a house price fall by 40%. Lower house prices feed through into consumption via the wealth effect. Owing to the decrease in the market value of houses relative to their replacement value (building costs), investment in new houses declines as well. In the course of four years, these negative effects eventually add up to 2% of GDP.

On the whole, the scenarios indicate that corrections of equity and real estate prices may have considerably negative macroeconomic effects. At the assumed scale of the corrections (40%), these model simulations show no significant consequences, though, for the stability of the financial system.

Asset price inflation and the central bank’s policy

In planning its monetary policy, a central bank first and foremost considers asset price developments insofar as these affect expected inflation. The reason for this approach is that expenditure and inflation are influenced by wealth effects. Besides maintaining price stability by its monetary policy, the central bank’s mission also consists in maintaining financial stability. Consequently, one important argument for a policy response to asset price inflation is that a possible stock exchange crash or a crisis on the real estate market jeopardises the stability of the financial system. The longer the bubble lasts, the more painful the consequences will be when it bursts. In other words: prevention is better than cure. As experience with the real estate crises in Japan in the nineties has shown, the macroeconomic costs of a seriously weakened financial system may be quite formidable.

Nonetheless, central banks will in practice exercise restraint in responding to asset price inflation on equity or real estate markets, also from the viewpoint of financial stability. Although central banks take a clear view of the sustainability of asset price developments – and occasionally make this public – these developments are nevertheless often surrounded by uncertainty. As this makes it hard to identify price rises officially as bubbles, policy focuses on curbing the damage from any burst bubble, rather than on the need to burst bubbles at an early stage. This article already pointed out that the deflationary consequences of negative financial shocks are more serious when the financial positions of financial intermediaries, enterprises and households have already weakened. This implies that both the private and the financial sector must have the resilience to sustain a sharp fall of asset prices without too much difficulty. This is not a duty of the monetary authorities alone, but also of the banking supervisory agencies, which – as at the Nederlandsche Bank – are often combined in the central bank. Adequate microprudential supervision must make sure that each bank has a sufficiently strong capital base to absorb unexpected losses, which is in the right proportion to the risks to which the bank concerned is exposed, and that it observes adequate criteria for lending.

Immediately after an actual crash on the financial or real estate market, a central bank will need to respond if financial system stability is in serious jeopardy. Thus, the American central bank cut interest rates after the stock exchange crash in 1987. Twelve years later, it acted likewise in response to the aftermath of the crisis in Russia. This easing of monetary policy in a financial crisis situation may also be designed to counteract the deflationary pressure of the (negative) wealth effects. However, there is no generally applicable recipe for the policy response to a crash, since it will largely have to depend on circumstances, as well as on the expected nature and scale of any subsequent crisis.

Conclusions

Asset price inflation on the equity and real estate markets is defined as a process of price rises not underlain by the level and development of intrinsic value. Depending on such factors as estimated profit growth and the rate of return expected by shareholders, the intrinsic value of equity cannot be measured with precision. Consequently, it is not possible to establish with certainty when specific price rises are economically rational (i.e. retraceable to their economic fundamentals) and whether economic irrationality comes in. It proves difficult to demonstrate on the basis of a historical analysis that the recent strong price rises are entirely attributable to a lower risk premium or...
to higher profit growth expectations. Therefore, these price rises appear to be, in part, 'economically irrational'.

A downward correction of overvalued asset prices to a more fundamental level may have serious consequences for the real economy and endanger financial stability. Equity prices influence the wealth of, and thus expenditure by, consumers and enterprises. Consequently, a stock exchange crash will have adverse effects on consumption, investment and GDP. Lower stock exchange prices also influence lending to consumers and enterprises, who, due to their weakened balance sheet positions, will be less capable of financing their expenditure. This, too, will slow down economic growth. Plummeting asset prices may equally well affect the financial soundness of financial intermediaries, putting the stability of the financial system at risk.

As, in practice, the extent of asset price inflation is hard to determine, the central bank will exercise restraint in its immediate response to asset price movements. The central bank's policy will primarily be targeted at controlling the risks inherent in asset price inflation and at seeking to ensure flexible private and financial sectors that have the financial reserves to absorb a sharp fall of asset prices.

1 This article is based on a study conducted on behalf of the Financial and Monetary Studies series, which is set to be published in the course of 2001.
2 Another accepted definition of rationality is that all (publicly) available information is used. According to this definition, rational bubbles are possible if investors make optimum use of their knowledge of the psychology of the market. Hence, this article expressly refers to economic (ir)rationality.
3 These are general statements applying to all types of equity. In addition, business-specific developments may, of course, be of influence on the value of an individual share.
4 The yield per equity is constituted by the dividend and the price gain compared to the purchase price. A government bond is a good proxy for a risk-free investment.
6 The estimated average risk premium for the Netherlands in the period 1880-1978 was just over 6%, varying from 3.1% in the period 1922-39 to 13.5% in the period 1947-60. See M.M.G. Fase and W.F.J. van de Poll, ‘De risicopremie op aandelen: een puzzel’, Economisch Statistische Berichten, 11 December 1996.
7 See Quarterly Bulletin, the Nederlandsche Bank, March 2000.
8 This is also noted by the Netherlands Bureau for Economic Policy Analysis in its recent study of the new economy; see Central Economic Plan, Netherlands Bureau for Economic Policy Analysis, The Hague, pp. 162-81.
9 The American central bank governor, Greenspan, used this term for the first time in describing the behaviour of equity investors in an address delivered on 5 December 1996. Also see the following footnote.
11 See Quarterly Bulletin, the Nederlandsche Bank, June 2000.
12 A customary, rough approximation of the relationship between price/earnings ratio and its fundamentals, one that is still used in literature, is M. Gordon’s model (‘The Investment, Financing, and Valuation of the Corporation’, Irwin, Homewood, 1962). According to this model, the price/earnings ratio equals \(d/(g-r)\), where \(d\) is the ratio between dividend paid and profit, \(g\) the growth rate of GDP (profit growth), \(r\) the risk-free yield, and \(p\) the risk premium. For a survey of the recent literature in this field, see, e.g., J.Y. Campbell (2000), ‘Asset pricing at the millennium’, NBER Working Paper Series, No. 7590.
13 See, e.g., Het Financieele Dagblad of 31 March 1997.
16 P.J.A. van Els and M.C.J. van Rooij (1999), Twintig spoorboekjes voor de Nederlandse economie met morkmon in, Onderzoeksrapport WO&E, 604 (December), the Nederlandsche Bank.
19 See Quarterly Bulletin, the Nederlandsche Bank, June 2000, pp. 31-43.
21 See OECD, World Economic Outlook, No. 66, December 1999.
22 In this ozcr simulation, the Fed cuts short-term interest rates by 0.25% of a percentage point, and the ecb does so by 0.25 of a percentage point. The greatest gdp loss is suffered in the United States, due to the deeper price fall and the more widely spread equity holdings.
Globalisation prompts overhaul of international financial architecture

The international financial landscape has changed radically over the past decade. Due to the immense increase in international trade and cross-border capital movements, individual markets and countries have become closely interlinked. While this globalisation is conducive to prosperity, there are risks attached, as evidenced by the recent financial crises in Asia, Latin America and Russia. The protection of global financial stability hence requires the reinforcement of the international financial system. In view of its open economy and relatively large financial sector, this is undoubtedly important for the Netherlands too. The International Monetary Fund (IMF) is playing a pivotal role in further developing initiatives in the field of crisis prevention and crisis management. Steady progress has been made in this area during the recent period.
Trend towards globalisation a fact

During the last decade of the past century, the development of the international financial and economic landscape rapidly gained momentum. Whereas the aggregated worldwide export of goods and services amounted to USD 4700 billion in 1992, this figure had soared to almost USD 7000 billion in 1999. The volume of direct investment in emerging economies, which stood at USD 35 billion in 1992, had more than quadrupled to USD 150 billion in 1999. Even when adjusted for inflation, these data remain impressive. Moreover, turnover on the financial markets has surged. In the 1995-1998 period, average daily worldwide turnover in over-the-counter derivative markets doubled to USD 1300 billion. One can safely say that international capital movements have expanded enormously, blurring the borders between national markets and significantly intensifying the interconnections between countries. In other words, globalisation is under way (Chart 1).

The main reasons for this trend towards globalisation are the liberalisation of capital movements and technological developments, which have greatly reduced the costs of exchanging information. In itself, this trend is associated with major benefits. For example free and cross-border capital movements generate a more efficient allocation of capital, more competition and a more rapid spread of technology. Furthermore, market parties are better able to spread risks geographically. As such advantages offer chances for higher growth and more job opportunities, they are generally conducive to prosperity. Nonetheless, the process of globalisation can heighten the risks to financial stability. The greater integration of financial markets increases the chance that a disruption in one particular market will spread to others (contagion). The successive crises in Mexico (1995), Southeast Asia (1997), Russia (1998) and Brazil (1999) show that these increased risks must be taken seriously.

The emergence of these crises can largely be attributed to shortcomings in domestic policies that were incompatible with the new international environment. Prior to the crises, most of the countries listed above faced sharply rising current account deficits, attended by a large inflow of short-term foreign capital; they also had to contend with widening budget deficits and a fragile banking system. National authorities themselves therefore bear prime responsibility for preventing new financial crises by pursuing prudent macro-economic and financial policies. Nonetheless, the international financial community, particularly the IMF, also has a vital contribution to make in arming the international financial system against these heightened risks. To this end, the IMF has already developed a number of new initiatives, aimed at reinforcing institutions and policy measures in order to prevent financial crises wherever possible and, if need be, to resolve them adequately. This process is sometimes referred to as strengthening the architecture of the international financial system. During the IMF annual meetings held in Prague last September, it was decided to boost the Fund’s effectiveness by bringing its activities more into line with its core tasks, particularly the promotion of macro-economic stability and the reinforcement of (the supervision of) the financial sector.

Importance for the Netherlands

A stable international financial system is vital to the Netherlands. Due to its open economy and relatively extensive financial sector, the Netherlands makes a significant contribution to the international financial system. The open nature of the Dutch economy is, for example, reflected in the volume of trade (imports and exports) in relation to GDP. Using this indicator, the Netherlands ranks seventh in the world. Furthermore, the Netherlands belongs to the top ten countries in terms of external claims. The considerable size of the Dutch financial sector is indicated by data such as the
aggregated balance sheet total of all credit institutions registered in the Netherlands: at end-1999, this figure was almost four times as high as economic output. Added to that, the Dutch banking sector also has an important position internationally, taking seventh place in the global rankings of banks (based on its share in the aggregated balance sheet total of the world’s 50 largest banks). Partly because of this significant share in the international financial system, the Netherlands plays an important part in shaping IMF policy. The Dutch Minister of Finance has a seat on the IMF’s policymaking committee (IMFC), and the Netherlands has its own director on the IMF’s Executive Board (see Box 1), who also represents eleven other countries. Furthermore, within the context of the IMF, the Netherlands contributes to international financial stability by making part of its reserves available to finance Fund lending, and by giving technical assistance to emerging economies.

