

# Monitoring the macroeconomic determinants of banking system stability

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Over the past few years, prudential authorities and, more specifically, central banks have focused increasing attention on the macroeconomic determinants of the stability of the banking system. Banks' vulnerability to changes in the economic environment, the many structural changes within the financial markets, and the banking crises which have recently hit a number of countries (including industrialised economies) are among the main factors underlying this enhanced interest. This paper examines the ways in which these macroprudential analyses are dealt with in Belgium.

These ways are partly conditioned by both the structural and the institutional environments in which the Belgian financial system operates. This general framework is examined in the first section of this paper. Notwithstanding these special national features, the theoretical foundations used for analysing the macroeconomic determinants of the stability of the banking system apply to the entire financial market. Those foundations are reviewed in the second section, which gives a brief overview of the economic literature devoted to the determinants of financial crises.

The third section deals with credit and interest rate risks, which are both highlighted by these theoretical analyses and considered as the most traditional components of the risks run by credit institutions.

The fourth section examines risks of a more structural nature which are also created by the interaction between the banking sector and the financial and real spheres of the economy. Banks do in fact run strategic risks in so far as they have to modify their lines of behaviour and activity in order to cope with changes in the economic and financial environment in which they operate. Furthermore, a number of recent changes, such as disintermediation and the development of new financial products, have enabled the banks to transfer part of their traditional credit or market risks to other economic agents, thereby possibly exposing the banks to other hazards, such as a weakening of the global financial resilience of customers or even reputational risks. The last section concludes.

## 1. Institutional and structural framework

In Belgium, the NBB does not have any specific brief in connection with bank supervision. It is not, of course, the only one in such a situation, since within the European Union prudential monitoring is the responsibility of the central bank only in six countries, namely Italy, Spain, the Netherlands, Portugal, Ireland and Greece. However, in four of the six other member states (Germany, France, Austria and Finland) the central bank does have to play an important role, either by providing the chairman of the banking supervisory body or by making staff available to that body, or again by carrying out certain assignments on its behalf. Belgium, together with Luxembourg, is the EU member country in which the demarcation between the central bank and the prudential authority is most clear-cut.

Despite this absence of direct responsibility, the NBB does however have various links with the body entrusted in Belgium with the supervision of banks and investment undertakings, the Banking and Finance Commission (BFC). It is thus laid down that a member of the NBB is an ex officio member of the BFC's decision-making body. The Bank is also consulted when changes are made in the prudential regulations and the accounting principles governing the presentation of the accounts of credit institutions. Lastly, the financial information and accounts provided by the banks in order to enable the BFC to carry out its off-site analysis are communicated to the BFC via the NBB, which carries out verifications and performs validation tests in advance. This procedure enables the Bank to maintain regular contacts with the banks and the BFC, and gives it direct access to statistical data which are particularly useful for macroprudential analyses.

The NBB's relatively limited involvement in the monitoring of the banking system is also attributable to more structural causes. Since the end of World War II, the Belgian banking system has displayed a fairly high degree of soundness, in contrast with the developments observed in many other countries. According to Lindgren et al (1996), who carried out a fairly extensive survey of banking problems

recorded between 1980 and 1996, 140 countries, including 24 OECD member states, have encountered such difficulties. Belgium is one of only five OECD members not to appear on this list.

This favourable development is attributable to a significant extent to the very structure of the activities of the Belgian banking sector. Owing to the high level of general government borrowing, public debt securities represent a very large proportion of the assets of credit institutions. Thus, about 40% of the Belgian banks' claims on resident sectors have general government as their counterparty; the corresponding average percentage for Germany, France, the United Kingdom and the Netherlands is only 11%. Conversely, the claims vis-à-vis companies and individuals, which carry higher risks, represent 58% in these four countries, against 39% in Belgium.

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Table 1  
**Breakdown of assets of credit institutions by resident sector**  
(outstanding amounts at end-1997, percentages of total assets vis-à-vis resident counterparties)

	Belgium	Germany	France	Netherlands	United Kingdom	Average of the 4 latter countries <sup>1</sup>
Individuals	18.9	30.1	20.3	40.3	41.4	33.0
Companies	20.5	20.0	24.5	35.7	19.8	25.0
General government	40.9	16.7	10.2	15.3	2.9	11.3
Credit institutions	19.7	33.2	44.9	8.7	35.8	30.7
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

<sup>1</sup> Unweighted average.

Sources: ECB; NBB.

Intermediation of the abundant financial savings of households in order to finance general government therefore still constitutes one of the major traditional functions of Belgian banks. They have been able to play this role by succeeding, through active use of their distribution network, in placing their own bonds with individuals at the expense of direct subscriptions for public securities.

This favourable structure must not of course be used as an excuse for an attitude of benign neglect to problems of a macroprudential nature. Moreover, the pressure of events is making itself clearly felt at this level. The challenges faced by the banking sector do not spare Belgian banks, nor are these sheltered from the contagious effect on their domestic market of accidents originating in other countries.

The management of the many banking crises which have occurred in recent years has, furthermore, focused attention again on the essential contributions which central banks can make, whatever their role in the microprudential field, to containing systemic risks.

The first is the adoption of a clearly defined objective of price stability, which is the best guarantee of financial stability, since such an environment reduces uncertainties and eliminates one of the fundamental causes of distortion in financial choices.

The second is the devising of reliable and efficient payment mechanisms. Such mechanisms ensure rapid and transparent transmission of monetary policy, but also make it possible to prevent the breakdown of a payment system or the default of one of the participants from bringing about a disruption of all the financial markets.

A third role which central banks may have to play in the event of the outbreak of a financial crisis is that of lender of last resort. Owing to the many types of interaction which take place nowadays between markets, the possible causes of systemic risks have become more numerous and the potential consequences of individual incidents more unpredictable.

In this context, the concepts of individual problems and temporary liquidity difficulties are no longer sufficient, on their own, to mark out with certainty the limits to the last-resort interventions of central banks. It is therefore vital for the latter to carry out regular analyses and adequate monitoring of the overall stability of the financial system.

In this field, the NBB is in a rather privileged position, owing to the very important role which it plays in the collection, analysis and dissemination of statistics in Belgium. In addition to its intervention, mentioned earlier, in the processing of the financial accounts submitted by the banks, the NBB is also charged with the administration of the Central Register for Credits to Enterprises and to Individuals and of the Central Balance Sheet Office, which collects the standardised accounting statements which have to be filed by all Belgian non-financial enterprises. It also conducts business surveys and is responsible for the balance of payments and foreign trade statistics. Lastly, it is the Bank that draws up, on behalf of the National Accounts Institute, the national accounts data, not only for the financial part but also for the real economy.

These various sources of information enable the Bank to supplement the analyses made by the BFC. While the latter adopts a kind of bottom up approach by grouping together the data concerning the individual banks to obtain an overall view of the entire banking sector, the NBB takes a top down view by examining the implications of major macroeconomic developments for the operation of the financial markets in general and the stability of the banking system in particular.

The spectacular expansion in the volume of financial transactions compared with that of real activity has, moreover, led the Bank to examine the link between these two spheres of the economy from a new angle. While it is of course still essential for a central bank to carry out a very close examination of the effects which changes in financial conditions produce on the real part of the economy, largely via the process of transmission of monetary policy, the financial system has, conversely, become more vulnerable to developments in the real sphere. This trend therefore makes it necessary to reverse the direction of the analyses by studying to what extent macroeconomic developments of a real nature can affect the stability of the financial system.

## **2. Theoretical outline of the determinants of financial crises**

Problems of a systemic nature, which can affect the whole of the banking sector, have been the subject of various theoretical analyses. Attempting to clarify the mechanisms of development of such risks, these analyses seek to draw lessons on the warning signs of financial crises. A first subsection deals with the more traditional approaches, namely the purely empirical works, demand-based explanations and monetarist-type analyses. A second subsection presents the more recent theory of asymmetric information, which places the emphasis more on the specific situation of credit institutions.

### **2.1 The traditional approaches**

In the absence of strict definitions of the concept of financial crises, many analyses covering this phenomenon adopt an essentially empirical approach based on circumstantial data and episodes (for instance, Kindleberger (1978)). This viewpoint has several deficiencies. By concentrating on the actual crises, it fails to account for risks which, while potentially destabilising, have been successfully confined by preventive action. Furthermore, empirical studies often lead to the attribution of any excessive volatility on financial markets to a systemic problem. They may thus lead to the choice of an excessively wide range of indicators. Conversely, by ignoring the logical links between the various constituent elements of a financial crisis, they may fail to take account of phenomena which, though unspectacular, nevertheless play a central role in the way a crisis develops.

