Restructuring of the Dutch banking sector: implications for banks and the economy

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1. Introduction and summary

In the past 10 years, the Dutch banking landscape has changed dramatically. Large-scale mergers, such as the creation of ABN Amro and NMB-Postbank (currently ING Bank), and closer cooperation between savings banks have resulted in a relatively concentrated market for banking services. Cross-border expansion has intensified as well, illustrated in recent years by rather sizeable acquisitions by Dutch banks in Belgium, Brazil and the United States.

In the next section of the paper, we provide an overview of the main changes the Dutch banking sector has witnessed since the late 1980s and some of the causes associated with the regrouping of the banking industry in the Netherlands. It is often stated that regrouping is a strategic reaction to increased competition. In the banking industry, regrouping may have halted the shrinking of margins in traditional lines of banking intermediation. In the third section of the paper, we present a detailed analysis of interest rate margins and their development. By exploring the development of margins on different activities, we hope to shed some light on the competitive conditions in different market segments. Although the main focus is on the Dutch banking system, we also include a comparison between major banks in the Netherlands, Germany, France and the United Kingdom. The fourth section is devoted to the relationship between banks and small and medium-sized firms in the Netherlands. In the fifth section we analyse the response of the banking sector to an increase in the money market rate.

The main results of our research are summarised below.

- In contrast to many other European countries, overall interest rate margins in the Netherlands have been remarkably stable in the 1990s at about 1.5% (domestic assets). However, the overall trend disguises diverging developments in different market segments as well as strong indications that downward pressures are building up.
- In particular, Dutch banks have profited from a buoyant housing market and very large margins on mortgages, largely on account of maturity transformation gains. The growth of the corporate loans business has also been strong, albeit at much narrower and shrinking interest rate margins, which does not support the proposition of increased market power following banking concentration.
- Due to rising competition from both new entrants and investment funds, banks have gradually increased the compensation for short-term retail savings relative to money market rates. Long-term funding costs have also increased relative to money market rates on account of a normalisation of the term structure of interest rates since 1993. As a result, the average banks' cost of funds hovered slightly above money market rates in recent years.
- In an international context, Dutch banks have performed relatively well in the 1990s. Whereas the interest rate margins obtained by major German, French and British banks have come down considerably over the last decade (about 50 basis points according to our calculations), the

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difference between the average bank lending rate and the cost of funds at major Dutch banks has fluctuated between 1.9 and 2.1% (consolidated assets).

- Small firms are four times as likely to be hit by credit constraints as large firms. The underlying causes of credit rationing are (1) asymmetric information, leading to a relatively strong preference on the part of banks for collateral and a track record, and (2) the relatively strong aversion on the part of firms to giving up control and to greater transparency of business operations.
- Firms mainly respond to (external) financing difficulties by muddling through or adjusting investment plans. In addition, small firms hold a larger stock of liquid assets and retain more of their profits than large firms, which can be seen as hedging strategies against the risk of credit rationing.
- Despite the high degree of concentration in the banking sector, there still appears to be significant competition among banks, as one out of three firms has changed to another bank in the past few years.
- Following a monetary policy tightening, Dutch banks attempt to shield their loan portfolio, with holdings of foreign assets acting as a buffer stock. This contrasts with the American experience where holdings of securities fulfil this role.
- Despite the guilder-Deutsche mark peg, the Netherlands has enjoyed a limited scope for discretionary monetary policy in the past 15 years. The impending move from a quasi-monetary union to a full monetary union therefore entails non-trivial costs.

2. General overview of recent developments in the Dutch banking industry

2.1 Introduction

As in many other banking systems, a trend towards concentration has characterised the Dutch banking sector during the last two decades. The largest shifts took place in the late 1980s and early 1990s, when Nederlandse Middenstandsbank (NMB) merged with Postbank (1989), subsequently adding the biggest Dutch insurer Nationale Nederlanden to form the ING Group (1991), and when Algemene Bank Nederland (ABN) and Amsterdam-Rotterdam bank (Amro bank) joined forces in ABN Amro (1990). The emergence of "all-finance" was not limited to the new ING Group. Other combinations of banks and insurers have emerged since the liberalisation of the so-called "financial structure policy", which effectively separated banking and insurance services before 1990. Savings banks, cooperative banks and merchant banks have joined forces as well, bringing the total number of credit institutions incorporated in the Netherlands down to about 150 in 1997 from 170 in 1988. Currently, the total number of banking firms is composed of almost 100 universal banks, 18 securities houses, 26 savings banks, 4 mortgage banks and 1 central institution. Close to 480 cooperative banks operate under the umbrella of a central institution (Rabobank).

In this section, we provide an overview of recent developments in Dutch banking. In particular, we review market structure and concentration in Section 2.2, diversification and internationalisation in Section 2.3 and efficiency and the financial results of the Dutch banking sector in Section 2.4.

2.2 Market structure

The merger activity described above has of course influenced the concentration levels and the distribution of market shares of banks in the Netherlands. However, two developments mitigated concentration in terms of market shares. First, customers with a preference for more than one banking relationship moved to third banks, which somewhat reduced the combined market shares of the merged banks. Second, new entrants in the mortgages and savings markets had some success in

concurring small market shares. Both developments are corroborated by data on individual market shares in credit and deposit markets.[2] In Table 1, the development of market shares of the three largest and the five largest banks over the last 10 years is shown. It is important to note that the two mega-mergers in 1989-90 involved all top five institutions except the largest one. As a result, the composition of the top three banks was changed and two – much smaller – banks were added to the top five. All in all, the market shares of the five biggest banks have decreased slightly over the last 10 years (most notably with respect to mortgages: reduction from 94% in 1987 to 88% in 1997), while an overall increase in concentration, although somewhat mitigated in the most recent period, did clearly show up in the top three figures.

Table 1
Degree of concentration in Dutch banking*
Combined market shares as a percentage of the total banking sector

	Private sector credit			Savings and deposits		
	1987	**1992**	**1997**	**1987**	**1992**	**1997**
BIG 3	65.8	81.5	77.7	61.3	80.4	78.7
BIG 5	89.0	88.5	86.8	90.2	86.9	87.3

* Data do not include Bank Nederlandse Gemeenten, Waterschapsbank and Nationale Investeringsbank due to their more recent classification and reporting as private sector banks.
Source: De Nederlandsche Bank (see, also, footnote 2 below).