Crisis prevention

Under the motto ‘prevention is better than cure’, several initiatives in the area of crisis prevention were developed in recent years. These all arise from one of the IMF’s main tasks, namely surveillance, the continuous process of evaluating, and advising on, its members’ macro-economic and financial policies. Transparency and the use of international standards, focusing particularly on the financial system, are other instruments which can help prevent crises.

More transparency

The availability of timely and complete information is central to the efficient working of market economies. The advantages of transparency are twofold: first and foremost, greater openness has the effect of making national policymakers, financial market parties and international financial institutions more disciplined. Secondly, more transparency facilitates risk assessment: financial markets will be able to form a sharper judgement on the future performance of investments and the attendant risks. The IMF has recently intensified efforts to improve transparency on two fronts.

Firstly, the Special Data Dissemination Standard (SDDS) was made more stringent. This standard contains guidelines for the publication of 17 macro-economic key statistics in the field of the real economy, central government, the financial sector and external relations. To date, 47 countries have subscribed to the SDDS, 33 of which actually meet the standard. As of April this year, the Netherlands belongs to the latter group. With effect from April 2000, the SDDS was extended to include data on a country’s net usable reserves; this was prompted by the Asian crisis when it emerged, for

Box The Netherlands and the IMF at a glance

Foundation and membership

The IMF was established on 27 December 1945, when 29 countries (including the Netherlands) signed the Articles of Agreement in Bretton Woods (US). The IMF’s membership now numbers 182 countries.

purposes

The purposes of the IMF are: to promote international monetary cooperation; to facilitate the balanced growth of international trade; to promote exchange rate stability and to maintain orderly exchange rate arrangements; to further a free multilateral system of payments; and to grant temporary loans for the orderly correction of members’ balance-of-payments misalignments.

Organisation and Dutch input

The IMF is formerly presided over by the Board of Governors, on which the President of the Nederlandsche Bank has a seat on behalf of the Netherlands. Major policy decisions are taken by the International Monetary and Financial Committee (IMFC), which meets twice a year and in which the Netherlands is represented by the Minister of Finance. The day-to-day business of the Fund is taken care of by the Executive Board which comprises 24 Executive Directors, including one from the Netherlands, who also represents the interests of a twelve-country constituency. This constituency is now made up of Armenia, Bosnia Herzegovina, Bulgaria, Cyprus, Georgia, Israel, Croatia, Macedonia, Moldavia, the Netherlands, the Ukraine and Romania. Within the IMF, the voting weight of the constituency headed by the Netherlands amounts to 4.9%, with the Netherlands accounting for 2.4%.

1 See also www.imf.org and De internationale financiële instellingen (International Financial Institutions), A.F.P. Bakker, Netherlands Institute for Banking and Stockbroking (NIBE) 1995.
2 Derived from Article 1 of the IMF Articles of Agreement.
example, that the actual usable central bank reserves in Thailand and Korea were far lower than had generally been assumed. This was caused by major central bank transactions in forward contracts which countries, at that time, were not required to report under the SDDS. Consequently, monetary authorities are now expected to report monthly on their short-term (contingent) liabilities denominated in foreign currencies, along with the usable foreign exchange reserve assets. Moreover, experiences in Asia showed that data on external debt positions can be an important indicator for the emergence of a financial crisis. In the light of this, the IMF decided that, as of 31 March 2003, reporting of statistics on the external debt positions of the central government, the monetary authorities, the banking sector and the non-bank private sector would be required on a quarterly basis.

Secondly, the IMF has itself become increasingly open with regard to its assessment of the economic situation in member states, as reflected in its recent decision in favour of voluntary publication of its country information. While this gives market parties more timely and relevant information about these countries, more openness should not result in a situation where authorities, for fear of negative market reactions, give poorer quality information to the IMF or that IMF reports become less candid. To overcome this problem, authorities will be offered the right to have highly price sensitive information (especially if it relates to exchange rate and interest rate developments) excluded from the documents prior to publication.

**Development, implementation and assessment of standards**

In addition to the SDDS described above, the IMF took the initiative for two other sets of standards relating to monetary and financial policies (Code of Good Practices on Transparency in Monetary and Financial Policies) and fiscal policy (Code of Good Practices on Fiscal Transparency). Since other fora have likewise developed standards in other areas, a core set of 12 standards has been identified with a view to enhancing the chances of their implementation. This core set covers topics such as the transparency of monetary and financial policies, fiscal policy, data dissemination, and the supervision of the banking, securities, and insurance sectors. It is important that efforts to attain international standards must take account of a country’s individual circumstances, such as the degree of economic development and the priorities for reform. There should be enough leeway for reviewing which standard is most relevant to the needs of a particular country.

To make a real contribution to global financial stability, countries need to put these standards into practice. Both private market players and the public sector can be instrumental in this respect. For example, if the degree to which countries actually met standards were reflected in the market by an interest rate premium on capital market loans, national authorities would be encouraged to make more of an effort. This has hardly ever occurred up to now, mainly because the existence of these standards is not widely known among market participants. The public sector could contribute by giving plenty of publicity to the standards that have been worked out and, where possible, to the extent to which countries observe them. In this context, the IMF has now launched a project for evaluating the degree to which countries observe the diverse standards that relate to the Fund’s core competencies. These evaluations are recorded in Reports on the Observance of Standards and Codes (ROSCs), which can be of major significance for the IMF’s own internal surveillance. If these reports were to be published (as now occurs on a voluntary basis), market participants could use this information too. Another possibility is that the IMF directly involve the observance of standards in the reports of its annual consultation with member states which, as mentioned above, are published in principle. The public sector can obviously promote the observance of standards in other ways as well, such as through technical assistance given by national and international financial institutions.

**Financial sector strengthening**

The surge in international capital movements and the increasing integration of financial markets is not without risks. These risks are particularly evident in countries where the domestic financial sector is not sufficiently advanced to properly absorb capital inflows. These risks emerged during the financial crises in South Korea and Russia, for example. Partly because both the won and the rouble were pegged to the dollar, banks in these countries had drawn large amounts in dollar-denominated loans (at a low dollar interest rate), which were then lent out in won and roubles (at a high domestic rate of interest). When capital inflows reversed into outflows and the currency peg had to be abandoned, the banks got into serious financial difficulties, exacerbating the financial crises.

In view of the importance of a well-established financial sector for sustainable financial stability, the IMF has worked out a number of initiatives to help member states improve the stability and resilience of
the financial sector. In May 1999, the Fund launched the Financial Sector Assessment Program (FSAP) along with the World Bank. Under this programme, staff members from both institutions carry out a thorough evaluation of a country’s financial sector, analysing its strengths and weaknesses along with risk management and supervision. They also decide whether the sector would benefit from technical assistance and, where appropriate, advise authorities to take certain policy measures. At this moment, an FSAP has been conducted for 12 countries and the IMF recently decided to expand this to 24 other countries (on a voluntary basis) in 2001. The Netherlands makes an active contribution to this project by assigning experts from the Nederlandsche Bank. It should be noted that the FSAP reports are not published, since they contain strictly confidential information about private financial institutions, which – in order to maintain a level playing field and for supervisory and other reasons – may not be released. The IMF also began a pilot project on macro-prudential analysis. For this purpose, it is devising indicators for the health of the financial sector such as the banks’ supply of capital and the quality of the loans issued. In a separate development, the European Central Bank’s Banking Supervision Committee has set up a study group which is likewise engaged and which, where possible, cooperates with IMF staff members. A survey conducted by the IMF among its member states revealed that national authorities and market participants are not only notably interested in data on the funding and the profitability of financial institutions, but also in the financial positions of the counterparties with whom the banks do business. However, it emerged that the reporting burden could become considerable, since the demand for macro-prudential information is greater than the current supply of data. Based on these findings, the IMF is attempting to compile an adequate core set of indicators; to this end a balance must be found between usefulness on the one hand, and the (reporting) costs attached to macro-prudential indicators on the other.

Finally, the IMF recently decided to carry out evaluations of off-shore financial centres on a voluntary basis. These are centres where most of the financial transactions are conducted with counterparties who are not residents of the country concerned. As off-shore centres are often closely linked to on-shore centres, they can pose a threat to financial stability if supervision is deficient. At present, many of these centres still have a limited degree of transparency. The emphasis of the evaluations, which the IMF carries out in close cooperation with the local authorities, is on the supervision of the banking and insurance sector and of securities transactions.

Crisis management

Despite all these initiatives, the chance that, at some point, a financial crisis might break out again somewhere cannot be ruled out. It is crucial that, in this event, the IMF can take adequate steps to limit the damaging consequences. This crisis management activity by the IMF is underpinned by a number of key principles. For one thing, IMF resources may not be used as a substitute for private capital. This explains the importance of designing the IMF loan facilities in such a way that countries restrict their use of them, which is in line with the Fund’s mandate, which refers to granting short-term financial support in order to correct temporary balance-of-payments misalignments. Another factor is that, due to the increasing volume of capital flows, the Fund has insufficient usable resources to resolve serious financial crises on its own. Moreover, if the Fund were to fully cover financial deficiencies, it would remove all incentives for responsible risk management by private investors (moral hazard). This is another reason why it is important to involve the private sector in resolving financial crises.

Streamlining IMF facilities

After the IMF had already decided in March this year to reduce the number of different facilities, an extensive debate was held within the Fund as to how the most frequently-used facilities, the Stand-By Arrangement and the Extended Fund Facility, could be modified to prevent countries from using them in unduly large amounts or for unduly long periods. One much-discussed proposal related to increasing the interest rate on IMF credit. However, this proposal carries a number of drawbacks. Firstly, an across-the-board rise in interest rates is a blunt instrument, since it would also affect countries with payments problems which can genuinely not meet the repayments. This would run counter to the cooperative nature of the Fund. Secondly, the reform measures which a country must implement as a condition for the use of IMF resources (known as conditionality) should be a more significant means of putting pressure on countries to limit their request for IMF credit than a higher interest rate. By this reasoning, the lower rate of interest offers some measure of compensation for the adjustment efforts to meet the required performance criteria. The Board of

Globalisation prompts overhaul of international financial architecture
Governors eventually reached an agreement that was acceptable to all member states, and this was endorsed by the policymaking IMF during the annual meetings in Prague. To prevent countries from relying on Fund resources for unduly long periods, a decision was taken to introduce early repurchase expectations. This means that borrowing countries are expected to make repayments earlier than stipulated under the terms of the loan. Countries with continuous payment problems can receive a waiver and so shall not be burdened by the new arrangement. Nonetheless, the IMF decided to impose an interest surcharge if a country uses an exceptionally large amount of Fund resources. This interest surcharge is, however, restricted and applies only to that part of the loan in excess of the agreed limit. Finally, the IMF decided in Prague that the IMF credit facilities should be better tuned to crisis prevention. To this end, the eligibility criteria for the Contingent Credit Line, which, incidentally, has not been applied for by a single country since its introduction in Spring 1999 – were relaxed.