Two rather different theoretical approaches, the Keynesian and monetarist lines of argument, have tried to lessen the shortcomings of empirical analysis. The former attributes the origin of financial crises to a decrease in demand. According to this school of thought, the assessment of financial risks

should therefore take account mainly of the development of the components of aggregate demand, measured either directly or, preferably, via indicators which are more readily available.

While the course of the business cycle certainly does exert an influence on the stability of the financial system, not every recession phase is accompanied by a systemic crisis. Conversely, a worsening of systemic risks is not always preceded by a slackening of activity, but may on the contrary trigger a cyclical turnaround.

The monetarists, for their part, attach only moderate importance to the cyclical variables, because they tend to analyse the economy from the angle of monetary developments. Thus, they trace the starting point of the financial crisis of the 1930s back to the rise in interest rates triggered at the end of 1928 by the Federal Reserve. The 1930 banking crisis, which in their opinion is the central element of the propagation mechanism of this crisis, is thus regarded as an essentially monetary phenomenon, because it was reflected in a cumulative decrease in the monetary multiplier. In the absence of a sufficiently expansionist monetary policy, the money supply therefore decreased rapidly, leading to recession.

By reducing the elements explaining financial crises to monetary factors alone, some monetarists go so far, at the extreme, as to deny the existence of a systemic risk applying exclusively to banks. Kaufman (1986), for instance, claims that the latter are not intrinsically more fragile than non-bank enterprises, and that the risk of contagion resulting from a possible bankruptcy is not greater. This approach obviously greatly narrows the scope of the argument, even though it has the indisputable advantage of giving prominence to the role of monetary stability in maintaining financial system soundness.

Table 2  
Synoptic table of the main approaches to financial crises

Approach	Source of financial crises	Main advantages of the approach	Main drawbacks of the approach	Preferred indicators
Essentially empirical approaches	Sources identified in an ad hoc manner, often by reference to the depression of the 1930s	Simplicity. Episodes close to on-the-ground reality. Recreate the historical and the socio-economic environment	Concentrates on crises which have actually occurred, failing to consider potential crises	Very wide-ranging sets of indicators
Keynesian approach	Insufficient global demand	Stress on the cyclical factors which constitute a major determinant of financial crises	Neglects the non-cyclical causes of financial crises	Aggregate demand and its components, or more rapidly available indicators
Monetarist approach	Financial crises always have a monetary origin (inadequate development of monetary aggregates or inappropriate interest rates)	Emphasis on the importance of monetary stability	Neglects the intrinsic causes of fragility of banks. Financial crises too restrictively defined	Interest rates, monetary aggregates, interbank market liquidity, etc
Asymmetric information models	Problems of adverse selection (poor choice of co-contractors) and moral hazard (harmful behaviour of co-contractors)  The main factors aggravating the moral hazard or adverse selection are the deterioration of repayment capacities, the rise in real interest rates and the volatility of asset prices	Strict definition of financial crises  Very structured theoretical foundations, well suited to the banks' intermediation activity	Approach essentially centred on market and credit risks  Fails to consider the crisis factors which do not intensify the asymmetric information problems	Solvency and liquidity of companies, households and banks  Nominal and real interest rates  Inflation rates  Share and bond prices and exchange rates (affecting guarantees)

Source: NBB, Economic Review, May 2000.

## 2.2 The asymmetric information models

The aim of the asymmetric information models is to remedy the shortcomings of the traditional economic approaches. Contrary to empirical analysis and, to a lesser extent, to the demand-based approach, which is more cyclical in essence, these models in fact propose a strict definition of the

phenomenon of a financial crisis. Moreover, their analysis framework is considerably less restricted than that of the monetarist approach.

The asymmetric information approach furthermore draws attention to phenomena of discontinuity in intermediation activity, whereas traditional economic theory is characterised by its marginalist line of argument and by the concept of equilibrium.

Ultimately, the management of the credit risk associated with information asymmetries is central to the banks' intermediation activity, while the knowledge which they accumulate concerning the profile of their borrowers constitutes their main comparative advantage with respect to the securities market.

Information asymmetry may take two forms which are often referred to in insurance theory, namely adverse selection and moral hazard. Very briefly, adverse selection refers to perverse mechanisms of choice of co-contractors or partners which lead to a biased risk structure. A moral hazard exists when an inadequate incentive structure induces a contractor to involve himself, after the conclusion of the contract, in activities which are liable to impede the successful progress of that contract.

Economists such as Mankiw (1986) and Mishkin (1991) have put forward the concept of asymmetric information to explain the occurrence of financial crises. In their view, moral hazard and adverse selection may, beyond a certain level, lead to a break in the intermediation channels, as these two phenomena may greatly obscure the information available to the banks on the quality of debtors. This may lead to a veritable rationing of credit, which may be damaging to the most solvent debtors even when they are willing to put up with interest rate conditions which are profitable for credit institutions. This is, moreover, the kind of situation which Mishkin (1991) refers to in his definition of a financial crisis: "financial crisis is a disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities".

By analysing the anatomy of various US financial crises, Mishkin draws attention to three categories of indicators which have often coincided at the beginning of a financial crisis. These are the worsening of the ability to repay loans, the rise in real interest rates and the volatility of asset prices.

The first factor fits directly into the framework of the banking profession. Owing to the special relationships which they maintain with their customers and thanks to their accumulated expertise, credit institutions have a decisive comparative advantage as regards credit risk management, which enables them to lessen the problems of asymmetric information. This advantage may, however, lessen if the environment becomes more unstable.

A rise in real interest rates constitutes the second factor of financial instability identified by Mishkin. This fundamental determinant operates at two levels. On the one hand, higher real interest rates can be borne only by borrowers whose investment projects are sufficiently profitable. This substantial degree of profitability is generally coupled with an increased risk profile. On the other hand, the most reliable borrowers are the victims of obvious discrimination when the banks, as a result of their inability to evaluate individual risk profiles, impose uniform borrowing conditions on their customers. By exacerbating this discrimination, a rise in the real rate will induce the most solvent operators to leave the market.

The third indicator, namely an increase in the volatility of asset prices, is more akin to market risks. Its influence is exerted via loan guarantees, the existence of which makes it possible to lessen the problems of moral hazard and adverse selection. An erosion of the value of guarantees, which constitute the penalty associated with default, becomes less of a deterrent when this guarantee loses some of its value. Furthermore, it reduces the protection enjoyed by banks against credit risks.

The banks are not only potential victims of moral hazard and adverse selection. They can also derive an advantage from these mechanisms. In the event of difficulties due to a deterioration in their customers' repayment capacities or a fall in the market value of their securities portfolio, some banks may be tempted to engage in riskier activities in a sort of "gamble for survival".

Similarly, the banks' perception of the existence of an implicit guarantee owing, for instance, to the principle of "too big to fail", or possibly an excessively generous deposit guarantee system, might induce some credit institutions to give preference to excessively risky investments.

Lastly, identical mechanisms of moral hazard and adverse selection are liable to extend the problems originally created by individual institutions to the entire banking sector. Firstly, depositors, who are generally unable to differentiate between credit institutions according to their solvency, will be induced to make massive withdrawals of their deposits, even from sound banks, for fear of being the victims of

adverse selection. Secondly, the existence of chains of claims and debts between financial institutions might accentuate the moral hazard if it strengthens, within the banking sector, the assumption of an intervention by the lender of last resort.

### **3. Credit and interest rate risks**

#### **3.1 General framework**

As indicated by the review of the economic literature in Section 2, theoretical analysis of the determinants of financial crises took a long time to free itself from its close links with traditional macroeconomic analysis, whether Keynesian or monetarist in spirit. The great merit of the asymmetric information approach is the focus on the factors that set credit institutions apart from other sectors of activity.

This indisputable progress in the theoretical approach has not perhaps been sufficiently accompanied as yet by parallel progress in empirical measuring instruments. This dichotomy might have a number of different explanations. Firstly, financial statistics remain in several respects less developed and less harmonised than real statistics, especially as regards data on outstanding amounts. Financial flows are often difficult to trace and are subject to sharp fluctuations. While the annual flows of real transactions vary within narrow limits, changes in stocks measured by the financial accounts are liable to jump suddenly from strongly positive balances to strongly negative ones.

This situation leads to a second difficulty. Capital movements are more difficult to predict and model. While there are a number of global and integrated real models, financial models are often more restricted in scope. They are generally confined to the transactions which are most directly relevant for the transmission channels of monetary policy and only very rarely apply to the problems of the stability of the financial sector.

Lastly, macroprudential analysis probably requires certain changes in perspective. On the one hand, as already indicated above, the traditional analyses which examine the impact of financial developments on the real sphere must be coupled with an approach which studies the implications of real developments for the soundness of the financial sector. On the other hand, the developments to be detected are no longer exposed just to gradual changes but may also reflect sharp deteriorations, since systemic crises are characterised by a discontinuity in intermediation activity.