The relatively high levels of concentration in the Dutch banking industry should be qualified by the relative positions of banks and non-banks in the intermediation process. In the Netherlands, domestic bank claims represent just over half of all claims vis-à-vis the domestic private sector. Insurance companies, pension funds and other institutional investors are rather important financial intermediaries as well.[3] In this respect, the Netherlands is comparable to the United Kingdom, whereas in France, Germany and Italy, the banking sector as a whole dominates financial intermediation with shares of 80% and more.[4]

Foreign banks have not really been able to penetrate Dutch retail markets to any significant extent, despite long-standing open access regulations on establishment and free capital movements. Only Credit Lyonnais captured a small retail market share in the 1980s, which was subsequently taken over by Generale Bank of Belgium. In wholesale markets, however, an increasing number of EU-institutions, rising from 120 in 1995 to 170 in 1997, offer cross-border services from their home base. Outward internationalisation had already been practised to some extent in the 1980s, mainly by ABN, but really took off in the 1990s. ABN Amro ventured into the United States by gradually building up a significant second retail home market. Acquisitions in Eastern Europe, Asia, Australia and Latin America have also taken place. In 1997, ING achieved the development of a second home market, a long held strategic goal, in one big stroke by acquiring Bank Brussel Lambert of Belgium. The move was more or less repeated by the binational Fortis Group as it acquired Generale Bank in 1998.[5] Both ABN Amro and ING earlier expanded into investment banking by taking over brokers and merchant banks in the United States (Furman Seltz), the United Kingdom (e.g. Hoare Govett, Barings) and other European markets.

2 Data on individual market positions are reported to De Nederlandsche Bank in confidence and cannot be reproduced here.

3 De Bondt (1998) and Borio (1996) show that the claims not intermediated by banks are mostly intermediated by other financial institutions, including investment funds, whereas claims held by households comprise only 3% of total private sector credit (compared to 19% in the United Kingdom).

4 Groeneveld (1998).

5 Fortis itself is a product of consolidation among savings banks, the integration of retail banking, merchant banking and insurance, as well as internationalisation.

2.3 Reasons for concentration and internationalisation

In the academic literature, a number of reasons for bank mergers and acquisitions have been discussed.[6] Economies of scale are generally found to exist for small banks, but the evidence is often inconclusive for larger banks.[7] Improving cost efficiency, however, may not be the only or even primary target of large-scale mergers and acquisitions.[8] As regards the restructuring of the Dutch banking sector in the 1990s, diversification and internationalisation goals (output efficiencies) have probably been as important as cost efficiency considerations. The benefits of increased diversification have been demonstrated by the savings banks, which have developed into universal banks. By means of "one-stop-shop" selling strategies, they have expanded their market shares in many financial market segments. The profitability of these banks has increased from a relatively mediocre level in the early 1990s to the average industry standard.[9] The NMB-Postbank merger (currently ING Bank) was also complementary in nature, with Postbank bringing in a very large retail customer base and NMB concentrating heavily on small and medium-sized corporates. As a result, a very large share of payment flows was internalised, increasing cost efficiency, the concentration of exposure to individual sectors of the economy was reduced and the surplus of retail funds at Postbank (the former state savings bank) was put to more profitable use in the corporate sector. Cost cutting was clearly one of the main targets for ABN and Amro bank (see Section 2.4). The new combination set out to redress overlaps both in terms of activities and geographical spread. In addition, combining and strengthening the home operations was a means to achieve a sound basis for international expansion.[10]

Ambitions with respect to internationalisation have been directed at two market segments: one being investment banking and large corporate clients, the other being foreign retail markets. Both segments require an adequate capital base for expansion, whilst serving customers abroad may also require an international banking network. ING and ABN Amro have to a large extent succeeded in positioning themselves as major players in international markets, mainly through acquisitions, which had most probably not been possible without regrouping first. The share of income derived from providing banking services abroad has increased sharply in the 1990s and currently stands at approximately 50% for these main banks and close to one third for the Dutch banking sector as a whole. The opportunities offered by internationalisation are related to both price and volume. As regards interest revenues, it appears that foreign interest margins are generally higher than domestic margins (see Figure 1). In terms of volume, foreign markets and especially emerging markets, may offer a much larger potential for expansion than the relatively mature domestic market. However, the advent of the single currency, the euro, may add a new dimension to competitive forces in European markets as well as increase the scope for diversification, which is already leading to bank regrouping within EMU-countries.[11]

2.4 Profits, solvency and efficiency

Since Dutch banks' profits are generated to a relatively large extent by lending, they are generally more stable than bank profits in the United Kingdom or Switzerland. In 1996, net commission income

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6 See Molyneux et al. (1996) for an extensive overview.

7 Swank (1996) finds that overall economies of scale only exist at small Dutch banks with the amount of branches held constant, in line with e.g. Berger and Humphrey (1991) for US banks. However, there is no evidence of a U-shaped average cost curve, suggesting that even the largest banks in the Netherlands can expand without having to worry about cost disadvantages.

8 Recent technological innovations suggest that the setting up of direct banking subsidiaries and internet branches with much lower cost to income ratios as well as increased electronic processing of retail business are probably the main ways of attaining higher cost efficiency.

9 This is in line with Akhavein et al. (1997), who find that profit efficiency, in contrast to cost efficiency, does generally improve following bank mergers in the United States due to changes in the composition of production.

10 Schuitemaker (1993).

11 For a discussion on increasing banking competition in continental Europe, see White (1998).

and other non-interest categories represented just 20 and 15% of total income respectively (Figure 2). This is not to say that profitability was not supported by the favourable stock market climate until recently, but on the whole, a strong growth in lending was mainly responsible for good financial results. Figure 3 shows a steadily rising return on equity in Dutch banking. Major banks in the United Kingdom and the United States still outperform Dutch banks, but some catching up has indeed taken place (Table 2). Potential problem areas are the investment banking activities, which, inter alia, compete with Anglo-Saxon investment banks for highly qualified staff.

Figure 1
Interest return on assets
Dutch banking sector, in percent

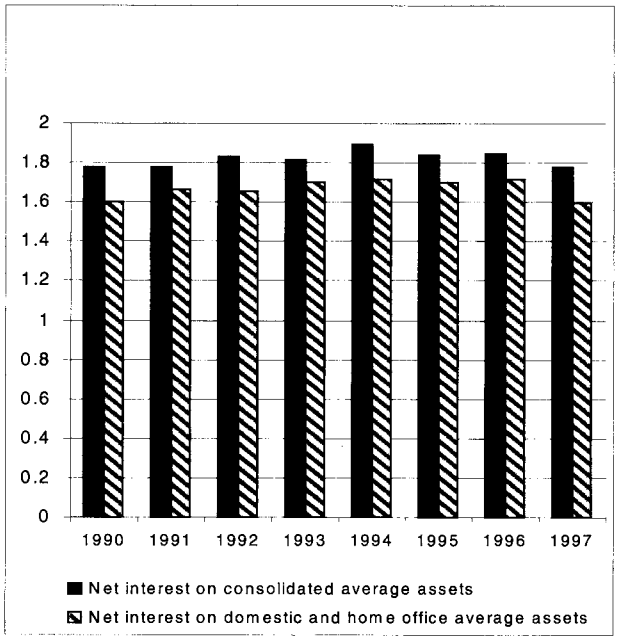

Figure 2
Income components
As a percentage of total income

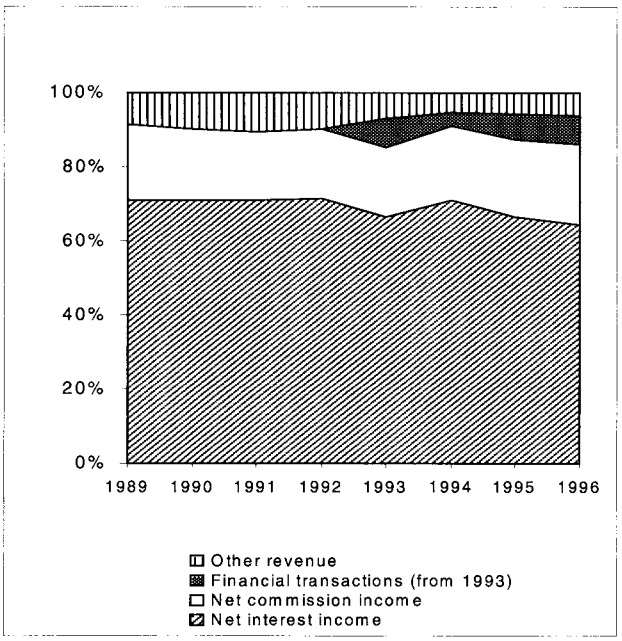

Figure 3
Return on equity
Dutch banking sector, in percent;
equity = average capital and reserves