Private Sector Involvement

As previously stated, deeper private sector involvement in the resolution of financial crises is an important element of the future international financial structure. International agreement has been reached on a number of basic principles. Where a country has good prospects of quickly regaining access to the international capital markets, the Fund will generally be able to rely on its traditional catalytic approach, i.e. that it takes on some of the financing, trusting that the implementation of policy adjustments shall rapidly restore market confidence. In cases where there is no likelihood of an early restoration of market access, private creditors shall, in principle, be expected to take action. While the general preference is for voluntary approaches, the Fund recognises that cases will arise where more pressure is needed to secure private sector involvement. In certain cases, a temporary payments suspension may be unavoidable, although whether, and to what extent, the IMF should impose sanctions in this context is still unclear. Another basic principle is that, wherever possible, different types of creditors should receive equal treatment. Moreover, countries should be encouraged to take advance measures which could facilitate private sector involvement in the event of an actual crises. Examples of such measures are the improvement of contacts between debtor countries and their (main) creditors and the inclusion of collective action clauses in bond contracts, governing the collective responsibility of the individual bond holders in the event of debt restructuring. The current framework does not specify the point at which the private sector should become involved. Indeed, this could never be spelled out exactly as some degree of flexibility is imperative given that no two crises are the same. Nonetheless, the IMF aims to work out the practical application of private sector involvement in the near future.

Conclusion

The changes seen in the global financial environment over the past decade have prompted the reform of some aspects of the international financial architecture. The term ‘reform’ may be too strong; efforts are actually focusing on building a more stable international financial system within the existing structures. One could say that the system is undergoing repair and maintenance, rather than structural alterations. There is no doubt, however, that the financial landscape will become more complex over time. Since this may jeopardise financial stability, continuous efforts should be undertaken to further strengthen the financial system. The challenge is to allow the benefits of globalisation to take full effect, while simultaneously keeping the risks to a minimum.

3 Specific information about this standard can be found on the IMF website which contains hyperlinks to the webpages presenting the macro-economic statistical information from the national authorities which have subscribed to the SDDS. See also the Nederlandsche Bank's Statistical Bulletin of September 1999, page 20.
4 The Stand-By Arrangement (SBA) is a credit facility which offers liquidity support in the event of temporary or cyclical problems, the Extended Fund Facility (EFF) is a financing facility to relieve more structural problems.
5 The Contingent Credit Line (CCL) is a preventative facility, allocated to a country before it enters a crisis.
Currency crises in emerging markets: predictable or not?

For those involved, the Asia currency crisis of 1997 came as an utter surprise. At first sight, some of the countries affected appeared to be in good health. Initially, the crisis was attributed mainly to changed speculative sentiment, on the argument that the liberalisation of international capital movements had made the countries concerned increasingly dependent on the whims of speculators, making it ever more difficult to prevent contagion effects from other countries. Later studies of the Asia crisis have emphasised that the crisis countries were actually marked by fundamental disequilibria, including unsound domestic banking systems. The present article analyses whether currency crises have sufficient features in common to permit the construction of an early-warning system. To this end, a new method has been developed at the Bank, which explicitly distinguishes between the probability of a crisis and its expected severity in the event that it actually erupts. The study has shown that the claim that the risk of contagion of currency crises is increasing would not appear to be supported by the available evidence.
Currency crisis: definition

Before dealing with the causes of a currency crisis, one should first of all be clear about the concept itself. In the theoretical literature a currency crisis is generally taken to be an official devaluation or the abandonment of a fixed exchange rate. However, an exchange rate which is not pegged may also depreciate sharply and thus have adverse economic consequences. Accordingly, the empirical literature mostly defines a currency crisis as a very substantial depreciation in either nominal or real terms. In this definition, a crisis is triggered by effective speculative attacks. However, as ineffective attacks also provide information about a country’s vulnerability, the definition is sometimes extended to make additional allowance for the magnitude of the decrease in international reserves and for considerable interest rate increases. Since complete and reliable information about market interest rates in emerging markets is not available, a crisis index has been constructed, defined as a weighted average of the monthly percentage depreciation of the relevant currencies against the US dollar and the percentage depletion of international reserves. An extreme value of this crisis index may be viewed as a potential crisis.

Causes of currency crises

Theoretical considerations

The first-generation theoretical currency crisis models (Krugman, 1979) regard a currency crisis as an inevitable consequence of inconsistent policies. An expansionary monetary policy, often serving to cover fiscal deficits, is combined with a fixed exchange rate. This combination makes for gradual depletion of the international reserves, a situation that cannot but lead in the long run to abandonment of the fixed exchange rate. This situation is also denoted as a balance-of-payments crisis. These models adequately reflected the debt crisis in Latin America in the 1970s. Major indicators in this approach include changes in international reserves, fiscal deficits, deficits on the current account of the balance of payments, and the real exchange rate.

The second-generation models (Obstfeld, 1986) emphasise that the probability of a currency crisis depends not only on present policies but also on expected future policies. These models allow for several results since optimum future policies depend on whether or not the currency becomes subject to speculative attack. In the event of such an attack, the country is forced to raise interest rates if it wishes to maintain its fixed exchange rate. The ensuing costs may become such as to outweigh the advantages of the fixed exchange rate. The EMS crisis of 1993 may be viewed as an example of this type of currency crisis. In these models the probability of a crisis depends on the societal costs attaching to high interest rates. These will be especially high if the country is in recession, if unemployment is high or if the banking system is seen to be weak.

Empirical findings

The empirical literature about currency crises is very extensive. Kaminsky, Lidonzo and Reinhart (1998) summarise 28 empirical studies which have been published over the past 20 years. Although the studies differ considerably in terms of methods used and periods considered, they yet permit a few general conclusions. First, it would seem an illusion to think that crises can be explained from a limited number of indicators. Various crisis had varying causes, even if similarities are also in evidence. Notably changes in the real exchange rate and in the level of international reserves prove sound indicators for the eruption of crises. A number of studies show that high inflation and excessive credit expansion also have considerable explanatory power. Deficits on the current account of the balance of payments, on the other hand, would appear to have no more than minor significance as causes according to this literature.

In terms of research methodology, three approaches may be distinguished in the empirical literature: the signal approach, the limited dependent approach and the crisis severity approach. The signal approach and the limited dependent approach define a currency crisis as a discrete event. If an underlying crisis index exceeds a certain arbitrary threshold value, a crisis is considered to be in evidence; if not, tranquil conditions are said to prevail. The crisis index may be equal to the magnitude of the depreciation or to a weighted average of the depreciation and the loss of international reserves. The signal method largely constitutes a graphic approach, involving a separate assessment for each relevant variable to ascertain whether its average value in the run-up to a crisis differs from that in tranquil periods. In the limited dependent approach, the probability of a crisis is determined with the aid of statistical techniques, which also permit the combined effect of several variables to be considered. The signal and the limited dependent approaches seek to explain both the where (which countries) and the when of crisis. The crisis severity models, on the other hand, ignore the timing of crises. They consider merely one international crisis.
period and seek to explain why some countries are harder hit than others. By contrast with the first two approaches, the crisis severity models rely on a continuous crisis index.

A new method

The method adopted in this article combines the strong points of the statistical techniques described above. As in the discrete models, both the where and the when of crisis are analysed. However, as in the crisis severity approach, the method relies on a continuous crisis index. The probability of a crisis and its severity are modelled simultaneously. Hence, the model generates both an indicator of the probability of a crisis and an indicator of the expected depth or severity of that crisis. The fact that markets react differently in times of crisis – in a panicky fashion – compared to tranquil periods has been described by assuming two regimes. The first regime describes the usual behaviour whereas the second regime models extreme movements in the exchange rate or in the reserves. The crisis probability indicator has been defined as the probability of entering the crisis regime. That probability depends on the state of the economy. Under the crisis regime, both the expected crisis index value and uncertainty are larger than under the normal regime. The degree to which the crisis regime differs from the normal regime governs the level of the crisis severity indicator.

This method has several major advantages over the alternatives described above. First, a currency crisis need not be defined beforehand. This is important, since the number of distinct crises is limited. Second, the method uses the data in a more efficient manner, both the probability and the gravity of a crisis being modelled. Third, a distinction is made between normal and excessive movements in the crisis index. An early-warning system for currency crises is notably useful if it gives early warning of unexpected shocks. By separately modelling the expected pattern, the information obtained about unexpected shocks becomes less biased. Thus, a country that is already in crisis will run a greater risk of suffering from further speculative attacks in the future. Such shocks are not, however, unexpected and should be assigned a lower weight in an early-warning system. Finally, a distinction is made between the probability of a crisis and its severity. These two aspects need not always point in the same direction. The fact is that, if a crisis erupts, a country’s economic outlook changes because of loss of reputation, imported inflation or higher interest rates. The probability of a crisis is governed by the pre-crisis situation, whereas the severity of the crisis depends on the post-attack situation. Only by simultaneously modelling the probability and the severity of a crisis can these two aspects be actually separated.

Estimation results

The model described above has been estimated using monthly data for 31 countries for the period May 1987-December 1996. The sample contains eight countries from Latin America (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela), nine from Asia (India, Indonesia, Malaysia, Pakistan, Philippines, South Korea, Sri Lanka, Taiwan and Thailand), eight from Europe (the Czech Republic, Greece, Hungary, Poland, Portugal, Russia, Slovakia and Turkey) and six from the Middle East and Africa (Egypt, Israel, Jordan, Morocco, South Africa and Zimbabwe). The start date was governed by the availability of data on short-term indebtedness. The end date has been so chosen as to ensure that the Asia crisis of July 1997 is not included in the sample period. The latter crisis, as well as the Russia crisis of August 1998 and the Brazil crisis of January 1999 can thus be used to ascertain the model’s predictive power. The crisis index has been calculated as a weighted average of the monthly percentage depreciation against the US dollar (with a weight of 0.8) and the percentage depletion of international reserves (with a weight of 0.2). For countries with a record of very high inflation rates, the estimate only includes those periods for which inflation in the preceding twelve months was below 50%.

The choice for a large group of countries and a relatively long time horizon helps to accommodate to some extent the problem that different crises have different causes. If one is primarily interested in explaining the Asia crisis, one had better model just that crisis, but there is no guarantee that a subsequent crisis will have comparable causes. A model which describes various crisis periods is more likely to emit the correct signal for the subsequent crisis. This more universal nature of the model, however, detracts from the signal’s clarity in the event that the causes are the same as for the previous crisis.