In this context, sophisticated instruments such as financial stability models or composite indices are not as yet widely available. Macroprudential studies are still largely based either on balance sheet analysis techniques applied to the accounts of credit institutions or on the macroeconomic indicators which are most directly connected with banking activity.

Belgium is no exception and still relies on this traditional approach. The risk indicators presented below are eclectic and limited. They do not aim to lead to an overall assessment of the stability of the Belgian banking sector, which is not the subject of this paper. They confine themselves to briefly illustrating some advantages and limitations connected with the use of a few indicators by dealing successively with the risks connected with credits to enterprises, credits to individuals and interest rate positions. The emphasis is on the macroeconomic data which can supplement the data derived from the financial accounts of credit institutions.

#### **3.2 Risks on credits to enterprises**

The risks run by banks on their credits to enterprises will depend, on the one hand, on the development of the outstanding amounts of these credits on the assets side of the balance sheet and, on the other, on the lesser or greater probability of their suffering losses on these assets.

However, the rates of change in bank credits to companies, as they appear in the statements of account of credit institutions, provide only a very sketchy picture of the development of companies' financing requirements. As is shown by the data of the Central Balance Sheet Office, bank credits represent less than 20% of the financing sources of Belgian enterprises. This is not, incidentally, a situation unique to Belgium. It is much the same in the other EU countries, as can be seen from the

BACH file in which the European Commission groups together the data concerning the annual accounts of enterprises in nine member states.

The fact that this proportion is small is not attributable, in Belgium any more than in the other countries of the Community, to a large growth in issues of fixed interest securities, the outstanding amount of which is still very small in Europe for non-financial companies. The share of equity capital has increased in a favourable stock market climate, but the main point to be noted is that over 40% of financing resources come from other (intragroup, commercial, payroll, tax, etc) debts.

An analysis and follow-up of the financing transactions carried out between enterprises in the form of intragroup credits or commercial credits is thus seen to be a necessary supplement for the monitoring of banking or market financing transactions. How do the big multinational groups manage their financial flows and spread their risks? What are the payment periods granted by or imposed on enterprises? Do these periods change over time according to the size of the enterprises or depending on the business cycle?

An analysis of the probabilities of default or of the risks of losses carried out on the basis of the banks' accounting data will have to rely chiefly on the development of provisions, supplemented where appropriate by an examination of risk concentrations. However, these data are not always easy to aggregate and often necessitate an individual approach.

In particular, provisions are generally formed by banks on a case by case basis when objective signals appear or as a result of specific events which point clearly to a worsening of the risk on a particular credit. They are rarely envisaged as a regular charge to be covered in advance according to expected losses. This conception deprives the provisions indicator of much of its predictive value.

The development of credit risk management techniques should lead to major developments in this field. It is also a sphere in which the use of macroeconomic data, particularly those of the Central Balance Sheet Office, might contribute not only to a better analysis of macroprudential stability but also to an improvement of the risk provision procedures advocated by the microprudential authorities.

Another statistical source, the Central Register for Credits, makes it possible to produce a sectoral breakdown of bank lending to enterprises, which is not generally possible on the basis of the banks' financial accounts.

This sectoral breakdown is, for Belgian banks, fairly close to that of the sectors' shares in total value added. This distribution of risks by types of activity is accompanied by a high degree of spread among enterprises. As the Belgian economy consists chiefly of SMEs, the average amounts of the bank loans contracted by enterprises do not reach an outstanding amount of 1 million euros in any sector.

The Central Register for Credits also provides an item of information which is at first sight less reassuring. The coverage ratio of interest charges (net operating result plus financial proceeds in relation to financial charges) is low, indeed less than unity in several sectors. This situation reflects the tendency of a large number of enterprises, particularly SMEs, to close their accounts near to break-even for tax reasons.

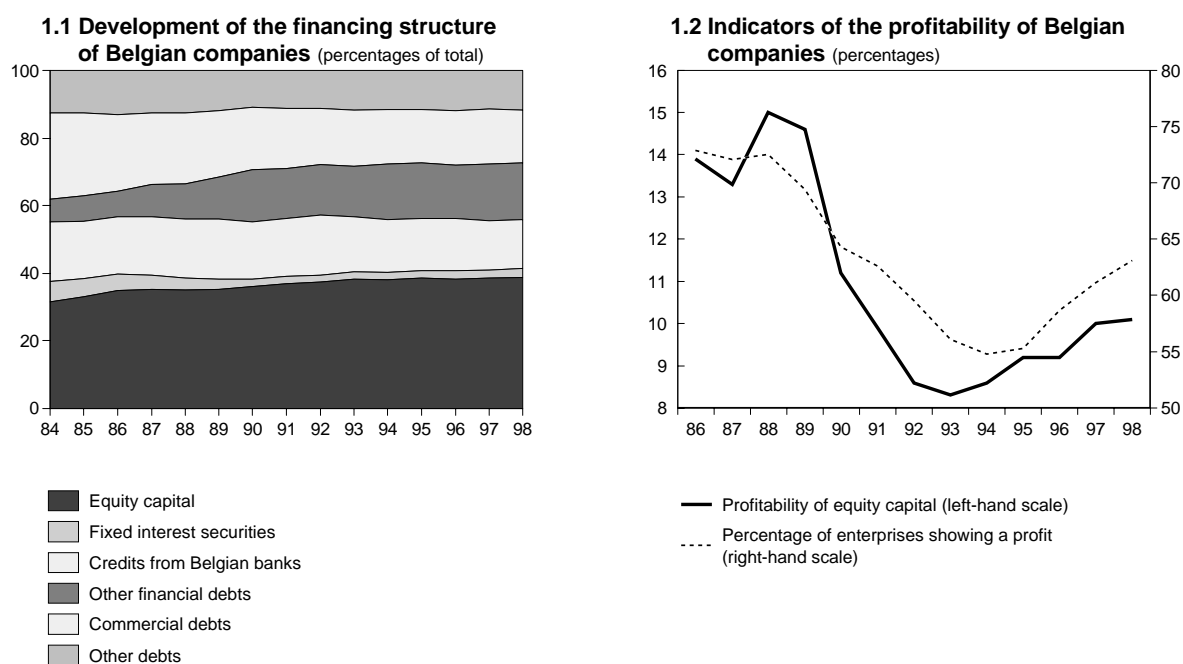
This behaviour is illustrated by the percentage of enterprises which have suffered losses, independently of the size of these negative results. This percentage has fluctuated between 35 and 45% since 1990.

While this indicator throws little light on the average profitability of Belgian enterprises (this is more appropriately measured by the profitability of equity capital), it does highlight the problems of data quality. The data of the Central Balance Sheet Office constitute a useful supplement to those of the banks' financial accounts, but they are also much less reliable.

The gaps and weaknesses still displayed by the accounts published by many non-financial companies continue to be one of the major sources of asymmetric information between borrowing enterprises and their lenders. The banks, owing to their special relationships and their bilateral contacts, endeavour to reduce this asymmetry, but obviously without being able to eliminate it entirely.

Figure 1

## Indicators of financial soundness of companies

**1.3 Analysis of the sectoral breakdown of bank credits to Belgian companies at end-1999**

	Loans contracted as percentage of total credits	Value added as percentage of total	Average amount of loans contracted in thousands of euros	Coverage ratio of interest charges
Agriculture	4.2	1.6	104.1	0.6
Industry	24.6	25.9	947.0	2.9
Building	5.1	5.7	200.8	1.4
Trade	23.2	14.1	265.2	1.3
Hotels and catering	2.4	1.9	138.8	1.3
Transport and communication	7.0	8.5	629.6	1.6
Real estate	9.4	10.0	535.5	0.8
Other services to enterprises	14.3	14.1	379.3	0.8
Other services to households	9.8	18.2	171.0	2.4
Total	100.0	100.0	312.3	1.8

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Sources: Gerling Namur; NAI; NBB.

**3.3 Risks on credits to individuals**

The risks connected with the granting of credits to individuals are, in a number of respects, different in nature from those resulting from loans granted to enterprises.

Firstly, the average amount of credits per borrower is much smaller. The distribution of total credits over a larger number of debtors leads to greater diversification of risks and, furthermore, a very large proportion of the outstanding amount of borrowings is covered by mortgage guarantees. Secondly, the management of the risks connected with credits to individuals can be standardised to a greater extent, since the uncertainty factors liable to undermine the situation of this category of debtors are less numerous than in the case of credits to enterprises. Thirdly, losses on credits in the event of an



economic recession do not generally take place at the same time for loans to individuals and those to enterprises, since the latter are the first to suffer the financial consequences of economic difficulties, whereas individuals are affected by them only at a later stage, as a result of losses of income due to redundancies, bankruptcies, etc.