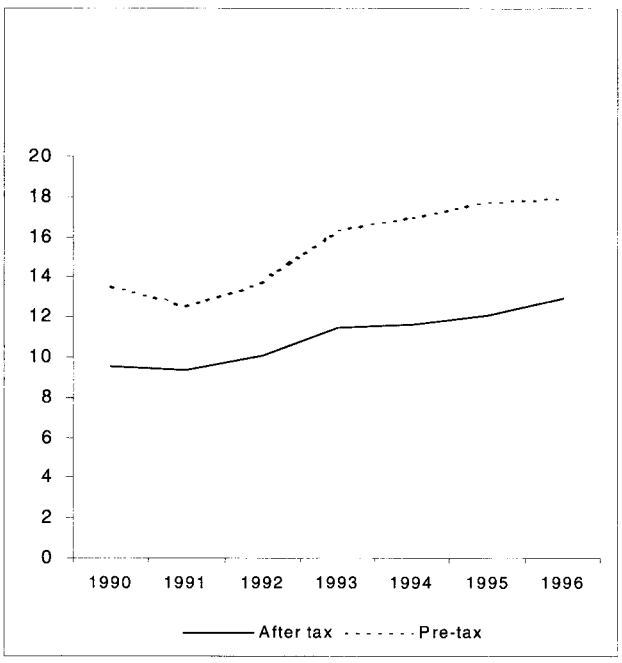

Figure 4
Efficiency ratios
Non-interest expenses on gross income

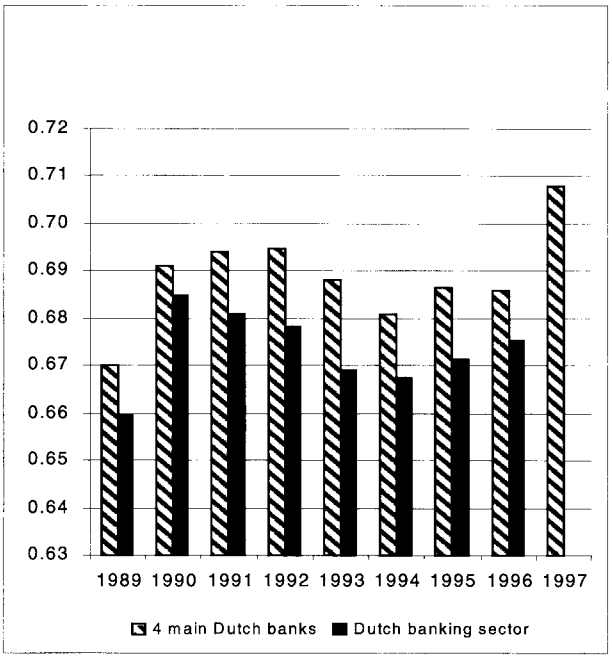

Table 2
Return on equity of major banks in selected countries*
In percentages

	1993	1995	1997
Netherlands	10.0	10.8	12.0
Germany	8.8	8.5	7.6
United Kingdom	14.8	20.2	18.0
France	2.4	4.0	10.0
Switzerland	11.6	5.8	9.5
United States	15.4	15.3	15.6
Japan	2.2	–2.1	–13.2

* ROE is defined as after tax profit on average capital and reserves. Major banks are the 5 biggest domestic institutions ordered according to tier-1 capital as far as listed in the Banker's top 50.

Source: Fitch IBCA, BankScope database.

The solvency of the Dutch banking sector has remained relatively stable, with average BIS ratios hovering between 10 and 11% in the 1990s. Broadly comparable levels are currently recorded by the main competitors in other countries, with the exception of Japan. Bad loan provisions have come down in recent years, following a rise before and during the 1992-93 economic slowdown.[12] The consolidation and restructuring of the Dutch banking sector have had the effect of dramatically reducing the number of banks with a poor performance, measured as ROE below the real risk-free interest rate. In the late 1980s, the Dutch banking sector did not score well on this performance measure (with approx. 60% of banks underperforming), only to move to the top of the league in the mid-1990s (7%).[13] However, average bank efficiency, as measured by the cost-income ratios, did not improve on balance (Figure 4). After initial cost increases, the mergers did have a positive efficiency effect, mainly through staff reductions, only to loose those gains in recent years on account of rising costs related to the investment banking activities (bonuses) and information technology (year 2000 and euro provisions).

3. The development of interest rate margins

3.1 Introduction

In this section, we will review the development of interest income in detail. It is recognised that the share of commission and other income related to capital markets business has increased somewhat in the 1990s, but interest income has remained by far the largest component of total bank income (65% in 1996 compared to 70% in 1989). Another reason for focussing on interest income is the popular claim, which is supported by research,[14] that interest rate margins are gradually eroding due to increased competition in savings and loans markets. If also found to be true for Dutch markets, rising bank profitability in the 1990s would be somewhat of a mystery given that the efficiency gains have not taken root. We cannot simply point the finger at the high level of concentration in the Dutch banking sector. For instance, Swank (1995), developing dynamic specifications for the demand for mortgage loans, the supply of savings and the associated interest rates over the period 1957-90, concludes that competition in the mortgage market significantly intensified in the course of the 1980s. Bikker and

[12] However, it is anticipated that 1998 data will show a significant increase in provisions on account of value adjustments to claims and other exposures on counterparts in Asia and other emerging markets.

[13] Davis and Salo (1997).

[14] E.g. Bonte and Holvoet (1996) and Deutsche Bundesbank (1998).

Groeneveld (1998), estimating competitiveness measures by evaluating the elasticity of interest rate revenues with respect to changes in banks' input prices, find that competition in Dutch banking has been quite fierce in the 1990s and on par with most other European countries, despite a relatively high concentration index. Nevertheless, we find that Dutch banks, as a group, have been able to expand in a profit centre – mortgage business – very successfully. Volumes have increased markedly due to a favourable economic climate and gradually falling long-term interest rates. And margins on mortgages have held up, despite growing pressures on funding costs and competition from non-bank intermediaries, thanks to a significant maturity mismatch.