Table 1 presents a qualitative overview of the estimation results of the approach used in this article. The table shows the sign and the significance of the various explanatory variables. The larger the number of signs (plus or minus), the stronger the statistical relationship.
The expected value of the crisis index under the normal regime depends mainly on recent developments in international reserves and the exchange rate. In addition, an overvalued exchange rate or a high rate of inflation leads to a higher expected index value. This may be explained from the fact that many countries permit an overvalued exchange rate to depreciate gradually.

The volatility under the normal regime, measured by the variance, also depends strongly on the recent past. If the exchange rate or the international reserves have been subject to major shocks in the recent past, present uncertainty is also greater. Where exchange rate shocks are concerned, the calculations show that greater uncertainty in other countries of the same continent also leads to increased volatility. This is one of the elements where contagion effects make themselves felt in the model. Finally, under normal conditions volatility turns out to be higher for regimes with freely floating exchange rates than for regimes with pegged exchange rates.

For the determination of the danger of crisis, the probability of entering the crisis regime is the most informative aspect. In this respect, six factors prove to have significant effects. In the model a country’s competitiveness is reflected in three variables – the real exchange rate, the domestic inflation rate and the import/export ratio. These variables may be viewed as indicators of a country’s longer-term solvency. The other three variables relate directly to liquidity. They are the increase in international reserves over the past quarter, the increase in floating debt over the past year to countries in the EU reporting area relative to the international reserves and the level of international reserves relative to the broad monetary aggregate M2. Several variables which proved relevant in other studies do not prove significant in the present model. They include the growth of exports, credit expansion and the level of floating debt relative to the international reserves.

The expected severity of a crisis is reflected in the
additional expectation and variance or spread of the index value under the crisis regime. With regard to the expected gravity of the shock, the average depreciation in the other countries of the same continent over the past month proves the only factor to have some effect.\textsuperscript{9} The variance is fully dominated by the ratio of short-term bank debt to international reserves.\textsuperscript{10}

\section*{Contagion}

After the Asia crisis in particular, the impression has arisen that, owing to the liberalisation of capital movements, the international financial markets have become more vulnerable to the whims of speculators. As a result, so it is held, fundamentally sound countries are hit more frequently by crises\textsuperscript{11} and, as a crisis in one country also influences speculators’ sentiments towards other countries, crises more often affect several countries at the same time. In the model used here, these contagion effects have been allowed for by including the lagged average exchange rate variance and depreciation in the normal variance and the additional expected index value under the crisis regime, respectively. However, the time horizon relevant for contagion is presumably one of days rather than months. This rapid transmission should be reflected in the unexplained proportion of the crisis index, since a turnaround in market sentiment would have to lead to an unexpectedly high index value for several countries at the same point in time. These simultaneous positive outliers lead to increased correlation between the model residuals.

Chart 1 presents a measure for the correlation between the unexplained proportions of the crisis indices.\textsuperscript{12} The chart shows that the correlation has not increased systematically since 1987. In the aftermath of the Asia crisis the correlation has admittedly shown a temporary increase but even during this period it was not stronger than in the peak years in the early 1990s. Moreover, the correlation has decreased since to a level that was also usual in the late 1980s. Hence, the notion that unfounded contagion has increased is not confirmed. This is not to say, however, that contagion is not a major problem. This study merely finds no evidence that the problem has increased.

\section*{Consequences for risk management}

In this article, the results of the method are shown graphically for a selected number of countries. Charts 2, 3 and 4, which concern a selection of countries from Latin America, Asia and Eastern Europe, respectively, show the movements in the crisis index (dark blue curve), in the indicator of the probability of a crisis (light blue curve) and in the indicator of the predicted severity of a crisis (black curve). The crisis index reflects the actual movements in the exchange rate and the international reserves. In the model, this is the variable to be explained. The crisis probability indicator has been calculated as the probability of entering the crisis regime. Since the crisis regime is mainly marked by greater uncertainty, this will not lead to a crisis in each period. Hence, the crisis probability is smaller than the crisis regime probability. The predicted severity of a crisis has been calculated as the expected additional value of the crisis index plus two times the additional standard deviation under this regime. Periods where inflation over the preceding twelve months was in excess of 50% are shown in the charts in light blue. These periods (like those from 1997 onwards) have been excluded in estimating the model.

\subsection*{Latin America}

Chart 2 shows some results for Latin America. The movements in the crisis indices clearly highlight the problem of defining a crisis. For some countries, such as Brazil and Mexico, one or more crises are distinctly identifiable. It would be most useful if these crises could be signalled well in advance. In Argentina and Chile, however, no major outliers are in evidence in periods of moderate inflation. If these countries suffered crises in these periods at all, they were definitely of a different order of magnitude from those in, for instance, Brazil or Mexico.

As far as the early-warning function of the crisis probability indicator is concerned, notably the move-
ments over time provide information for a country. The information content of the absolute value of the probability is more limited. Across countries, major differences are in evidence. This is caused not least by the fact that country-specific elements make themselves felt only through the explanatory variables included. Most major crises in periods of moderate inflation were preceded by an increase in the probability of entering the crisis regime. Cases in point are the Mexico crisis of late 1994, the crises in Venezuela of March 1989 and May 1994, the problems in Ecuador in the late 1990s and the Brazil crisis of January 1999. The last two occurred after the sample period covered by the model. The models performs less well when it comes to predicting the exact timing of a crisis. Measured by the probability of entering the crisis regime, the vulnerability of the Brazilian economy seemed greater two months before the crisis than during the crisis itself, while in November 1994 the worst seemed over for the Mexican economy. The problems in predicting the exact timing are not surprising. If it were actually possible to predict currency crises with accuracy, speculators could become rich without running any risk at all. Such opportunities would, however, be exploited immediately, so that disequilibria would not be permitted to build up. Hence, if one wishes to gain a sound insight into the vulnerability in a certain month, one must not only consider the probability during that month but also the trend over the past few months or even years. Another problem is that the model frequently signals that the crisis probability increases whereas this is not confirmed by an actual crisis at a later stage. This need not mean, however, that the model does not perform well. The model signals a country’s increased vulnerability. If the country reacts in good time, for instance by curbing domestic inflation, this need not always result in a crisis.
The crisis severity indicator, too, generally emits the correct signal. This indicator proves to better comparable across countries. During virtually each grave crisis, this indicator was well above 10%. Moreover, in many cases, increases were measured in the period preceding the crisis. For Argentina, the indicator’s level is high (about 15%). However, this has been consistently the case throughout the sample period. The fact that Argentina operates a currency board probably reduces the concrete threat of crisis. Moreover, the crisis probability indicator does not signal any imminent speculative attacks.

Asia
Chart 3 shows some results for Asia. The Asia crisis took place in the second half of 1997, beyond the period covered by the model’s estimation. Problems first arose in Thailand, where the crisis erupted in July 1997. In terms of both crisis probability and predicted crisis severity, the model signalled increased vulnerability in the run-up to the crisis. The clearest signal was emitted by the crisis severity indicator, which showed an upward pattern from 1991 onwards to a level of about 14% immediately prior to the crisis. The probability of entering the crisis regime had risen from 1995 onwards, reaching a historically high level from June 1997 onwards. Thus, for Thailand there were signs of an imminent crisis. The same is true of Malaysia. For this country the probability of entering the crisis regime increased from 1994 onwards. The predicted severity, too, showed an upward tendency over this period. At the beginning of the crisis, however, the level of this indicator was still low (about 8%). For the Philippines (not shown in the chart), the probability of entering the crisis regime showed erratic movements, with an upward tendency from around 1993 onward. Compared to the late 1980s/early 1990s, the probability in 1997 was not yet extremely high. In the early 1990s, the volatility of the crisis index had also been extremely high. Before the Asia crisis, the crisis severity indicator for this country
was fairly stable at around 10%. For Indonesia, the model emitted few signals of increased vulnerability. The probability of entering the crisis regime showed no upward tendency. The crisis severity indicator provided more indications. Though not showing an upward tendency, this indicator’s level was high at over 15%. The crisis in Thailand, combined with the political unrest in Indonesia itself, prompted a speculative attack. The external vulnerability had major consequences. For South Korea, the model also provided distinct indications of vulnerability. From end-1995 onwards, the crisis probability indicator showed a slightly upward tendency. In the early 1990s, however, the probability of entering the crisis regime had been higher, but this had not been followed by an actual crisis. However, a relatively low crisis probability for South Korea is also in line with chronological events during the Asia crisis. Whereas the rest of (Southeast) Asia went into crisis in July 1997, the crisis in South Korea did not erupt until November. However, once the country was hit, the consequences were very grave indeed (crisis index values of 20% and 40% in November and December, respectively). These grave consequences were also predicted by the model, with the crisis severity indicator rising to 20%.

Except for Indonesia, the model would thus appear to have good predictive power for the countries hit by the crisis. But what about the countries that were, to a greater or lesser extent, untouched? In respect of these countries, too, the model shows satisfactory performance. For India, no early-warning signal was given off.

The crisis probability showed a downward tendency and was much lower than at the beginning of the sample period, when there were crises indeed. The expected severity showed no clear tendency at a relatively low level. For Sri Lanka, the crisis probability indicator did increase slightly from 1994 onwards, but remained at a relatively low level, definitely when compared to the restive years at the beginning of the sample period. The crisis severity indicator, too, was low. For Taiwan, no signals suggesting a crisis were emitted either. The crisis severity indicator was low and neither the probability nor the severity indicator had shown an upward tendency in previous years. Pakistan is in a class of its own as the crisis index for this country is much more volatile. The last peak in the crisis index before the Asia crisis had occurred in October 1996. Since then, the crisis probability had shown downward volatile movements. The crisis severity indicator is very high throughout the sample period; considering the large number of extreme index values, this properly reflects actual conditions.

The fact that all countries that were included in the study and that were actually hit by the Asia crisis did show signs of vulnerability whereas the countries that were not hit barely showed such signs, is a result which affords hope. Since only vulnerable countries were hit, the danger of contagion in currency crises is not extremely large.

Europe, Middle East and Africa
For Europe, the Middle East and Africa, too, the model
broadly generates correct signals. The Russia crisis of 1998, for instance, was predicted by the model. The indicator of the probability of crisis had risen, even though it must be noted that the brief period of time marked by moderate inflation does not permit unambiguous signals. The indicator of the severity of the crisis – which is better comparable across countries, so that its absolute value also provides information – was very high (over 20%), rightly so in the light of the consequences. Other distinct crises (in Egypt, Jordan, Zimbabwe and South Africa) were also preceded by very high values of the crisis severity indicator.