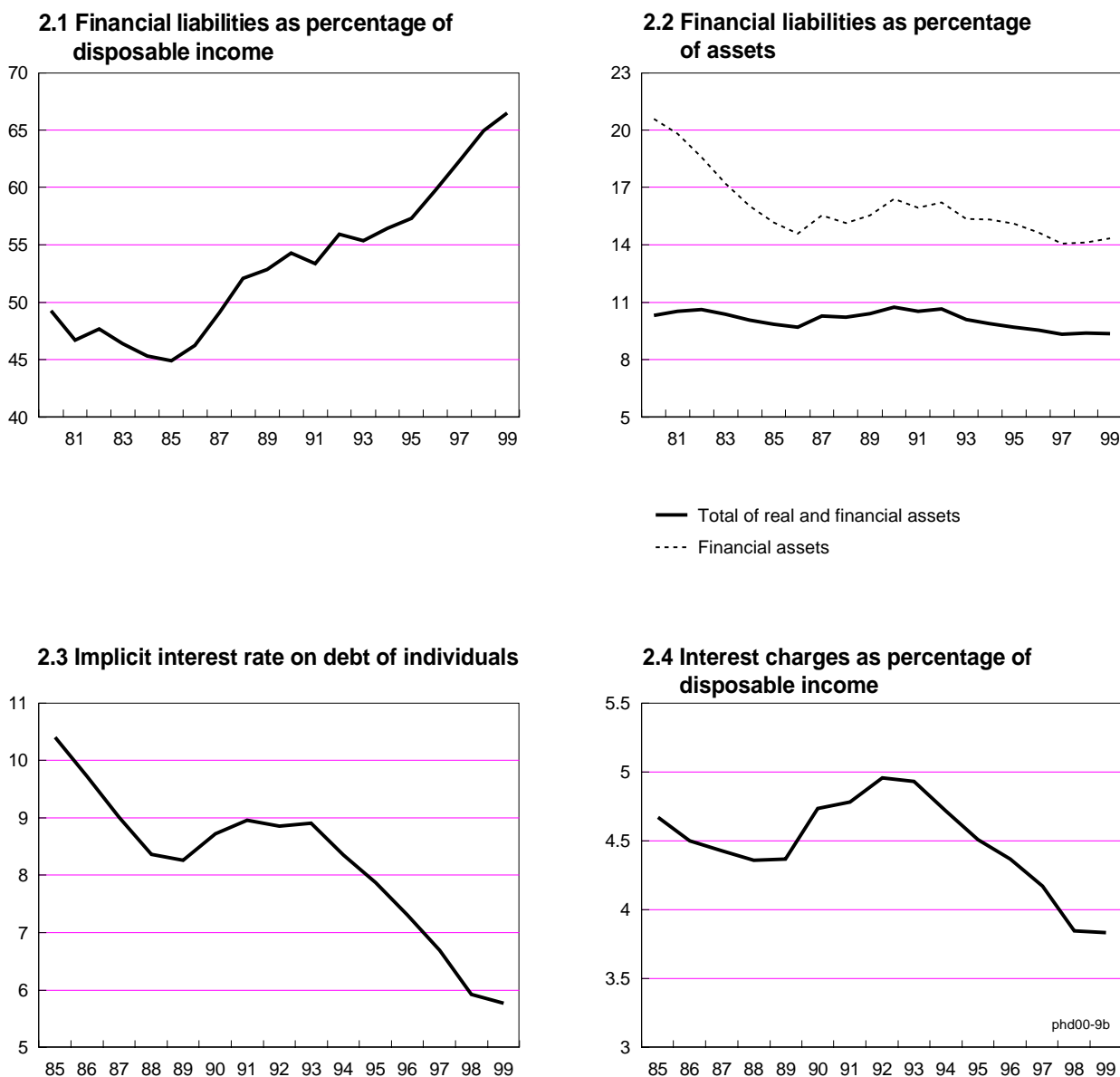
Unlike enterprises, individuals depend almost exclusively on the banks for their financing, and therefore the accounting data of credit institutions give a very good indication of the development of the liabilities of individuals.

On the other hand, individuals' investments are much more diversified, so that recourse to a wider set of statistics (the financial part of the national accounts) is required in order to obtain correct information on this other component of the financial situation of individuals.

As has been the case in many other countries, the steady growth in the liabilities of individuals as a percentage of their disposable income has been accompanied in Belgium by a similar increase in financial assets. Consequently, debts expressed as a percentage of total assets have remained very stable.

Figure 2

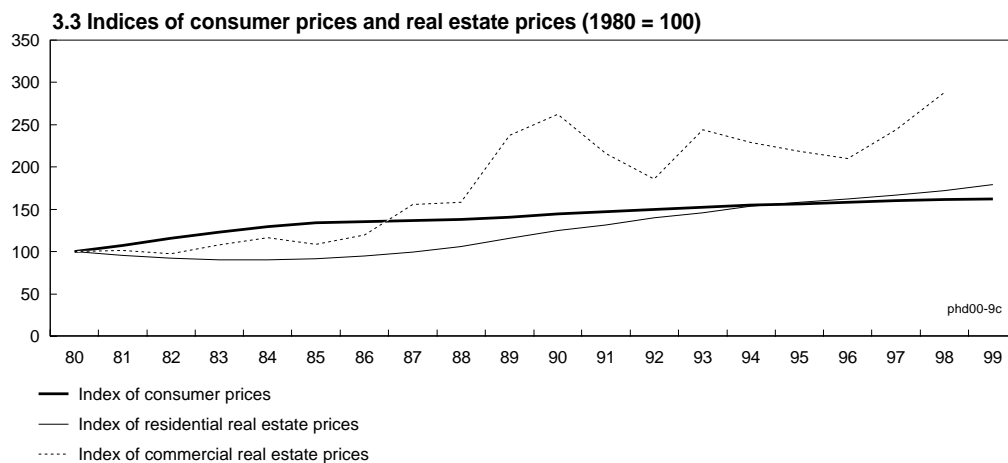
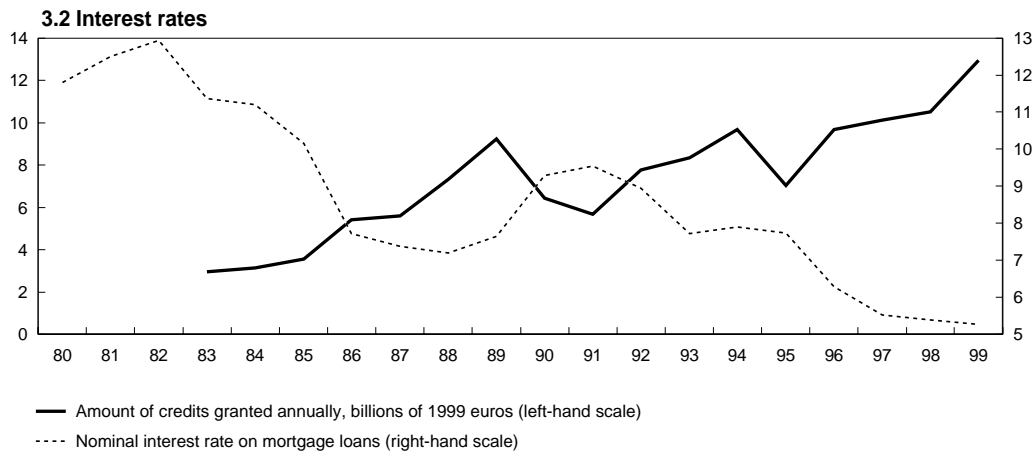
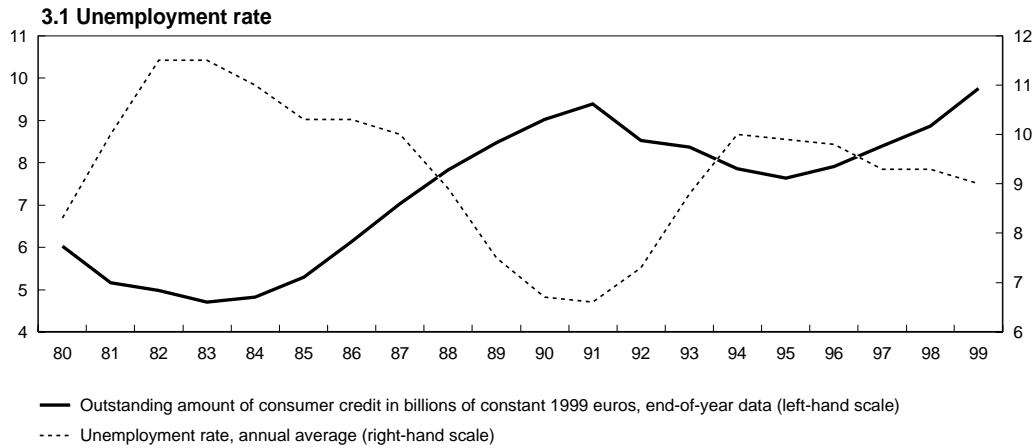
**Indicators of financial soundness of individuals**



Sources: NAI; NBB.