3.2 Methodology and data

3.2.1 Methodology

In many studies, interest margins are determined by straightforward accounting, i.e. the net interest margin is calculated as net interest income over total assets (Figure 5). In this way, changes may reflect innovations in the numerator or in the denominator of the ratio.[15] As a consequence, the development of the net interest margin provides a picture of average net price changes only, without reference to the changes in the composition of assets and liabilities and the price movements of the various components. We set out to provide a more detailed picture of interest rate margins. In addition to calculating average bank interest rates on assets and liabilities (the bank lending rate and the cost of funds), we also decompose the overall margins into interest rate margins for various intermediation activities. A reduction in the overall margin may, for instance, be caused by a decrease in the share of interest-free deposits, an increase in the share of a relatively unprofitable activity, relatively lower lending rates or relatively higher savings rates. A general ratio would not be able to tell the difference.

Assuming that detailed bank balance sheets are available, the analysis would be relatively straightforward if all prices were easily observable. However, this is not the case. First, bank lending rates for certain activities may not be readily available. In our case, average lending rates for corporate credits had to be calculated, whereas average mortgage rates, government bond yields and interbank offer rates were known ex ante. Second, it is not clear from banks' balance sheet information when financial contracts have been entered into and how often interest rates on long-term contracts are being changed. Thus, the average portfolio interest rates must be construed on the basis of estimated or assumed interest rate (re)adjustment frequencies for various portfolios (or, in other words, the interest-specific maturities of the specific portfolios). This is relevant for both asset portfolios (e.g. mortgages and bond investments) and liabilities (e.g. long-term savings and debentures issued).

The overall interest rate margins and the margins on certain portfolios have been calculated vis-à-vis a common reference variable, the weighted average cost of funds. This rate was arrived at by adding the compensations paid to the banks' creditors: deposit-holders (current account, savings, time deposits), holders of bank debentures, domestic and foreign banks. Since two foreign interest rates were used, seven components contributed to the reference cost of funds, which can be expressed as follows:

$$(1) \qquad i_t^f = \sum_j^7 \mu_{j,t} i^*_{j,t} \qquad \text{with} \quad \sum_j^7 \mu_{j,t} = 1$$

where $\mu_{j,t}$ refers to the share of liability component j at time t and $i^*_{j,t}$ is the relevant compensation paid to banks' creditors holding instrument j at time t. Since portfolios of bond liabilities and long-term savings build up over time and interest rate adjustments are relatively infrequent, average portfolio interest rates must be calculated. Based on Swank (1995), the following function was used to estimate average interest rates for these portfolios:

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[15] In addition, if the interest rate margin is defined as a ratio rather than the difference between lending and funding rates, the absolute level of interest rates is not taken into account. This does not matter much as long as interest rates are relatively low. But the higher the interest rates, the larger is the difference between the ratio of net interest income over total assets on the one hand and the difference between lending and funding rates on the other hand (see also footnote 17 and the slight difference between overall margins in Table 5 and Figure 5).

(2) $$i^*_{j,t} = \delta i_{j,t} + (1-\delta) i^*_{j,t-1}$$

where $\delta = 1/(1+\lambda)$, λ being the average interest-specific maturity of the portfolio.[16]

Having established the reference variable, i.e. the cost of funds, net interest income can be attributed to the various income generating activities in order to arrive at the respective margins. Four asset categories have been distinguished: corporate credits, government (guaranteed) loans, domestic interbank exposures and mortgages. This can be formalised in a straightforward identity, stating that net interest income is equal to gross interest revenues (in four intermediation activities) minus interest expenses:

(3) $$I_t = (i^f_t + \alpha_t) A^{cc}_t + (i^f_t + \beta_{1t}) A^m_t + (i^f_t + \beta_{2t}) A^g_t + (i^f_t + \beta_{3t}) A^b_t - i^f_t P_t$$

where I_t is the net interest income for the selected aggregate of banks at time t; i^f_t is the weighted average cost of funds at time t; α_t, β_{1t}, β_{2t} and β_{3t} are the interest rate margins belonging to the various intermediation activities at time t: respectively, corporate credits (A^{cc}), mortgages (A^m), public sector loans (A^g) and domestic interbank exposures (A^b), and P_t is total liabilities less capital and reserves at time t. Since interest income is measured over a period of one year (t), all balance sheet components are determined as averages of two end-of-year data (t and t-1).

The β-values refer to margins that can be calculated relatively easily by subtracting the cost of funds from the relevant portfolio interest rates. This is the case for domestic interbank deposits, because the relevant interest rate, AIBOR, is readily available. It is also true for public sector loans and mortgages, because the margins on these activities can be calculated using observable interest rates, i.e. government bond yields and mortgage rates, and equation (2). Thus, the only really unknown variable is the margin on corporate credits. Rewriting equation (3) generates the following equation for the α-values over time:

(4) $$\alpha_t = \frac{1}{A^{cc}_t}(I_t - i^f_t [A^{cc}_t - P_t] - i^*_{m,t} A^m_t - i^*_{g,t} A^g_t - i^*_{b,t} A^b_t)$$

where $i^*_{m,t}$, $i^*_{g,t}$ and $i^*_{b,t}$ are the bank lending rates for mortgages, public sector loans and domestic interbank exposures respectively; in other words $i^*_{m,t} = i^f_t + \beta_1$ etcetera.

3.2.2 Data

Regarding balance sheet data, two sets of data have been used. First, in order to provide a full picture of the Dutch banking sector, we have used data gathered as part of the reporting framework by De Nederlandsche Bank. These data make it possible to disregard income derived from the activities of foreign subsidiaries of Dutch banks (see also Section 2.2). Interest income related to cross-border loans, however, is included as part of corporate credit. The data have been aggregated or averaged over the entire Dutch banking sector. Hence, the interest rate margins presented in the next section are industry averages. Second, comparisons between major banks in selected European countries have been carried out on the basis of data from the BankScope database by Fitch IBCA. BankScope provides foremost consolidated data that do neither permit a separation of domestic income streams from those from abroad nor can balance sheet data be easily split in such manner.[17]

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[16] The following interest-specific maturities have been used: 5 years for bank debentures and government bonds, 3 years for mortgages (typically 5 or 10 years, but reduced in order to take into account product innovations, prepayment and switch over options) and 2 years for savings.

[17] Furthermore, since asset components were not individually analysed, only in an aggregate value for the interest rate margin of major banks could be calculated. If γ is that composite, then $\gamma_t = 1/A_t(I_t - i^f_t[A_t - P_t])$.

3.3 Results

3.3.1 Volumes

Before turning to the calculated interest rate margins, we present the quantitative forces that, together with the prices or portfolio interest rates, have shaped the net interest revenues and thereby the overall financial results of the Dutch banking sector. In Tables 3 and 4, recent developments in the balance sheet structure are provided. As regards liabilities, a number of developments can be highlighted. First, long-term funding and domestic interbank deposit taking have been substituted to some extent by loans from foreign institutions. Second, the share of short-term savings and time deposits appears to react to the level of market interest rates in line with theory. However, it cannot be concluded from these figures, as is often claimed, that bank customers rationalise on low-interest deposits, as the share of current account balances has expanded continuously. Third, assuming that foreign funding is mainly of a short-term nature, the total share of short-term funding components has increased by 7 percentage points between 1989 and 1997.