Conclusions

In view of the results, the conclusion is warranted that currency crises are to some extent predictable, also for out-of-sample periods. The model used generates two independent early-warning signals, one for the probability of crisis and one for the expected severity of the crisis. The probability of crisis is related to a country’s solvency as well as liquidity. The indicator of the expected severity of a crisis solely depends on contagion effects and on the ratio of short-term bank debt to international reserves. During the period covered by the study, each grave crisis was attended by a value of this crisis severity indicator of at least 10%. The indicator of the probability of crisis is more country-specific. Moreover, it is more volatile, while the exact timing of a crisis cannot always be predicted with accuracy. Consequently, where this indicator is concerned, consideration should be given to the longer-term tendency in particular. An upward tendency may be interpreted as an early-warning signal. Analysis of the model residuals did not reveal any evidence of an increase in the danger of contagion. Moreover, the results for Asia suggest that only vulnerable countries need fear contagion.

What are the implications for the present vulnerability of emerging markets? On the basis of the most recent data, the crisis severity indicator suggests that ten countries are currently in the danger zone. These are Argentina, Brazil, Ecuador, Indonesia, Pakistan, Slovakia, South Africa, Sri Lanka, Turkey and Zimbabwe. Of these countries, Ecuador and Zimbabwe have inflation rates in excess of 50%, which may reduce the model’s applicability. Among the other countries, Pakistan, Brazil and Sri Lanka would currently seem the most vulnerable since their crisis probability indicators are marked by an upward tendency. In addition, Egypt is still vulnerable in view of the high probability of entering the crisis regime. Whether these countries will actually go into crisis will depend on the policies pursued and, perhaps even more so, on random factors.

Furthermore, it must be stressed that a model can accommodate no more than a limited number of variables. For specific countries, specific features that have not been included in the model, such as political factors, may well be of major significance. An early-warning system for currency crises can never take the place of a profound analysis of individual countries to ascertain country risks. Yet, the model may serve a useful role in identifying vulnerable countries and ascertaining the magnitude of risks.

Literature


Currency crises in emerging markets: predictable or not?

1 See, for instance, Kaminsky, Lindzonzo and Reinhart (1998), and Berg and Pattillo (1999).
2 Examples of this method for emerging markets are Frankel and Rose (1996), the ‘Event Risk Indicator’ of J.P. Morgan (1998), Berg and Pattillo (1999), and Deutsche Bundesbank (1999).
3 See Sachs, Tornell and Velasco (1996), Glick and Rose (1999), and Bussière and Mulder (1999).
4 For an extensive description of method and results, see Vlaar (2000).
5 Periods marked by very high inflation rates have not been included because it may be expected that during such periods other processes predominate (in such periods, the purchasing power parity theory, for instance, will come to hold good to a higher degree). Considering the major shocks in the nominal exchange rate during periods of hyperinflation, these periods would come to dominate the results to an undue extent.
6 In this article the real exchange rate is shown in levels (normalised at 1990=100) and not as deviations from trend. The latter specification is frequently used in the empirical literature. However, this manner of modelling involves a major drawback in that the trend is not known in advance. As, during construction, this variable must average nil, a positive value cannot but lead to future depreciation. In general, therefore, this variable is found to be the most successful in “forecasting” currency crises. Where the movements in the real exchange rate are concerned, changes spanning one to four years (real appreciation) have also been taken into account. However, this variable consistently obtained the wrong sign if domestic inflation, which did remain interpretable and statistically significant, was also included.
7 Depreciation in other continents was shown not to affect the variable.
8 Real appreciation, total indebtedness (to banks) relative to the value of annual exports, the increase in the ratio of indebtedness to exports, the growth of national income, developments on domestic or foreign stock exchanges, US interest rates, dummies for various exchange rate regimes and the growth of manufacturing output in the industrialised countries also proved to have no effect in the present model.
9 Depreciation in other continents has no significant effect. Neither have the real exchange rate, real appreciation, the exchange rate regime or the level of international reserves.
10 Here, too, the real exchange rate, the exchange rate regime and volatility in other countries are found to have no effect.
11 This was also frequently heard during the 1992/1993 crisis within the European Monetary System.
12 The chart shows the explanatory power of the first principal component of correlation matrices calculated from twelve-month model residuals for fifteen countries for which data were available for the entire period. The first observation was thus calculated from residuals for the period May 1987-April 1988.
13 Country-specific features which are not reflected in these variables might have been modelled in the estimation procedure using country dummies. However, country dummies have a drawback in that they tend to predominate the panel’s cross-sectional element, detracting from the distinctiveness of the more interesting economic variables.
The Dutch economy in 2000-2002: a forecast based on MORKMON

The favourable economic developments in the Netherlands in recent years will continue in the 2000-2002 period, although inflation will prove considerably higher than it has been in the previous years. The article begins with a discussion of basic foreign and domestic economic assumptions relevant to the Netherlands, and of the estimates concerning the 2000-2002 period. Next, several risk scenarios are outlined, starting with an analysis of relevant downward and upward inflation risks. These risks are primarily related to the tightness on the labour market and the development of commodity prices and the euro exchange rate. Special attention is given to subjects touching on financial stability, the overall theme of this Quarterly Bulletin. The macroeconomic consequences of sharp price falls in the housing market and in international stock exchanges are charted. The article ends with summary conclusions. All forecasts and analyses were made using MORKMON, the Bank’s macroeconomic structural model for the Netherlands.
Introduction

This article presents a forecast for the Dutch economy in the years 2000-2002 based on calculations using the MORKMON macroeconomic structural model. Compared to the forecast made six months ago, the picture for 2000-2002 has undergone a number of changes. The volume growth of GDP for 2000-2002, e.g., has risen by 0.3 to 0.4 percentage point. The inflation estimate, too, was adjusted upwardly as a result of higher oil prices and the appreciation of the dollar. Inflation, as measured by the rise in the consumer price index (CPI), will work out at 2.6% this year, while in 2001 it is expected to peak at 4.2%, followed by a price rise of 3.0% in 2002. The high 2001 figure is caused by the factors mentioned (oil price, dollar exchange rate), but especially by the introduction of the new tax plan and the concomitant VAT increase on 1 January 2001. Leaving aside the direct effects of the tax plan, inflation over the next two years will average about 3%.

The structure of the article is as follows. The section on Assumptions for 2000-2002 sketches the external outlook as regards world trade, world market prices, exchange and interest rates, as well as the assumptions for the domestic economy. The baseline projection resulting from these fundamental assumptions is described in the section entitled Baseline projection results for 2000-2002, which deals primarily with the determinants of economic growth, employment and wage and price developments. Next, the Risk analysis section deals with a number of uncertainties and risks in the projected economic development, with particular focus on those developments which may affect the financial stability in the Netherlands and on upward and downward inflation risks. The article ends with a number of summary conclusions.

Assumptions for 2000-2002

For an open economy like the Netherlands, developments abroad are of prime importance. Below, an outline is given of the most significant external influences, based on recent OECD and IMF estimates (Table 1). The world economy is growing fast in Europe and the United States. Japan, recovering from a recession, may also boast some (though modest) economic growth again. The volume growth of GDP in the OECD area will accelerate from 3.0% in 1999 to 4.2% in 2000. For 2001 and 2002 economic growth in the OECD area is assumed to be slower at 3.3% and 3.1%, respectively. The primary factor causing diminished growth in the OECD area is the slowdown in US growth from 5.3% this year to 3.9% (2001) and 3.3% (2002). Within the European Union, growth will decrease slightly from 3.3% in this year to 2.7% in 2002. Seen in this external economic perspective, the growth of world trade relevant for the Netherlands will accelerate considerably, from 4% last year to almost 10% this year, remaining above average at 8% in 2001 and 7% in 2002.

Under the impact of the drop in world demand following the Asian crisis, world market prices for commodities, especially energy, bottomed out in early 1999 (USD 10 per barrel of Brent crude). Since then, with the recovery in world demand and the announcement in February 1999 that some oil producing countries were to limit production, the price of crude quickly rose again to well over USD 30 in the last few months. The forecast for the coming years is based on futures prices, which means that crude prices will ease down to an average of USD 25 in 2002. The section entitled A closer look at inflation discusses in detail the implications of oil price movements for economic growth and inflation. Commodity prices excluding energy, which fell in 1999, rose again in 2000 and the upward tendency is expected to continue. Partly as a result of the euro’s depreciation in 2000, prices of imported goods in guilder terms have risen considerably by 9.4%, and will continue to do so in 2001 (by 3.7%) and 2002 (by 0.8%). The prices of goods exported by competitors (excluding energy) are expected to follow the same general trend.

As usual, the present estimate is based on the interest and exchange rate levels as they were at the time the analysis was performed. The estimates therefore do not reflect the Bank’s opinion on the interest or exchange rates. Expectations on the basis of these technical assumptions are that in 2001 and 2002, the long-term interest rate in Germany and the USA will remain about equal, at 5.2% and 5.6%, respectively, while the euro will remain constant against the dollar at USD 0.871. The implication of these figures is a fall in the average euro rate of 13.5% in 2000 and another 5.5% in 2001. The consequences of a rise in the euro-dollar exchange rate will be discussed in the section on risk analysis.

Assumptions about the domestic economy mainly relate to fiscal policy and other areas of the public sector. In terms of taxation, it is assumed that the small consumer energy levy will be increased both in 2000 and 2001, in combination with compensatory direct taxation cuts. Of particular importance is the reform of the tax system in 2001, which involves, among other things, a shift in emphasis from direct towards indirect
taxation. The tax reform will be accompanied by a net easing of the tax burden by some NLG 7 billion. Our analysis assumes that any deviations from expected revenues will be offset against the general government balance. This means, for instance, that if revenue overshoots are to be used for greater expenditure or extra tax cuts, the general government balance will turn out correspondingly lower than is estimated here.

Baseline projection results for 2000-2002

This section discusses the main forecast results as summarised in Table 2. In particular, we will focus on the determinants of economic growth, on employment and on wage and price developments.

The Dutch economy in 2000

The Dutch economy, as measured by GDP volume growth, will grow by 4.0% in 2000, making it the fourth consecutive year of around 4.0% economic growth in the Netherlands. Both domestic and foreign expenditure have contributed to the continuing prosperity. The improvement in purchasing power and the sharp growth in homeowners’ capital assets were able to maintain the volume growth of private consumption almost at last year’s level, in spite of employment levelling off somewhat. Private consumption this year is also being encouraged by the fact that consumers, anticipating the 2001 VAT increase from 17.5% to 19%, will spend more in 2000 to save expenditures in 2001. The projection assumes that 0.4% of annual consumption will be moved forward. Because of this and of other factors, private savings will decrease for the third year running.