Figure 3

Determinants of the development of credits to individuals



Sources: NSI; Ministry of Economic Affairs; Ministry of Employment; Fortis Bank; NBB.

This is of course only an aggregate situation. The individuals who have increased their indebtedness are not necessarily those who have increased their holdings of assets. Furthermore, these assets may have become riskier or more sensitive to changes in prices (we shall return to this point in Section 4).

The financial situation of households is also very sensitive to the movement of interest rates, owing to the large amount of interest in the total charges on mortgage loans, especially during the first repayment years. A great number of borrowers have taken the advantage of the fall in interest rates to refinance their credits, which has helped to reduce total interest charges as a percentage of disposable income.

Two other macroeconomic components to be taken into account are the general development of economic activity (especially the labour market situation) and the development of real estate prices.

In Belgium, consumer credits display a fairly marked anticyclical character. They move clearly in the opposite direction to the unemployment rate, and this inverse correlation is thought to be due to the fact that consumer credit is largely intended to finance the purchase of durable consumer goods, the movement of which follows the course of the economic cycle fairly closely.

This inverse relationship, which at first sight appears to reduce the risks run by banks in the event of a cyclical downturn, is hardly confirmed for mortgage loans. The course of the annual amounts of new credits granted in this form appears to be chiefly dictated by the movement of interest rates.

In Belgium, the price of residential real estate has not undergone any speculative rises. Taking into account a catching-up movement after the stagnation of prices observed in the early 1980s, they have, over these 20 years as a whole, risen at more or less the same rate as the consumer price index. This is in contrast to the movements observed in several other countries, or even in Belgium itself, with the much more pronounced changes which have taken place on the market for buildings for commercial use.

### 3.4 Interest rate risks

Maturity transformation is one of the main activities of credit institutions. The annexes to the financial accounts submitted by Belgian banks provide particularly useful information in this field. They break down the banks' assets, liabilities and off-balance sheet items into 10 different periods to the next adjustment of interest rates.

An aggregate position is shown as an example in Table 3, in which the data are expressed as a percentage of equity capital. Some characteristics emerge clearly.

Table 3  
**Position in euros of Belgian banks classified according  
to period to next interest rate adjustment**  
(data as percentage of equity capital at end-September 1999)

Periods	Assets	Liabilities	Net balance sheet positions	Net off-balance sheet positions	Total net positions
Indeterminate	351	655	- 303	- 5	- 308
Up to 8 days	255	651	- 397	53	- 344
More than 8 days, up to 1 month	153	234	- 81	66	- 15
More than 1 month, up to 3 months	264	251	12	- 13	- 1
More than 3 months, up to 6 months	240	180	60	9	68
More than 6 months, up to 1 year	276	156	120	- 53	68
More than 1 year, up to 2 years	164	102	62	- 17	45
More than 2 years, up to 5 years	357	143	214	- 31	183
More than 5 years, up to 10 years	283	42	241	- 49	191
More than 10 years	96	5	91	15	106

Source: NBB.

First of all, net very short-term liabilities serve to finance net assets at over three months and, furthermore, the positive differential between medium- and long-term assets and liabilities appears to be proportionately greater the more distant the maturity date. Secondly, Belgian banks make active use of off-balance sheet transactions to manage their interest rate positions, but despite this recourse to derivatives the total net positions remain substantial, especially at the two ends of the maturity range. Lastly, a significant proportion of the transactions included in the balance sheets of Belgian credit institutions are for an indeterminate period (current account advances and fixed assets on the assets side, equity capital, provisions and, above all, savings deposits on the liabilities side). The choice of the duration to be applied to these items is thus one of the key variables of the banks' asset and liability management.

While these statistics obviously fall far short of the much more finely differentiated data used by the banks for managing their individual interest rate risks, they do provide a relatively detailed overall breakdown by term, especially as these data are also available by major balance sheet item (interbank, claims and debts vis-à-vis customers, investment and borrowings in the form of securities, etc).

At the microeconomic level, the BFC uses these data to highlight, by means of comparisons with reference groups, any individual lines of behaviour which diverge greatly from the average. At the macroeconomic level, these data can be used to evaluate the effects of a constraint which affects the whole of the banking sector, for example through scenario analysis aimed at assessing the overall effect, for the banks, of a given variation in the interest rate structure.

The overall position of Belgian banks is in fact partly dependent on the timing choices made by all economic agents, even if the field of this constraint has widened from the Belgian franc area to the euro area. The permanent achievement of an overall balance for the whole sector, apart from depriving the banks of their income from maturity conversion, might entail enormous fluctuations in interest rates.

These interest rate positions, which largely relate to securities, make Belgian banks very sensitive to the capital gains or losses recorded upon the realisation of part of their securities portfolio. Between 1995 and 1998, in a context of falling rates, the capital gains made by Belgian banks on these transactions represented, on average, 11% of bank earnings (the latter figure corresponding to the net interest results plus other net income). Owing to the rise in rates, this figure amounted to only 6% in 1999.

## **4. Structural risks**

### **4.1 Strategic risks**

An examination of the stability of the Belgian banking sector confined to credit and market risks presents an incomplete picture. While these risks do at present appear to be fairly well under control, this is largely due, as has been indicated above, to a concentration of claims on low-risk debtors (general government).

This situation is not without its counterpart. It is accompanied by a fairly traditional activity structure and relatively modest profitability, at least when the latter is measured in relation to assets; the yield on assets of Belgian banks having, on average over the period 1995 to 1998, amounted to only 0.39% against 0.64% for the European Union as a whole. The extent of their claims on general government does however allow the Belgian banks to meet the solvency ratio requirements while contenting themselves with a proportionately more limited level of equity capital. By making more use of the leverage effect, Belgian banks thus succeed in obtaining a return on equity very close to that of the other banks in the European Union.

This overall structure is, however, the result of widely differing individual situations, as the variation between credit institutions is very great. In 1999, around 30% of Belgian banks recorded a profitability figure of less than 4%, whereas 13% of banks achieved a return on equity of more than 20%.

Figure 4

**Indicators of bank profitability**

(average percentage for years 1995 to 1998)