Figure 5
Net interest margin
Dutch banking sector, in percent

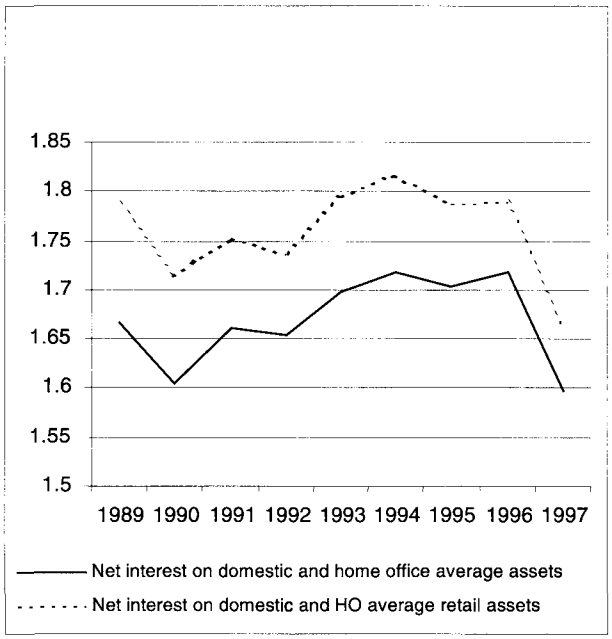

Figure 6
Bank lending rate and cost of funds
Dutch banking sector, in percent

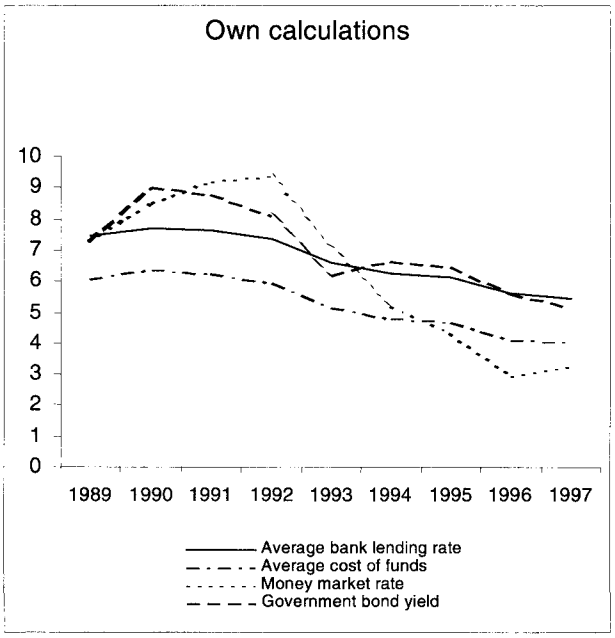

Table 3
Funding structure of Dutch banks
As a percentage of total average liabilities less capital and reserves*

	Domestic funding components				Foreign funding share
	Interbank loans	Short-term savings and time deposits	Sight deposits and current accounts	Long-term savings and debentures	
1989	7	25	10	23	28
1993	5	28	11	19	31
1997	4	22	13	18	38

* The components do not add up to 100% as the category "other liabilities" is not included.

Source: De Nederlandsche Bank (1998).

Table 4
Asset structure of Dutch banks
As a percentage of total average assets

	Interbank	Public sector	Corporate sector	Mortgages
1989	7	18	61	14
1993	5	15	64	15
1997	4	13	62	21

Source: De Nederlandsche Bank (1998).

As part of the asset side of the balance sheet, the share of public sector loans (including government guaranteed loans) has decreased significantly over the 1990s. The banks' expansion has been concentrated in the mortgage market. In the Netherlands, both public sector and mortgage business are mainly based on long-term interest rates. Thus, on the assumption of a stable maturity pattern of the corporate loan business,[18] the increase in the share of short-term funding was not matched by a similar shift on the asset side of the balance sheet.[19]

In recent years the growth of mortgage business has been consistently stronger (12-19%) than the growth of total assets (approx. 10%). Demand for housing was supported by relatively low long-term interest rates and, on account of government subsidy reforms, rising rents. Rising house prices, tax provisions and relaxed lending standards have been held responsible for increasing mortgage credit volumes as well.[20] It is of interest to note that institutional investors, although on the whole growing faster than banks, have recorded a more modest 6% increase in mortgage loans, thus reducing their market share to about 30% in 1997.

The balance sheet changes point in the direction of increased profits and a rising return on equity, in line with the account of recent developments in Section 2.4. Not only is short-term funding generally cheaper than long-term funding, which provides profitable maturity transformation opportunities, mortgage business is more profitable than public sector loan business as well.

3.3.2 Prices

In Figure 6, the development of the average bank lending rate and the cost of funds are drawn out. In addition to the changes in the balance sheet composition described above, several price trends have played a role in shaping the margins between lending and funding rates. First, due to the maturity composition of the asset and liability components (in fact, differences in the average interest rate adjustment frequencies), average bank lending rates adjusted more slowly to lower market rates in the course of the 1990s than the average cost of funds. Second, following a rather flat yield curve and some inversion, a normalisation of the term structure has taken place since 1993. Thus, over the period under review the interest rates on balance sheet components with long-term interest-specific maturities did not fall as much as the rates on short-term components. As a result of both factors, average bank lending rates on the portfolios of government bonds and (fixed-rate) mortgages remained relatively stable and the margins on these components, as measured vis-à-vis the falling average cost of funds, increased significantly (β_1 and β_2-values, Table 5).

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18 Mallekoote and Moonen (1994) find that the share of short-term corporate credit in total corporate credit is rather stable at 25-30% (1982-92). But the share of loans with money market related pricing is probably larger and perhaps more volatile when long-term loans with floating rate conditions are also considered. In addition, a survey by Swank (1994) brought to light that the pricing of long-term bank loans is partly based on short-term interest rates as well as long-term rates.

19 Another caveat is in order: we abstract here and in the remainder of the paper from any net hedging of the open maturity position by the banking sector in interest rate derivatives markets (asset-liability management).

20 De Nederlandsche Bank (1998), Chapter 7. The mortgage interest tax relief policy has probably stimulated credit demand secured by mortgages for other purposes than housing as well.

Table 5
Overall margins and margins for selected activities
In basis points vis-à-vis average cost of funds

	Net overall interest rate margin	Margins for selected activities			
		Interbank	Public sector	Corporates	Mortgages
1989	141	121	147	125	213
1990	133	215	143	103	219
1991	138	293	168	90	259
1992	138	341	201	70	300
1993	146	192	255	68	350
1994	148	41	273	71	359
1995	147	-36	264	72	346
1996	150	-116	291	66	359
1997	137	-82	265	60	327

Source: Own calculations.

Third, and perhaps most important in the long run, savings rates more or less doubled in relative terms between 1992 and 1997 (Figure 7). New entrants in the savings market have gained significant market shares (see Section 2.3) and the increasing clout of some non-bank intermediaries, such as investment funds, have probably made a competitive difference as well. Thus, in contrast to the mortgage market, where banks became more dominant, developments in the savings market did not go their way. This can be illustrated by the ratios between the average cost of funds on the one hand and the money market rate and the bank lending rate on the other hand, which we have called market power ratios (Figure 8).