The growth of corporate investment will this year slide back to 5%. The decrease is caused by higher capital costs due to higher interest rates and diminishing corporate profits. The labour market continues to
exhibit serious tightness, forcing many companies to make capital-deepening investments. The considerable rise in goods imports (9.3%) is another direct consequence of the rise in consumption and of the difficulty the industrial sector is having in meeting domestic demand. At 8.6%, the rise in export volume of goods (not including energy) lags behind the volume of world trade relevant for the Netherlands, despite an improvement of the Netherlands’ international price competitiveness. This is due in part to the unfavourable composition of Dutch exports, compounded by the fact that a rising labour income ratio is having a negative impact on Dutch exporters’ competitiveness. The improvement of price competitiveness in 2000 is predicated on the depreciation of the euro, which is also affecting the terms of trade, causing the current account surplus to decrease to 5.4% of GDP in 2000.

Remuneration per employee is rising more rapidly in 2000 than in 1999. Owing to the continuing tightness in the labour market, the negotiated wage rate increase is accelerating from 2.6% to 3.5% (see Table 3). The latter figure is based largely on the results of previously con-
cluded collective labour agreements. The labour market tightness is also expressed in increasing wage drift, which is contributing 0.8 percentage point to the increase in wage costs. In combination with the slight rise in employers’ social insurance contributions, this is resulting in an increase of remuneration per employee of 4.4%, which is considerably more than the 1999 increase of 2.9%. The large number of hard-to-fill vacancies and the steep rise of wage cost per employee encourages savings on labour. This in turn is reflected in a slightly sharper rise of unit wage costs compared to the previous year. All in all, the rise in unit wage cost will grow to 2.5% in 2000, more than doubling the 1999 growth rate. Because the rise in selling prices is clearly lagging behind this development, the adjusted labour income ratio this year will show a hefty rise from 82.3% to 83.7%.

The growth of employment is flattening out under the pressure of rising real wage costs, from 2.9% in 1999 to 2.6% this year. Nevertheless, it is still more than sufficient to accommodate the added labour supply, so that unemployment continues to drop from 221,000 persons in 1999 to 184,000 persons in 2000, or from 3.1% to 2.5% of the labour force. This means that unemployment has been falling for the sixth consecutive year, which is also reflected in a further drop in the ratio between economically inactive and economically active persons (i/a ratio in short), to 65.8%. However, the ever increasing number of unfilled vacancies is an indication that the labour market is approaching its limits. For a discussion of this aspect, see the Risk analysis section.

Inflation as measured by the consumer price index (cpi) stands at 2.6% in 2000, against 2.2% last year (Table 4), the increase being largely caused by the sharp rises in import prices. The share of finished goods is increasing to 0.4 percentage point, while the share of imported commodities, energy and services soars to a spectacular 1.5 percentage points. This is due mainly to steeply risen oil prices and in a lesser degree to price

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<th>Table 3 Breakdown of market sector unit wage costs</th>
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<td>Contributions in percentage points</td>
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<td>1999</td>
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<td>Negotiated wage rates</td>
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<td>Unit wage costs</td>
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<th>Table 4 Breakdown of consumer price rise</th>
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<tbody>
<tr>
<td>Contributions in percentage points</td>
</tr>
<tr>
<td>1999</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Imports</td>
</tr>
<tr>
<td>Finished goods</td>
</tr>
<tr>
<td>Commodities, energy, services</td>
</tr>
<tr>
<td>Non-market sector</td>
</tr>
<tr>
<td>Indirect taxes</td>
</tr>
<tr>
<td>Natural gas</td>
</tr>
<tr>
<td>Housing rents</td>
</tr>
<tr>
<td>Public sector services</td>
</tr>
<tr>
<td>Wage costs</td>
</tr>
<tr>
<td>Improvement in gross margins 1</td>
</tr>
<tr>
<td>Private consumption deflator</td>
</tr>
<tr>
<td>Consumer price index Ditto, excluding indirect taxes</td>
</tr>
<tr>
<td>1 Including the cost of capital.</td>
</tr>
</tbody>
</table>
The Dutch economy in 2000-2002: a forecast based on MORKMON

The most important financial-economic development of 2001 in finance and economics will doubtless be the introduction of the new tax system on 1 January. The major changes under the new system are an 8 percentage point reduction of the marginal rates in the upper two income tax bands; the introduction of a fixed income tax rebate replacing the income tax exemption limit; and the increase of the high VAT rate from 17.5% to 19%. The net effect is a shift in taxation away from work and towards consumer spending. Accompanying the tax reform is an easing of the tax burden by some NLG 7 billion. An in-depth discussion of the consequences the tax reform will have for the Dutch economy follows below.

In 2001, GDP volume growth will slow down from 4.0% to 3.7%. The volume of exports (excluding energy) is expected to increase by 8.6%, which figure, owing to the delayed effect of the improvement in 2000 of the Netherlands’ international price competitiveness, is higher than the growth of relevant world trade. As a result of the eased tax burden, real disposable wage incomes per employee will increase by 4.9%. Without the anticipatory effects mentioned above, consumption growth would be even higher: In view of the VAT increase by 1 January, consumer expenditures are being moved forward from 2001 to this year, so that consumption growth in 2001 will turn out lower than it would have been without this anticipatory effect. Concurrently, part of the extra consumer spending as a result of the 2001 increase in real disposable private incomes will be postponed until 2002. The 5.5% increase in corporate investment in 2001 will turn out lower than it would have been without this anticipatory effect.

The favourable image presented by the Dutch economy in 2000 is also reflected in public sector figures. Public sector net lending (according to the EMU definition) runs to 1.7% of GDP. If the revenue of the UMRS licence auction (0.7% of GDP) is left out of this balance, however, the general government surplus remains unchanged from last year, despite the current economic boom. The surplus has a lowering effect on nominal public debt, making possible a lasting reduction in interest charges and thus creating room in the general budget to accommodate financially the expected ageing of society. The share of wage costs in total wage cost is hefty, too, at 1.0 percentage point, although at the same time, again as a result of the tax reform, employers’ contributions to social insurance will decline, resulting in a 0.3 percentage point lowering of wage costs. Remuneration per employee will rise 4.4%, as it did this year. As labour productivity is rising by only 2.1%, there remains a net unit wage cost increase of 2.3%. Sales prices are expected to rise more rapidly than unit wage costs, causing the adjusted labour income ratio to decrease to 83.3%. Concomitant with a less exuberant growth in production, employment growth will slow down even further to 2.0%, and this in turn will decelerate the decrease in unemployment. In 2001, according to MORKMON calculations, the number of unemployed will average 161,000 (i.e. 2.2% of the labour force). The i/a ratio will by then have fallen to 64.8%.
As a result of the developments discussed, inflation will rise steeply from 2.6% this year to 4.2% in 2001. The CPI, adjusted for indirect tax changes, will increase from 2.3% to 3.2%. The rise in indirect taxes, in the form of the VAT increase and the ecotax, will contribute a significant 1.0 percentage point to the inflationary trend, while the share of rising import prices in the increase of CPI is also considerable, at 1.2 percentage point. Price increases of imported commodities, energy and services, however, will be weaker in 2001, while those of finished goods will be sharper. Attributable to the world-wide rise of commodity prices in the year 2000, this phenomenon is termed a ‘second-round effect’. The respective shares of rising natural gas prices, rents and public sector service prices will be 0.4, 0.4 and 0.2 percentage points. Gross profit margins will remain almost unchanged in 2001 and as they did this year, wage costs will contribute a good percentage point to price rises.

The easing of the tax burden under the new tax system and the absence of the once-only UMTS revenues will cause the general government surplus to fall in 2001 from 1.7% to 0.8% of GDP. The balance would have been even lower if it had not been for increased natural gas revenues. The gross debt/GDP ratio will decrease further, partly as a result of a sharp rise in nominal GDP (the ‘denominator effect’), to 51.8% of GDP.

The Dutch economy in 2002

In 2002, volume growth of GDP will continue to decrease slightly to 3.6%. Consumption growth, owing to the delayed effect of the 2001 purchasing power impulse, will remain high at 4.2%. The growth of corporate investment will maintain itself at nearly the level of the previous year (5%). Continued labour market tightness will hinder industries in meeting demand. These circumstances combine to boost the volume of goods imports by 6.7%. The exports volume of goods (excluding energy) will grow by 6.8%, less vigorously than in 2001 and lagging behind the growth of relevant world trade – a result of a further deterioration of the Netherlands’ price competitiveness, which is caused in part by high wage rises. The current account surplus will increase to 6.4% of GDP.

Negotiated wage rates will rise 3.9%, up from 2001. The same applies to wage cost per employee, which will rise by 4.9%. Both accelerations are caused, again, by labour market tightness. As employers’ contributions to social security remain equal and labour productivity – rises by 2.3%, unit wage costs will go up 2.6% in 2002. This increase roughly matches that of selling prices, causing the labour income ratio to remain nearly constant at 83.2%. In line with the slight fallback in production growth, employment will grow more slowly, by 1.7%, while labour supply will increase by 1.6%. Unemployment will therefore decrease once again, albeit slightly. In 2002, an average of 152,000 people, or 2.0% of the labour force, will be out of work, while the inactive-to-active ratio stands at around 64.2%.

Inflation will decline from 4.2% in 2001 to 3.0% in 2002, primarily because the one-off contribution made to inflation by indirect taxes in the previous year will now be absent. If the influence of changes in indirect taxation is left out, inflation will decline only slightly, from 3.2% in 2001 to 3.0% in 2002. The 2002 rise in the CPI is largely due to a rise in remuneration per employee, which will clearly outgrow labour productivity. Wage costs in 2002 are expected to contribute 1.3 percentage point to price rises, while the influence of import prices decreases to 0.5 percentage point, partly as a result of lower energy prices. Price increases of natural gas, public sector services and rents will together contribute 0.8 percentage point to the increase in the cost of living. Gross profit margins in the business sector will improve slightly in 2002, as businesses pass on cost increases from previous years to selling prices. All in all, this means that inflation, if the one-off effect of the 2001 tax reform is disregarded, will be higher in the next few years.

The general government balance will show a surplus of 1.6% of GDP in 2002, due partly to a decline in interest charges. Also, part of the 2001 tax reform will only now begin to pay off, as the revenue generated by the tax on capital return introduced in 2001 will largely be levied from 2002 onwards. As already explained in the assumptions section, this forecast assumes any and all revenue overshoots to be reflected in the fiscal balance. Thus, if a substantial part of possible new expenditure undershoots is used for additional public spending or additional tax cuts, the surplus may turn out lower. The gross debt/GDP ratio is estimated to decline further, from 51.8% to 46.7% of GDP, 3.5% of which is attributable to the denominator effect of the rapid nominal GDP growth.

Risk analysis

Several risks are inherent in the projection described above. In a small, open economy like the Netherlands, these risks depend primarily on external developments, but risks of domestic origin exist as well. Since this
Quarterly Bulletin is focussing especially on financial stability, discussing, among other things, asset price development; this article will concentrate in particular on the macroeconomic implications which a collapse in the housing market or the international stock markets would have for the Netherlands. It should be said here that such a crisis scenario is not at this moment seen as a highly probable risk, although several historical instances could be cited of unexpectedly collapsing real estate and stock markets, with grave consequences for financial stability and economic growth. Next, the other risks relating to growth and inflation will be discussed. Because inflation in the Netherlands will, according to the central forecast, reach the highest mark in almost two decades, some attention will also be paid to the risks presented by accelerating inflation.