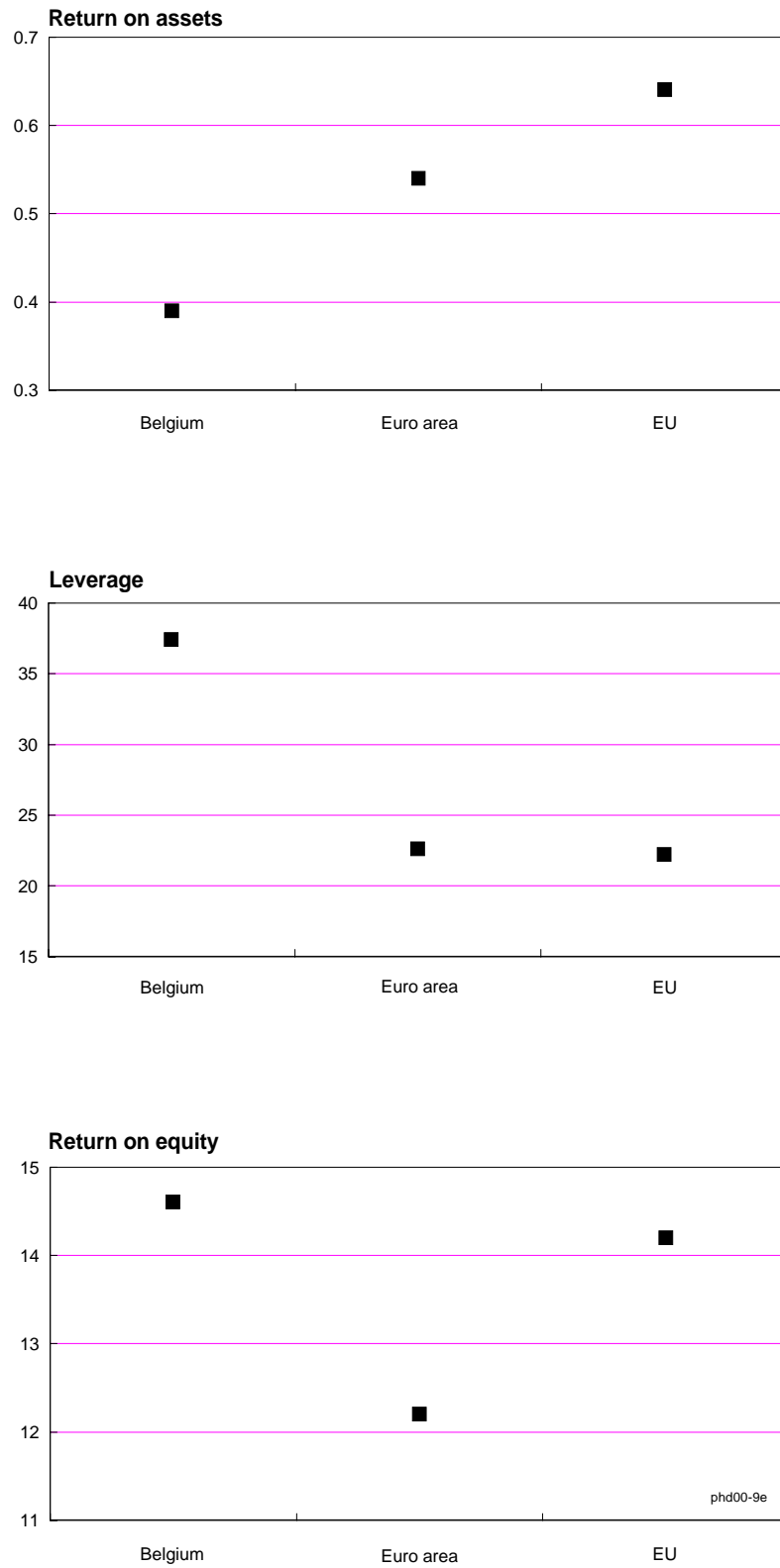
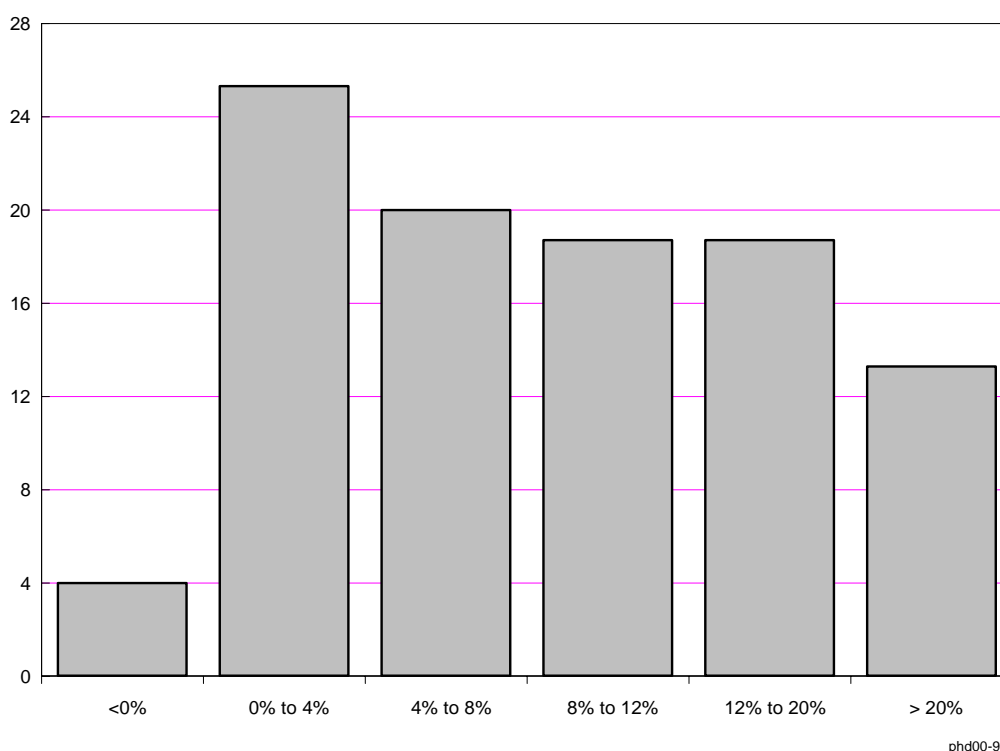


Figure 5

**Spread of yields on equity capital of credit institutions governed by Belgian law**

(data for 1999, as percentage of total, on a corporate basis)



Source: NBB.

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The inadequate profitability of many Belgian banks coupled with a generally rather low capitalisation rate, limits their scope for development of operations with a private clientele requiring a greater degree of capital cover. It also makes external growth through acquisition of other financial institutions more difficult. Furthermore, the possibilities for undertaking capital increases are limited owing to the high yield requirements of shareholders and the importance attached to shareholder value.

Against this background, there is a temptation to increase profitability by taking greater risks. This is true not only for Belgian credit institutions but also for the international banking sector as a whole. In other countries, too, shareholders' requirements have to be satisfied in an environment in which disintermediation and increased competition among institutions exert downward pressure on margins.

The potential dangers of these shifts towards higher "risk-yield" couplings may not materialise immediately if the business situation is favourable. However, in such a scenario, the adverse consequences for banks of a cyclical downturn are greatly increased.

It can thus be seen that an examination of the exposure of banks to the business cycle cannot be made without undertaking a parallel analysis of the structural developments affecting the banking sector. The cyclical and structural components interact with each other, and this explains why banks are not affected in the same way during each recession.

In many banking crises, the driving force appears to be a change in the structural environment, which is reflected in the adoption of unsuitable lines of behaviour. The cyclical downturn then merely brings a latent crisis to the surface.

These interactions can be analysed with reference to the "structure-behaviour-performance" paradigm taken from the theoretical framework of industrial economy: the structure of the market leads to certain lines of behaviour which, in turn, have an effect on performance.

This paradigm can be used to analyse the banking crises which have affected several industrialised economies (for instance the United States, Japan and the Nordic countries) during the last 15 years. These crises have been greater in number and more pronounced than those observed during the

1970s and in the early 1980s, even though the latter period was marked by the two deep recessions caused by the double oil shock.

These divergences are very probably attributable to the differences in the regulatory environment. Between these two periods, most banking systems moved from a fairly rigid structure marked by controls on prices and/or volumes of activity to a more flexible structure, most of the regulatory constraints having been lifted. Many banks sought to exploit this margin for manoeuvre by changing from a fairly conservative approach of relying on situation rents to more aggressive lines of behaviour in which they took greater risks in order to increase market share.

The deregulation of banking systems has now largely taken place, at least in the industrialised countries. However, another phase of structural changes is currently under way. The deregulation within national frontiers during the 1980s has been followed by an international liberalisation marked by a removal of frontiers, both between national financial markets and between types of activity (credit institutions, investment service companies, institutional investors).

In Europe especially, the creation of the single market and the entry into force of EMU have allowed the formation of genuinely transnational financial groups and facilitated the removal of the partitions between the categories of financial services (the creation of combined bancassurance groups is a good example of this).

**Table 4**  
**Application of the paradigm structure - behaviour - performance**  
**to the conditions of operation of the banking system**

	<b>Structure</b>	<b>Behaviour</b>	<b>Performance</b>
<b>Prior to deregulation</b>	<p><b>Regulation</b></p> <ul style="list-style-type: none"> <li>• Ceilings on debit or credit interest rates</li> <li>• In several cases, control of volumes or activities (segmentation of markets)</li> </ul>	<p><b>Conservative approach</b></p> <ul style="list-style-type: none"> <li>• Specialisation of institutions</li> <li>• Limited risk-taking</li> </ul> <p>Long-term relationship based on proximity of customer</p>	<p><b>High gross margin</b></p> <ul style="list-style-type: none"> <li>• Little pressure on costs</li> <li>• Expansion in capacities (branch network)</li> </ul>
<b>Following the deregulation of the 1980s</b>	<p><b>Liberalisation</b></p> <ul style="list-style-type: none"> <li>• Interest rates aligned on market rates</li> <li>• Abolition of credit rationing measures</li> <li>• Lifting of constraints on banking activities</li> <li>• Freeing of international capital movements</li> </ul>	<p><b>Aggressiveness</b></p> <ul style="list-style-type: none"> <li>• Competition for market shares with increase in volume of credits and in balance sheet total</li> <li>• Development of new products and approach to new markets</li> <li>• Higher risk profile</li> </ul>	<p><b>Small gross margin</b></p> <ul style="list-style-type: none"> <li>• Loss of situation rents</li> <li>• Excessive costs inherited from the past</li> </ul> <p>Deterioration in profitability and solvency</p> <ul style="list-style-type: none"> <li>• Poor risk management</li> </ul> <p>Excessive concentration on certain sectors</p>
<b>Following the disappearance of geographical and sectoral frontiers</b>	<p><b>Elimination of frontiers</b></p> <ul style="list-style-type: none"> <li>• Creation of the single financial markets within the EU</li> <li>• Creation of EMU</li> <li>• Removal of partitions between banking activities and investment and insurance services</li> <li>• Use of remote access technologies</li> </ul>	<p><b>Emphasis on expansion</b></p> <ul style="list-style-type: none"> <li>• Effort to achieve economies of scale (mergers and acquisitions leading to consolidation in the financial sector)</li> <li>• Diversification of activities (especially of financial flows)</li> <li>• Disintermediation of financial flows</li> </ul>	<p><b>High but fragile profitability</b></p> <ul style="list-style-type: none"> <li>• Strict control of capital requirements to satisfy shareholders (shareholder value)</li> <li>• Need to produce high profits in order to position themselves in the mergers and acquisitions game</li> </ul> <p><b>Appearance of new risks</b></p> <ul style="list-style-type: none"> <li>• Development of new products and off-balance sheet activities in order to reduce credit risks and capital requirements but ...</li> <li>• Strategic risks, operational risks, reputational risks</li> </ul>