Figure 7
Savings deposit ratios
Dutch banking sector

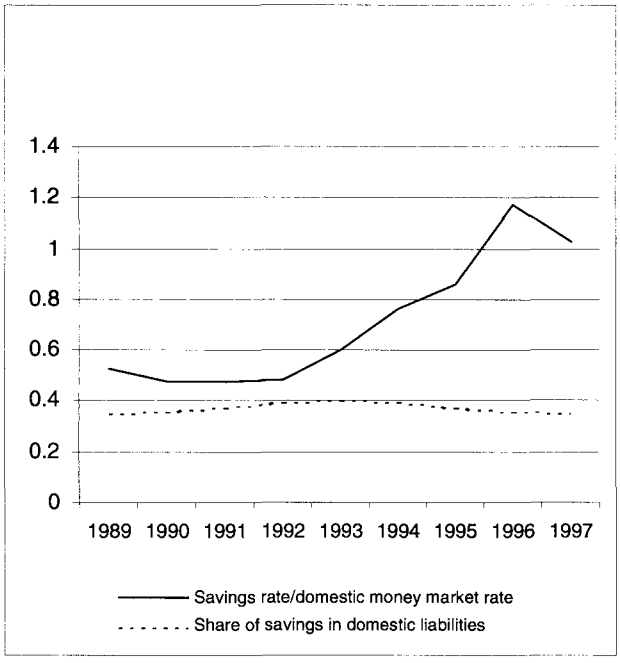
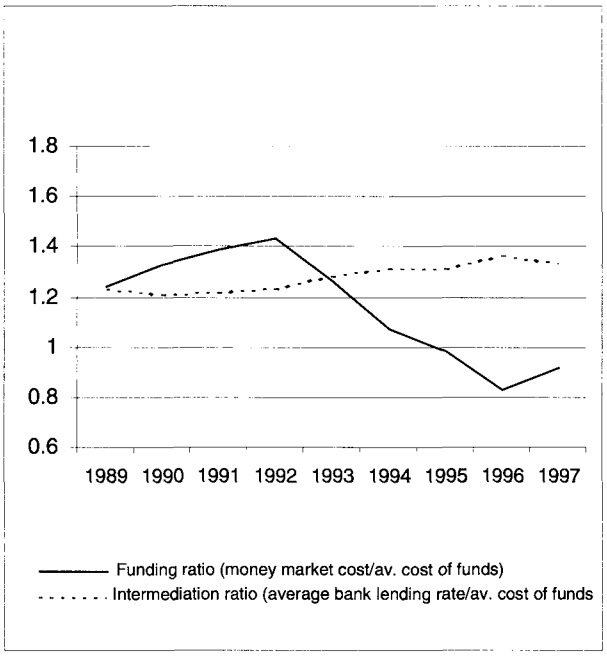


Figure 8
Market power ratios
Dutch banking sector



Fourth, average interest rates on corporate credits have been falling somewhat faster than the average cost of funds, which resulted in shrinking margins (see α-values). It is recalled that the computed margin on corporate credits is a residual, bringing together short-term and long-term loans, as well as domestic and cross-border loans initiated by banks' head offices. It is therefore difficult to draw definite conclusions. Explanatory variables may be interest rate developments, (international) loan market competition, portfolio risk and economic conditions.[21] As regards interest rate developments, somewhat lower α-values from 1992 onwards were indeed to be expected on account of a narrower spread between the market rates and the cost of funds. The relative rise in the compensation to bank creditors could not be passed on to (large) corporate debtors. It appears that, at least in the corporate loan market, increased market power on account of concentration in the Dutch banking sector would not square with these results. Other factors, such as reduced portfolio risk as a result of diversification following the mergers in 1989-90 (Section 2.2), increasing credit quality since 1993 and improved economic conditions in general (Figure 9) may also have played a role, but further research would be required to test these hypotheses.

Figure 9
Corporate credit margin and some economic indicators

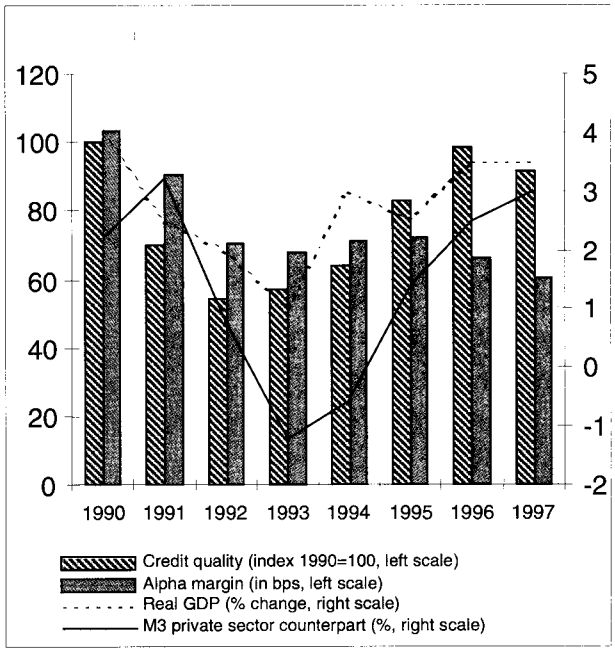
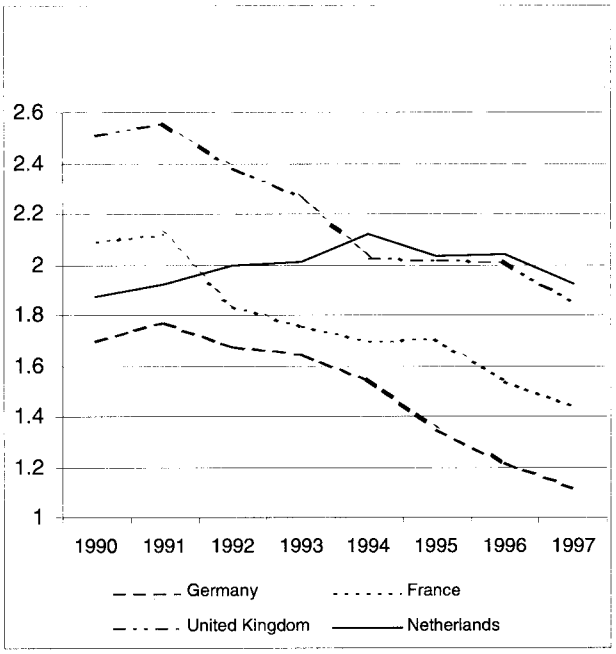


Figure 10
Interest rates margins
Four major banks, in percent



Simulation exercises suggest that the results for the α- and β-values are fairly robust. Large changes to the assumptions underlying the calculations, i.e. the λ-values and the relative distribution of foreign interest rates in the foreign funding component, have no significant effect on the net overall interest margin (at maximum 2 basis points) and relatively small effects on the margins for selected activities (5-10 basis points generally, at maximum 25 basis points).