**Macroeconomic consequences of risks relating to financial stability**

This Quarterly Bulletin discusses a broad range of subjects related to financial stability. We take a look at crisis situations which occur or have occurred only sporadically. In its latest *World Economic Outlook* of October 2000, the IMF presents an uncertainty variant factoring in the possibility of financial market unrest and a hard landing of the US economy, and goes on to discuss its macroeconomic implications. Based on this scenario, the following discussion describes a ‘bad weather’ variant for the Dutch economy.

**Hard landing of the US economy**

Higher inflation in the US could lead, first, to a stricter monetary policy in that country, and from there to a world-wide adjustment of stock market prices. If, through high-running inflation, rising interest rates and falling share prices, the US economy should make a hard landing, this cannot fail to impact the European economy. Because of the high integration of capital markets it may be expected that through ‘spillover’ effects the EU, too, will see share prices fall. In addition, a lower imports demand from the US will lead to less growth in Europe. This effect could be even stronger if in reaction to the hard landing in the US, the dollar should drop steeply against the euro. By way of side-effect, the real estate markets might be faced with dropping prices. Especially countries which, like the Netherlands, have seen sharply rising real estate prices, might be faced with considerable price drops. The combined effect of the sudden deterioration in economic growth and the falling asset prices might lead to credit rationing, resulting in turn in a further weakening of demand and capital destruction. The macroeconomic effects which the Netherlands might experience as a result of such a financial crisis are explored tentatively below, using the MORKMON model. It should be kept in mind that this doom scenario is a thought experiment based on the premise of a hard economic landing in the US, and not a course of events which is accorded a high degree of probability. We begin our discussion by analysing the macroeconomic implications of an isolated share price adjustment.

**World-wide adjustment of stock exchanges**

Share prices in both Europe and the US have risen sharply (Chart 1) over the last few years. At the same time, Europe’s economic growth could be called modest in comparison to that of the US. This is, incidentally, one more example of the close interrelation among world-wide stock markets, an interrelation which only seems to become closer in times of crisis. Viewed in this light, it seems most realistic to calculate the consequences of a world-wide share price adjustment. Slumping stock markets are reflected, via consumer spending, GDP and thus imports and exports, in a lower world trade volume and lower world trade prices. For the Netherlands, this means lower exports demand and lower imported inflation. Decreased demand from abroad causes effects on spending, compounding those arising from the direct negative capital effects on consumer spending. By way of illustration, the overall impact of a 40% drop in share prices has
been calculated (Table 5). Volume growth of GDP in the Netherlands would drop by roughly half a percentage point for three years running. Inflation effects take longer to materialise, because they are brought about primarily through wage restraint. As, over time, the slowdown in economic growth leads to higher unemployment, lower wage demands will follow. Yet inflation effects are not negligible: in the fourth year, inflation is projected to be 0.8% lower.

**Share price adjustment: additional effects through credit channels**

An adjustment of share prices like the one discussed here may be variously reflected in the real global economy. Many macroeconomic models use private share holdings as a determinant of consumer spending. A fall in share prices lead directly to a slowdown of consumption because of the capital loss suffered by share owners. But share prices may also influence consumer spending through confidence effects caused by share price movements. Another channel from share prices to the real economy runs through investment. Since the market value of the capital goods supply is decreasing in relation to its replacement value, investments, according to Tobin’s q theory, will slacken also. The investment channel is, in turn, fed largely by credit channels, i.e. a bank loan channel and a balance channel. Share depreciation and its implications for the economy will, through a decline in collateral value on the balances of borrowing parties, lead to less favourable credit conditions (the balance channel). This may be expressed in a higher external financing premium for companies which have to pay a risk markup on the normal risk-free rates when taking out or renewing bank credits. At the same time, share issues are a less attractive proposition under these circumstances, so that only the large and thoroughly sound companies may borrow funds on the open capital market. In other words, financing costs especially for small and medium-sized companies increase, so that fewer investment projects will be viable. The lower share prices will also depreciate lenders’ own capital, so that they may become less willing to provide loans, even leaving aside credit pricing, to protect their own solvency (the bank loan channel). A situation where banks’ hesitance to provide loans becomes so great that it hurts the real economy is called a credit crunch.

The above shows that a steep drop in share prices is able to destabilise the economy through the way credit channels work, although for lack of sufficient empirical evidence this mechanism is only partially factored into most macroeconomic models. At the micro-economic level, however, there is some empirical evidence suggesting that credit channels may have a role

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**Table 5: MORKMON simulation forecasts: financial stability**

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>40% lower share prices</th>
<th>1 percentage point high long-term interest rate</th>
<th>Ditto, at 5% lower business investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects in year no.</td>
<td>Effects in year no.</td>
<td>Effects in year no.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Volume growth of relevant world trade</td>
<td>-1.2</td>
<td>-1.7</td>
<td>-0.8</td>
</tr>
<tr>
<td>Growth of goods import prices</td>
<td>-0.2</td>
<td>-0.7</td>
<td>-0.9</td>
</tr>
</tbody>
</table>

**MORKMON forecast**

<table>
<thead>
<tr>
<th>Effect</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP volume growth</td>
<td>-0.4</td>
<td>-0.6</td>
<td>-0.4</td>
<td>-0.1</td>
</tr>
<tr>
<td>Registered unemployment</td>
<td>8</td>
<td>29</td>
<td>50</td>
<td>56</td>
</tr>
<tr>
<td>Growth of wage per employee (business sector)</td>
<td>-0.1</td>
<td>-0.6</td>
<td>-1.2</td>
<td>-1.2</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>-0.0</td>
<td>-0.2</td>
<td>-0.6</td>
<td>-0.8</td>
</tr>
</tbody>
</table>

1. During 2 years.
2. Level, x 1000 persons.
to play. In the absence of both a direct effect of share prices on business investment volume and data on the behaviour of the external financing risk markup, the results of the share price adjustment presented in Table 5 may reflect an overly conservative estimate of the effects such an adjustment might have. Therefore, in order to illustrate the working of the balance channel, Table 5 also shows the implications of a 1 percentage point increase of the external financing risk markup, represented as a 1 percentage point increase in the commercial long-term interest rate during two years. Finally, a variant is presented in which on top of the rising interest rate, credit rationing is presumed to lead to a 5% lower level of business investment (bank loan channel). If the latter variant is combined with the first share price variant, implications for GDP volume growth appear to be substantial: for two years, projected economic growth would be a good percentage point slower.

Lower housing prices
A financial crisis may also have serious implications for Dutch housing prices and thus for economic growth. For one thing, the favourable economic development of the Dutch economy over the past few years has been encouraged by steep price rises in the housing market. These price rises have in large part been a typically Dutch phenomenon within the EU, second only to those in Ireland. Especially the larger EU countries are characterised by modest price rises or even falling prices in the housing market. The latest figure for September 2000, at the time this article was written, indicated a rise of 20% in the price of an average dwelling over the previous twelve months. Home-owners, therefore, have seen their financial position improve sharply. And even if they have not cashed in on the revaluation, the euphoria of feeling rich may diminish home-owners' inclination to save and boost the urge to spend. In many cases, moreover, the capital gains have been realised through second mortgages which were used for expenditures predominantly aimed at enhancing the comfort of living. As a result, Dutch private debts have soared, and so has the financial vulnerability of private people to adjustments in the housing market.

This is the background against which Table 6 presents the economic consequences of a sharp fall in housing prices. A 40% fall, housing prices will revert to the 1997 level. Over the period 1978-1982, a decline of almost equal proportions occurred.

MORKMON has housing prices influence expenditures in two ways. First, lower housing prices lead to a deterioration in the financial position of homeowners, and hence to slower consumption growth. Secondly, lower housing prices, at unchanged costs of building new housing, will discourage investment in housing. Lower expenditures go hand in hand with diminishing growth of production and employment and a weakening purchasing power. Thus the direct financial effects combine with this indirect channel to push down consumption. In terms of real GDP, 40% lower housing prices will eventually lead to accumulative loss of economic activity of almost 2%, nearly equal to the effect of the share price simulation.

A crisis scenario
A bad-weather scenario combining both variants presented above would entail considerable negative implications for economic growth. A crash in the international stock markets, with additional effects through credit channels and a simultaneous collapse of the Dutch housing market would, according to these calculations, lead to a 4% drop of GDP volume in the course of two years. Nor would such a scenario fail to

Table 6 Effects of 40% lower housing prices
Effects in percentage points, unless stated otherwise

<table>
<thead>
<tr>
<th>Effects in year no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MORKMON forecasts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP volume growth</td>
<td>-0.5</td>
<td>-1.0</td>
<td>-0.3</td>
<td>-0.0</td>
</tr>
<tr>
<td>Registered unemployment ¹</td>
<td>9</td>
<td>38</td>
<td>62</td>
<td>64</td>
</tr>
<tr>
<td>Growth of wage per employee (business sector)</td>
<td>-0.2</td>
<td>-0.8</td>
<td>-1.5</td>
<td>-1.2</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>-0.0</td>
<td>-0.2</td>
<td>-0.4</td>
<td>-0.5</td>
</tr>
</tbody>
</table>

¹ Level, x 1000 persons.
have a strong effect on producer and consumer confidence, which might accelerate and intensify these effects. But although the crisis scenario presented here would clearly entail considerable macroeconomic setbacks for the Netherlands, there are no indications that the stability of the Dutch financial system would be endangered.17

A closer look at inflation

Inflation is expected to peak in 2001, when it will reach a level not seen in the Netherlands since 1983. There are a number of mostly incidental reasons for this. This section deals with present and future inflationary trends, and in that connection also with the energy component of inflation, the implications of changes in the external value of the euro and tensions in the labour market. First, however, a short discussion on the current inflation figures.

Inflation peaks

According to morkmon, inflation, as measured by CPI increase, will rise to above 4% next year. Figures over 4% have not occurred since the early eighties. To a large extent, however, the high inflation may be explained by a coincidence of several in themselves temporary inflationary factors. The VAT increase, for instance, will boost inflation during 2001, after which it will disappear from the figures.18 The direct contribution to inflation, too, is a temporary phenomenon. The contribution of energy prices to CPI inflation is exceptionally high at the moment, but is expected to ebb away from the figures.