Source: NBB, *Economic Review*, August 2000.

These two phases - deregulation and the disappearance of geographical and sectoral frontiers - have been based on two successive waves of innovation. Whereas the progress made in the field of information technology enabled credit institutions substantially to increase the speed and efficiency of processing of their transactions during the 1970s and early 1980s, the new communication products developed during the 1990s are now facilitating the entry of new players and remote access to financial services.

With regard to risks, the first phase was characterised by a strategy of increasing market share on the traditional markets, if necessary by seeking riskier borrowers. At present, the banks are endeavouring rather to extend their activities to other segments of financial services or other geographical areas, so that the risks seem to be linked more with the mastering of new and therefore less well known activities.

## **4.2 Transfer of risks and reputational risks**

Strategic risk obviously applies not only to credit institutions but also to all enterprises faced with a problem of adaptation or of diversification of their activities in a context of increased competition.

Placing the emphasis on strategic risk would thus apparently mean departing from the philosophy underlying the approach based on asymmetric information, which on the contrary sought to underline what constitutes the basis of the banks' intermediation function.

It is, however, the very existence of such information asymmetries that offers banks scope for reacting to structural changes in ways which are not accessible to most other branches of activity. As pointed out earlier, they can respond to a fall in their profitability by running greater risks. This strategy is justifiable if these additional risks are correctly valued and appropriately monitored. Failing this, the result will be, after a certain time lag, a deterioration of the financial soundness of the credit institution. It is this lag which will induce some banks to "gamble for survival".

The need for an appropriate valuation of risks also applies to the other major segment of financial services, the insurance sector. Two main techniques are used for this purpose by that sector.

The first is a fairly far-reaching quantification of the risks, even though this is easier to achieve in some fields (for instance life insurance) than in others (such as large industrial exposures). In the banking field, many efforts have been made in recent years to achieve a more finely graded risk assessment. This problem is, in particular, central to the discussions currently taking place in the Basel Committee.

The second major technique to which the insurance sector resorts is that of reinsurance, which enables part of the risks to be transferred to other companies. Here, too, new instruments have been developed by credit institutions for improving risk-spreading mechanisms. A more recent addition to the derivatives based on interest rates, exchange rates or stock market prices are derivatives based on credits. Those techniques facilitate risk transfers between professionals, although they involve a counterparty risk.

On a more general level, the disintermediation phenomenon also has the effect of transferring some of the banks' risks to their customers. This development can be highlighted by examining the changes which have taken place in recent years in the structure of investments by individuals.

The share of low-risk investments, in the form of deposits and banknotes, decreased from 41% in 1980 to 22% in 1999. As this fall was accompanied by a reduction in holdings of securities issued by credit institutions, the decline in banking intermediation - from 60 to 30% - was even more pronounced.

This reduction was mainly compensated for by an increase in investments in equities. The proportion of directly held shares rose from 18 to 31% of the portfolio, but this figure is greatly affected by the high proportion of unlisted shares in Belgium representing capital invested directly by individual entrepreneurs in their SMEs. In this connection, the increase in investments with institutional investors is much more significant. Growth has been especially pronounced in the case of CIUs: while they were virtually non-existent on the Belgian market in 1980, at the end of 1999 they were receiving nearly 15% of the financial assets of individuals; about two thirds of these investments are made with funds whose yields are, directly or indirectly, connected with the movement of stock market indices.

Risk transfers are not confined to investors but can also affect borrowers. In Europe, the diversification of enterprises' financing sources is probably less advanced than the diversification of individuals' investment instruments. Non-financial companies still issue relatively few fixed interest securities.



Table 5  
**Structure of financial assets of Belgian individuals**  
 (percentage of total)

	1980	1990	1999
With credit institutions	60.1	49.3	30.5
Deposits and notes	41.3	30.8	21.6
Fixed interest securities	18.8	18.5	8.9
Direct holding of securities	32.1	37.5	43.5
Shares	18.1	22.2	30.8
Fixed interest securities	14.0	15.3	12.7
With institutional investors	7.8	13.2	26.0
CIU's	0.5	5.3	14.6
Insurance companies	6.2	6.9	9.6
Pension funds	1.1	1.0	1.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: NBB.

However, an increase in such recourse to the capital markets at the expense of bank credit might expose enterprises to a funding risk because, in the event of a sudden reversal in market expectations, opportunities for issuing securities might dry up, creating a difficult situation for companies which have failed to retain an alternative source of finance with credit institutions.

Disintermediation is a new form of competition for banks but it also offers opportunities. In particular, it enables them to react to the reduction in intermediation margins by developing new sources of income.

This development is revealed by an examination of the structure of the banks' profit and loss accounts. The intermediation margin, measured by the ratio between net interest incomes and total assets, is showing a downward trend in the European Union as a whole. While this decline seems less pronounced in Belgium, the margin is also smaller there in absolute terms. This reflects the relative importance, in the Belgian banks' transactions, of lending to general government. The latter consideration confirms that an analysis of the intermediation margin cannot be made without taking account of the risk component.

In response to this trend, credit institutions have endeavoured to increase non-interest, especially commission, income. In 1998, this other income represented about 40% of the total income of European banks.

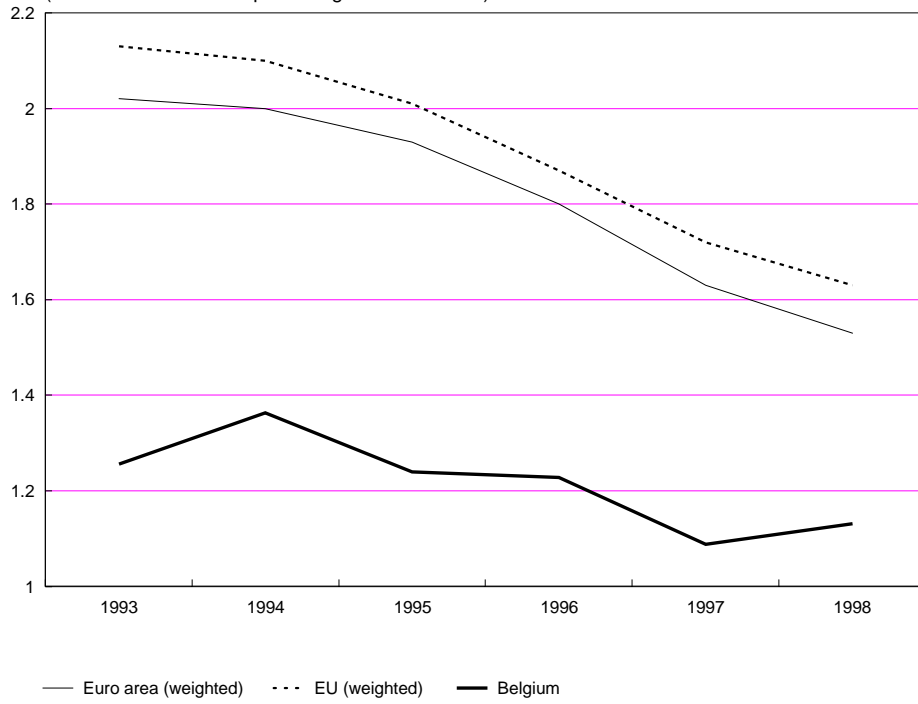
In Belgium, a large proportion of these commissions is levied on the sale of units of CIUs, which, as has been seen above, has increased very substantially during the last two decades. This market is largely dominated by banks, which themselves generate, manage and sell to the public most of the funds marketed in Belgium.