3.3.3 Value

The development of the overall interest rate margin is the result of changes to the balance sheet composition (the shares of the various portfolios) and price movements (the portfolio interest rates). On balance, the overall interest rate margin was remarkably stable over the 1990s. However, the overall trend disguises diverging developments in different market segments as well as strong

[21] Demirgüç-Kunt and Huizinga (1998).

indications that downward pressures are building up. In structural terms, changes in balance sheet composition have pointed to a widening of margins (e.g. the strong growth of the contribution of the mortgage portfolio). But the rising cost of savings is probably a structural phenomenon as well. The negative impact of the latter development on banking margins becomes clearer if it is realised that, rather than stability, a significant cyclical improvement was to be expected following the peak of market rates and a flat yield curve in the early 1990s, on account of maturity transformation gains. Thus, if competition in the savings and corporate loans markets remains intense and the share of low cost deposits cannot be expanded further – which is unlikely in any case – it can be expected that the interest margin will, at least temporarily, come under pressure once market rates go up and the interest-specific maturity mismatch turns against the banks.

3.4 International comparison

The booming housing market, although a recurrent phenomenon in many countries, and the dominance of fixed-rate mortgages can be regarded as country-specific to the Netherlands in the period under review. We would therefore not expect to find a similar development of profitability and aggregate interest rate margins in other countries. In line with the methodology set out in Section 3.2, overall interest rate margins have been calculated for major banks in the Netherlands, Germany, France and the United Kingdom. In contrast to the analysis for the Dutch banking sector, which mainly focussed on domestic operations, consolidated balance sheet and income data have been used. Figure 10 shows that interest rate margins in Germany, France and the United Kingdom, as represented by four major banks, have shrunk in the 1990s (by approx. 50 basis points), compared to a fairly stable development at major Dutch banks (1.9 to 2.1%).[22] A relatively heavy reliance on long term funding has certainly not supported the financial results of the major German banks in recent years. In contrast to the Netherlands, the selected German banks apparently could not compensate these rising costs with buoyant mortgage or other long-term business. But even in places where long-term funding has been a relatively minor part of total funding (France and the United Kingdom), banks were confronted with a rising average cost of funds (in relative terms). The selected banks in France, for instance, witnessed average costs of funds exceeding money market rates for the first time in 1997. In the United Kingdom, bank lending rates have come down considerably – as a result, the relatively wide margins, compared to international levels, appear to be a thing of the past.

4. The banking sector and small and medium-sized firms

In the literature there has been a growing attention to the relationship between banks and small and medium-sized firms (SMEs), and the impact of these firms on the business cycle (see, for example, Gertler and Gilchrist (1994)). Information on the economic and financial behaviour of Dutch SMEs, in particular their relationship with banks, is relatively scarce and scattered around. In this section we summarise the information that can be gleaned from various recent Dutch language surveys. Before going into the financial behaviour of Dutch businesses, we first present some basic facts on the importance of SMEs for the Dutch economy.[23] Within the private sector, 99% of the firms is either a small or a medium-sized firm. In 1997, SMEs accounted for 29% of total value added, 30% of total wage income, 16% of exports, and 37% of total employment (EIM 1998). In the past few years, job creation within small and medium-sized firms represented more than 40% of the economy-wide employment growth.

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[22] For the data source, see section 3.1. The selected 16 main banks are: ABN Amro, ING bank, Rabobank, Fortis bank, Natwest, Barclays bank, Lloyds bank, Abbey National, Deutsche Bank, Dresdner Bank, Commerzbank, Bayerische Vereinsbank, Credit Agricole, BNP, Société Géneral, Credit Lyonnais.

[23] Small and medium-sized firms refer to firms with less than 100 employees in the private sector. The non-private sector comprises government organisations and sectors that are heavily affected by government regulations, like agriculture, fishery, mining, utilities, education, social services, health care, etc.

Non-financial firms in the Netherlands primarily use retained earnings (profits not paid out as dividends) to pay for investments. This holds for small firms and large firms alike. Figure 11 shows gross saving and gross investment by nonfinancial firms in the 1990s. Since 1993 total gross saving has even exceeded gross investment for the aggregate of all nonfinancial firms. Of course, not every firm can finance its investment plans out of retained earnings. Broadly speaking, there are four ways to raise external funds: (1) the bond market, (2) the stock market, (3) loans from banks and other financial institutions, and (4) venture capital companies and informal investors. Due to problems associated with asymmetric information, access to public capital markets is limited to those firms that are able to establish their creditworthiness, e.g by a debt rating accorded by an independent rating agency, and by publishing annual reports that meet certain accounting standards. In practice this implies that only large firms can tap capital markets for investment funding.

Figure 11
Gross investment and saving by Dutch non-financial firms, 1990-96

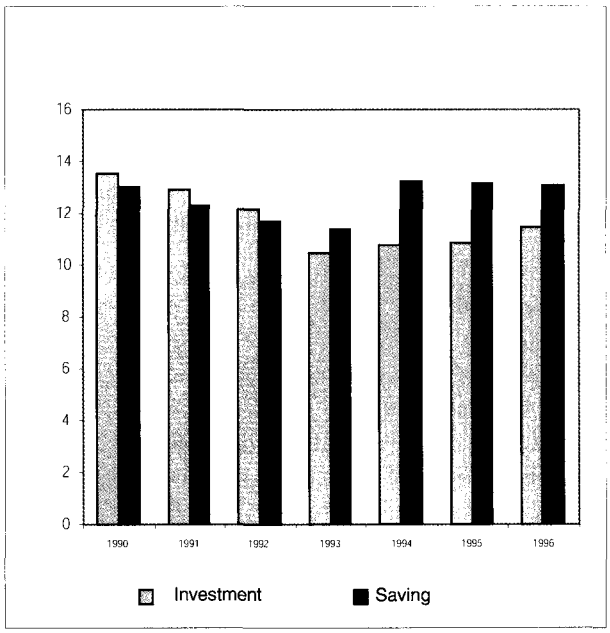
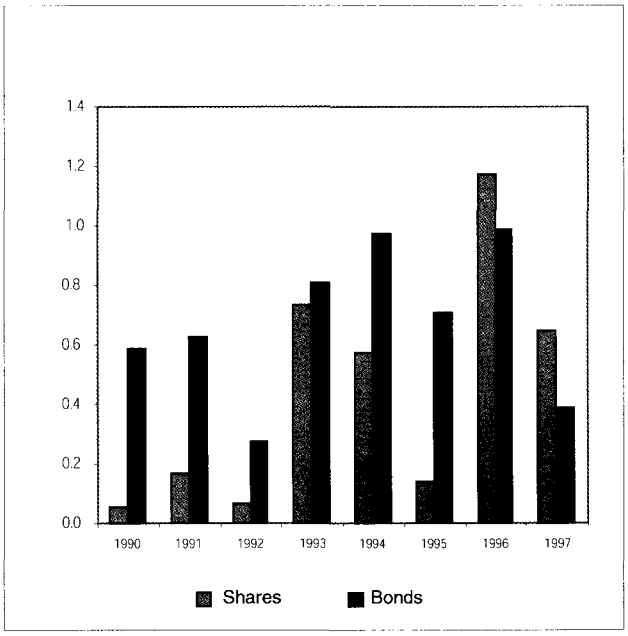


Figure 12
Issues of new securities by Dutch non-financial firms, 1990-97



Like elsewhere in continental Europe, the corporate bond market in the Netherlands is underdeveloped compared to its US counterpart. Dutch private sector bonds are mainly issued by financial institutions. Bond issues by non-financial firms on average amounted to 0.67% of GDP annually in the period 1990-97 (see Figure 12). Only large and well-known companies issue bonds, and when they do, comparatively large amounts are involved. The risk and liquidity premium versus government debt was only 0.9% on average in 1991-95. Ligterink and Schmeits (1998) argue that there seems to be a natural self-selection of issuing companies: few companies issue marketable debt, but the ones that do are very creditworthy and thus pay low rates of interest.