The influence of oil prices

The strong movements in the price of oil have not failed to affect worldwide inflation. In the Dutch CPI, energy carries a 7% weight. The energy component contributed significantly to the rising inflation figures, although with energy excluded, CPI is also on the rise (Chart 2). With energy left out, inflation is more than a percentage point less than total inflation. The energy component correlates strongly with changes in the price of oil, as Chart 3 illustrates for the Dutch inflation rate.19 This chart also suggests that the contribution of the energy component to inflation has peaked and that its direct contribution will soon start to wear off. If the declining oil price has not yet pushed the rising tendency of the energy component into reverse, this is probably caused by its delayed action on consumer prices.20 Of longer term importance is the question to what extent oil prices impact the underlying inflation indirectly. Oil price rises also exert second-round effects on inflation, when producers factor the cost increase into their selling prices and when workers negotiate wage compensations for the fallback in purchasing power caused by higher prices.

The results in Table 7 indicate the significance of oil prices for the Dutch economy. For the sake of illustration, a 25% lower oil price is assumed. Based on the oil price in the baseline projection, oil would bring USD 18.8 a barrel in 2002, which is roughly comparable to the
level in the years preceding the Asian crisis. A fall in oil prices may be regarded as a positive supply shock, causing a jump in purchasing power for most of the Netherlands’ trading partners, which will boost imports from these countries. The net result is that Dutch exports will increase as well as consumption and investments. The volume growth of GDP will, according to these calculations, come out 0.1 to 0.2 percentage point higher for several years running. Inflation effects are more marked: 0.3 percentage point less inflation on average during the first two years.

**External value of the euro**

The robust growth of the US economy and the concurrent capital flows towards the USA have contributed to the depreciation of the euro vis-à-vis the US dollar. The Dutch economy is to some extent susceptible to movements in the exchange rate of the euro. In view of diminishing differences in economic growth between Europe and the US, the implications of a recovering euro were calculated using the MORKMON model. Table 7 presents the consequences of a 10% higher euro rate. In the short term, an appreciation of the euro will entail slower economic growth in the euro area, because initially, it will cause price competitiveness vis-à-vis countries outside the euro area to weaken. For the Netherlands, a 10% appreciation causes a slowdown in GDP volume growth of 0.7 percentage point in the first year, according to MORKMON. The inflationary effects take longer to materialise, but will persist considerably longer, too. These inflation effects, varying between \(-0.5\) to \(-1.1\) percentage points over the first four years, depend both on decreasing imports prices and on the response of wages to diminishing labour demand. Factored into these results is the fact that the sensitivity of wages to changes in the demand and supply of labour is higher in a tighter labour market situation.

### Tightness in the labour market

The labour market looks fundamentally different from a few years ago, when it was feared the economy would grow without new jobs being created. Now, some 200,000 jobs are being created each year, a number which exceeds by a wide margin the growth in working age population. A large proportion of vacancies could until now be filled from the existing pool of unemployed, which initially had been extensive. At the same time, the proportion of working age people who do not seek employment has dwindled: in 1999 their number undercut the 1994 count by over 400,000, the majority of newcomers on the labour market being women. By consequence, the number of people receiving unemployment or financial assistance benefits has fallen sharply. However, unemployment is nearing the point where further large-scale downward movements become impossible, especially in the case of frictional...
unemployment. This means that even more than before, persons who fall outside the usual definitions of unemployment will be called upon to offer themselves on the labour market. Since one may assume that a relatively large part of the directly available labour force has already been activated, it is becoming increasingly difficult to find sufficiently qualified staff. Labour market tightness is aptly illustrated by the uv curve (Chart 4). The percentage of unfilled vacancies is at an unprecedented level, and unemployment is approaching percentages not seen in 30 years. The labour shortage is presenting a serious risk for the bright growth prospects in the baseline projection. For instance, a record number of industries report production impediments for lack of employees. Seen in this light, reports that many women who reenter the workforce are soon finding themselves on disability benefits are alarming. The Government tries to help relax labour market tension, not only through the review of the tax system, but also by creating incentives for inactive persons to go (back) to work, and through plans to improve, e.g., the availability of children’s daycare. In drafting the estimates, the assumption was made that sons to go (back) to work, and through plans to improve the system, but also by creating incentives for inactive persons to go (back) to work, and through plans to improve the availability of children’s daycare. In this connection, the fact that the contribution of wage demands will end up a rise in the adjusted labour income ratio for that year. However, as the Dutch economy is already showing various signs of overheating, particularly on the labour market,22 further upward wage risks in connection with the projected continuing economic buoyancy cannot be precluded. Table 7 shows the effects of annual wage rises 1% higher than assumed. In the short run, the effects on GDP remain limited, because the negative impact on investments and exports, caused by a decline in profits and international competitiveness of Dutch companies, will be offset by higher consumption as a result of increased purchasing power. Higher wage demands, in the meantime, will provoke labour saving measures, depressing labour demand and increasing unemployment. Inflation itself, under the impact of these wage demands, will end up 0.4 percentage point higher over a four year period.

Medium range inflation prospects
Inflation prospects for the next two years are less than encouraging. However, a strengthened euro or a lower oil price vis-à-vis the baseline projection will result in a lower inflation estimate, whereas the estimate will be even higher if oil prices remain at the present high level. Yet expectations are that even if the oil price and the euro’s exchange rate do hold their own, inflation will come down again in the medium long term. The direct effects of the sharp oil price rises on inflation are expected to wear off soon, while the inflationary effect of the var increase will be limited to 2001. In the longer term, however, a very real risk is that the short-term high inflation figures and the labour market tightness together will trigger a wage-price spiral, in which wage costs would be the principal inflation determinant. In this connection, the fact that the contribution of wage costs to inflation over the forecasted period may rise to almost one-and-a-half percentage points, the highest figure since the 1982 Wassenaar agreement, is ominous.

Summary and conclusions
Prospects for the Dutch economy in the years 2000-2002 are good as far as volume developments go. If GDP volume growth slows down somewhat from 4.0% in 2000 to about 3.5% in 2002, it will nevertheless remain at a relatively high level. The same holds for inflation, which after reaching 2.6% in 2000 will continue to rise to above 4% in 2001, to decrease again to 3% in 2002.

Public sector finances are expected to show budget surpluses throughout the forecast period. In 2002, the general government surplus will run to 1.6%, on the assumption that any additional revenues will be reflected in this

![Chart 4](https://example.com/chart4.png)

**Chart 4 uv curve: registered unemployment and vacancies**

<table>
<thead>
<tr>
<th>Vacancies (% of labour force)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1.5</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unemployment (% of labour force)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

DNB / Quarterly Bulletin December 2000
balance. In 2000, the debt ratio first fell to below the limit of 60% of GDP agreed in the Maastricht Treaty and over the next years, it will continue to fall, to below 50% – a welcome development, if only with the ageing of the population in view.

Part of the rationale behind the risk analyses presented alongside the baseline projection is the macroeconomic effects which risks in the sphere of financial stability may have. It appears that a worldwide stock market adjustment in combination with falling housing prices in the Netherlands would entail wealth effects dampening economic growth. Extreme falls in asset prices could also lead to a decrease in bank lending, through the bank system’s diminishing solvency and the deterioration of private sector wealth. The analysis shows that although such a scenario could have substantial negative effects on the economic development in the Netherlands, the Dutch banking system will be sufficiently sound to deal with such a situation.

Apart from the risks pertaining to financial stability, both downside and upside inflation risks are treated in depth. The high inflation rate during the forecast period is partly caused by high oil prices and the depreciation of the euro. Lower oil prices or a higher exchange rate for the euro may lead to less inflation. Besides, labour market tightness is accompanied by upward price risks. In short, the good prospects are offset by a risk of overheating and the possibility of a wage-price spiral jeopardising growth prospects. Thus, removing the labour market’s bottlenecks is at present the greatest policy-making challenge, especially with part of the labour force unemployed.

7 The third way in which a worldwide share price adjustment indirectly influences the real economy is through the trade relations between various countries. The niger world economic model is eminently suited to to chart these indirect effects, so this transmission channel was consistently taken into account in the share price simulation described above.

8 Tobin introduced the variable $q$ as the ratio between the market value of a marginal unit of capital and that same unit’s replacement cost. The value of $q$, in other words, represents the shadow price of capital in the dynamic transition equation of the stock of capital goods. A value of $q$ greater than 1 thus means that investing in capital goods is profitable, and that as a result the ratio between investment and capital will grow. If the value of $q$ is less than 1, the reverse is true.

9 See e.g. G.J. de Bondt, 1999, *Financial Structure and Monetary Transmission in Europe: a cross sectional study*, Cheltenham. Naturally, these credit channels are important for both businesses and households. Regarding the macroeconomic relevance of credit channels for household consumption, the reader is referred to Chapter 6 of this publication.

10 In a recent article, Bernanke and M. Gertler presented a theoretical model illustrating how the working of the transmission mechanisms under discussion reinforce output fluctuations through a so-called ‘financial accelerator’ mechanism. See B. Bernanke and M. Gertler (1999), ‘Monetary policy and asset price volatility’, Economic Review, 84, Federal Reserve Bank of Kansas City, pp. 17-42.

11 See e.g. A.N. Berger and G.F. Udell, 1994, ‘Some evidence on the empirical significance of credit rationing’, Journal of Political Economy, 100, pp. 1047-1077. They fail to find empirical proof that credit rationing is a significant macroeconomic problem. Nor does the share price, as a rule, manifest itself as a determinant in estimating investment equations.

12 For the Netherlands, indications of this were found by, among others, L. de Haan, 1997, *Financial Behaviour of the Dutch Corporate Sector*, Thèse Thesis, Amsterdam. See also L. de Haan, K.G. Koedijk and J.E.J. de Vrijer, 1994, ‘Buffer stock money and pecking order financing: results from an interview study among Dutch firms’, *De Economist*, 142, pp. 287-305. For empirical evidence concerning the importance of credit channels in several European countries, see G.J. de Bondt, 1999, op. cit.


14 Research performed at the Bank has confirmed that there is little correlation among international housing prices. See M.C.J. van Rooij and L. Vos, ‘De samenhang tussen Europese huizenprijzen’, *Maandschrift Economie*, Volume 63, June 1999, pp. 224-229.

15 Recently the number of mortgage renewals and second mortgages has been declining as mortgage rates have risen.


17 See e.g. R.T.A. de Haas, A.C.F.J. Houben, J.I. Kakes and H. Korthorst, 2000, *De kredietverlening door Nederlandse banken onder de loep*, *Monetair Monografieën* 18, De Nederlandsche Bank, or the article ‘Asset price inflation on the equity and housing markets: risks and policy implications’ in this Quarterly Bulletin.

18 It is implied here that prices are fully adjusted for the new value of a marginal unit of capital in the dynamic transition equation of the stock of capital goods. A value of $q$ greater than 1 thus means that investing in capital goods is profitable, and that as a result the ratio between investment and capital will grow. If the value of $q$ is less than 1, the reverse is true.

19 The contribution of the energy component is also partly determined by taxation such as the regulatory energy tax, also known as *ecotax*.

20 E.g. through delayed adjustment of natural gas prices to market developments.