Disintermediation does not have implications only for the banks' sources of income. The increased recourse to the market is coupled with greater requirements regarding transparency and dissemination of data, a trend which limits the relative importance of the exclusive information which the banks traditionally have concerning their customers. In other words, the transfer of credit and market risks is accompanied by developments which tend to reduce the comparative advantage enjoyed by the banks in the management of these risks.

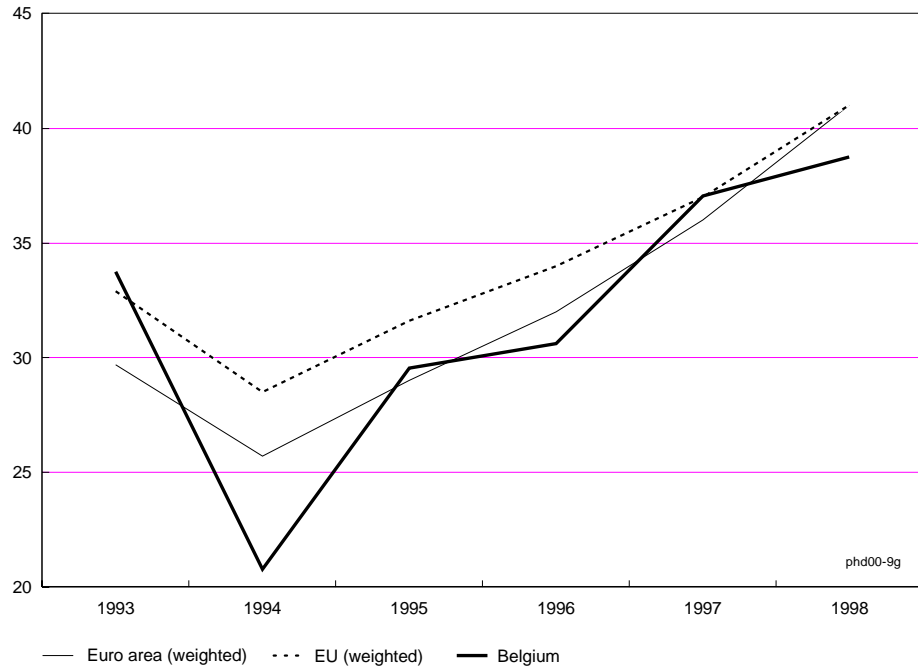
Furthermore, disintermediation, while it does contribute to reducing the credit and market risks run by banks, could give rise to other types of risks.

Figure 6

**6.1 Intermediation margin**  
(net interest income as percentage of total assets)



**6.2 Share of non-interest income in total income**



Sources: ECB; NBB.

On the one hand, it increases the vulnerability of the economic agents to whom the credit and market risks are transferred. The financial incomes of individuals become subject to sharper fluctuations; the financing sources of enterprises are less regular. These developments have macroeconomic consequences (one of the best known examples is the possibility of a wealth effect). They may also have macroprudential repercussions, by weakening bank customers' soundness, since the possibility of mobilising financial or real assets is one of the major components of the capacity to repay loans.

On the other hand, disintermediation induces the banks to establish with their customers relationships in which the sharing of responsibility and risk-spreading procedures present themselves in terms which are often more complex than in classical bank intermediation. Thus, the sale of units of CIUs and, generally, asset management presupposes a good knowledge of the customer's requirements. The same products cannot be sold in the same way to professionals and to inexperienced customers. Consumer protection requirements will have to be met. Conduct-of-business rules will have to be defined in order to ensure good provision of information, proper settlement of conflicts of interest and, more generally, integrity in the treatment of transactions. Banks will become exposed to reputational risks in the event of shortcomings in their organisational structures or internal audit mechanism, which might lead to lawsuits and actions for damages.

In principle, these new activities entail, for the banks, an obligation regarding means but not regarding results. Nevertheless, the reputational risk will not be totally independent of the performance achieved by banks. Asset management, or the provision of investment banking services to enterprises, are sophisticated products with a high value added. Customers therefore not only expect to have the benefit of good organisation. They will also want to obtain good results in terms of yield or costs. This also means that the banks must preserve a reputation for professionalism and efficiency, failing which their volume of activity is liable to undergo sharp changes.

## **5. Conclusions**

The banking crises which have occurred in recent years in many countries have again highlighted the contributions which can be made by central banks, at a macroprudential level, to containing systemic risks. The devising of reliable and efficient payment mechanisms is directly in line with this. The work devoted to the conditions of granting of last-resort loans or to the synergies which exist between price stability and financial stability is another example of this. These various lines of action need to be supported by regular analyses and proper monitoring of the factors which are liable to affect the overall soundness of the financial system.

The nature of these factors has been the subject of various theoretical studies. Endeavouring to explain the mechanisms whereby such risks develop, these studies attempt to draw lessons concerning the warning signs of financial crises.

These analyses have long been based on the traditional macroeconomic models, whether Keynesian, with the emphasis on demand, or monetarist, paying greater attention to monetary factors. More recently, new models have been developed which seek to focus on what is the specific feature of the banks' intermediation activity.

The concept of asymmetric information has thus been put forward. These asymmetries will give rise to phenomena of adverse selection or moral hazard, which, beyond a certain threshold, will lead to a break in the intermediation channels. The approach via asymmetric information thus makes it possible to explain discontinuity processes in intermediation activity, whereas traditional economic theory is characterised by its marginalist line of argument and the concept of equilibrium.

These analyses reveal three categories of indicators which are often present together at the beginning of a financial crisis. These are the deterioration of the ability to repay loans, the rise in real interest rates and the volatility of asset prices; these indicators relate directly to the credit and market risks inherent in the banks' activity.

The progress made in theoretical analysis has not perhaps been sufficiently accompanied by parallel progress in empirical measurement instruments. This situation may be attributed to various factors. Financial statistics are still in many respects less developed and less harmonised than real statistics, especially as regards data concerning outstanding amounts. These figures, being subject to sharp fluctuations, are more difficult to extrapolate or model.

In this context, sophisticated instruments such as financial stability models or composite indices are still not very widely available. Macroprudential studies are largely based on two categories of instruments, namely the balance sheet analysis techniques applied to the accounts of credit institutions and the macroeconomic indicators relating most directly to banking activity. In Belgium, the BFC gives preference to the former category and starts from the individual data, working upwards to obtain an overall view of the whole banking sector. The Bank resorts more to the second category and examines, based mainly on a top down approach, the implications of the major macroeconomic developments for the functioning of the financial markets in general and the stability of the banking system in particular.

For this purpose, the Bank has a large number of databases, owing to the important role which it plays in the collection, analysis and dissemination of statistics in Belgium. For instance, the Central Balance Sheet Office makes it possible to obtain a complete overview of the financial structure of companies, while the Central Register for Credits enables sectoral breakdowns to be made. The financial accounts give information on the development of total assets, an important factor for judging the repayment capacity of economic agents. Direct access to the financial accounts submitted by the banks and to their various annexes enables a fairly detailed breakdown to be made of the banks' interest rate positions.

Credit and market risks are largely dependent on the movement of the business cycle and are a manifestation of the vulnerability of the banking sector to the development of economic activity. However, the banks are not affected in an identical manner upon each reversal of the cyclical trend. In many banking crises, the driving force appears to be a change in the structural environment. This forces banks to change their behaviour, but is sometimes reflected in a choice of unsuitable strategies. Many credit institutions may also be induced to run greater risks in order to preserve their profitability in the face of keener competition, so that economic recessions may merely bring latent crises to the surface.

Admittedly, these strategic risks are not peculiar to banks, because they relate to all enterprises confronted with diversification or changes in activity. Nevertheless, the specific character of intermediation activity - whose function is to manage and reduce information asymmetries between borrowers and lenders - offers banks opportunities to choose between different "risk-yield" couplings which are not accessible to most other branches of activity.

Various recent developments are changing the context in which the problems of information asymmetry are addressed. The development of derivatives on market instruments and on credits, or even disintermediation, enable the banks to transfer some of their risks to other economic agents. These developments are accompanied by greater requirements in terms of transparency and dissemination of data, which tend to limit the comparative advantage enjoyed by banks in the management of information asymmetries.

The possibility of transferring part of credit and market risks represents a positive factor for the stability of the banking sector. However, these operations create some problems which might also be systemic in nature. On the one hand, they increase the vulnerability of the economic agents to which risks are transferred, which could reduce the financial resilience of banks' customers. On the other hand, the terms and conditions of the relationships and the sharing of responsibility with customers are becoming more difficult to determine precisely, a factor which is liable to expose credit institutions to reputational risks.

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