Large companies can also go to the stock market for new funds. Issues of new shares by nonfinancial firms are relatively small, although in recent years their size has increased. In the 1990s new issues were on average 0.44% of GDP per year (see Figure 12), although there is a marked increase after 1993. Like in the bond market, financial institutions are more active as fundraisers than nonfinancial firms. For example, in 1997 new issues by financial institutions amounted to Hfl 14.6 billion (2.1% of GDP), three times the amount raised by non-financial firms.

Since small and medium-sized firms cannot signal creditworthiness easily, they cannot use the bond

and stock markets as a source of funds.[24] Consequently they are heavily dependent on banks for external financing.[25] Banks offer a solution to the two problems caused by asymmetric information, adverse selection and moral hazard. By developing long-term relations with their customers, banks get access to firm-specific information, which allows them to determine their clients' creditworthiness, and to monitor their activities. Because of the inside information, they can make better lending decisions than lenders in the public capital markets. Although banks specialise in gathering and evaluating business information, they know that informational asymmetries will continue to exist. Since banks cannot perfectly discriminate between good and bad borrowers, increasing the lending rate, especially when it is high already, will exacerbate the adverse selection problem. Bad risks will have no problem to promise to pay the higher interest rate, while some of the good risks will withdraw their loan application. Banks will not raise the lending rate too much in order to avoid the deterioration of the loan portfolio. Instead, they will refuse credit to some loan applicants and only extend part of the amount applied for to others, even though these applicants are willing to pay a higher interest rate. Besides credit rationing, another common strategy to limit the effects of adverse selection and moral hazard is to ask for collateral or a minimum amount of capital put up by the entrepreneur himself. Banks also value a track record, as it reduces the information shortage.

Informational asymmetries between lenders and borrowers are most severe for the smaller firms, especially starting firms and firms that try to market a technological invention, like small high-tech firms. Small firms have ill-diversified activities and customer base, and a small capital base, and thus have a unfavourable risk profile. Starting firms do not have a track record and lack collateral. The assessment of the prospects of firms that invest in new products and services requires know-how that banks often do not possess, which naturally makes them reluctant to get involved. Moreover, these firms often invest in licenses and other immaterial assets, which cannot serve as collateral.

Jonkheer et al. (1997) conducted an international survey on the financial bottlenecks facing SMEs, and the way they are dealt with.[26] Their analysis, which is based on qualitative rather than quantitative information, yielded the following results. Dutch banks are relatively risk-averse compared to their foreign counterparts. In part this finding is attributable to the fact that Dutch firms on average are riskier since they invest more in immaterial assets (like software licenses and R&D expenditures), which are not accepted as collateral, and have a more international orientation. Consequently, Dutch banks put great emphasis on collateral and a track record.[27] For small companies, mortgaging the private home is often necessary. However, the lending rates banks charge are relatively low. Compared to their foreign counterparts, Dutch firms mainly respond to (external) financing difficulties by muddling through or adjusting investment plans (downsizing, delay, or even cancellation), rather than searching for other solutions in the financial sphere (e.g. leasing, use of credit card, change of repayment conditions, informal investors).[28]

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[24] A listing at the Amsterdam Stock Exchange requires a minimum equity capital of Hfl 10 million. Since March 1997 Amsterdam has a separate exchange for small, fast-growing companies (minimum equity capital Hfl 2 million), NMAX. However, only four companies were listed in October 1997 (Ministry of Economic Affairs 1997, Chapter 8).

[25] Venture capital companies and informal investors are an alternative source of external finance, especially for starting high-tech firms and fast-growing firms, but the amounts involved are rather small. Total invested venture capital funds amounted to 0.6% of GDP in 1995. Invested funds by informal investors were also 0.6% of GDP, although this potential source of funds is not yet fully utilised (Ministry of Economic Affairs 1997, Chapter 8). Trade credit is another source of working capital. Unfortunately, there are no data available on the relative importance or the role of this source of funds.

[26] Countries included in the survey are Denmark, Germany, Italy, the Netherlands, the United Kingdom and the United States.

[27] This behaviour can also be observed in the market for housing finance. Banks are eager to extend mortgage loans and ask for relatively low risk premiums. Consequently, the volume of mortgage credit has been growing at a fast pace in the 1990s, and it is well-known that part of the borrowings will be used to finance consumption of durables. This part is in effect collateralised consumer credit. By contrast, banks ask much higher interest rates for regular, unsecured consumer loans.

[28] There is also evidence to the contrary. For instance, Haffner and Waasdorp (1998) and Ministry of Economic Affairs (1997) cite research that found that 1 out of 3 high-tech starters that initially were unable to secure funding ultimately succeeded to pull off a viable market introduction of their products and services.

Table 6
Short-term bank loans to Dutch SMEs, 1990

Number of employees	Use of credit			Credit rationing	
	Had short-term bank loans at the end of 1990 (%)	Never had any short-term bank loans (%)	Credit outstanding (% of sales)	Encountered difficulties borrowing from banks	Therefore still reluctant to call on a bank
1	29	42	12.5	31	57
2-19	44	25	9.7	20	47
20-99	45	24	8.1	16	20
100 and more	56	31	7.3	8	19
Total	40	30	10.5	22	48

Source: De Haan (1997), Chapter 7.

How dependent are Dutch firms on banks? Table 6 (left panel) contains information on the importance of short-term bank credit, derived from a survey of SMEs in the early 1990s by De Haan (1997). Short-term bank credit consists of two types. The most important one is credit on current account, which accounts for about two thirds of credit outstanding. This involves an arrangement whereby the customer can overdraw his bank account to a certain limit. In principle this facility can be used indefinitely, although the limits will periodically be reviewed. The second type are fixed advances, which account for about 30%, and which are granted for a certain period. At the end of 1990, 40% of the firms had short-term bank loans, while 30% had never had any loans. The larger firms in the sample are more likely to have bank loans and less likely to have never borrowed short-term funds. Only 29% of the one-employee firms had short-term bank loans in 1990, and 42% had never had any. The borrowed amount is on average 10.5% of total sales or turnover. Again there are differences between small and large firms. For one-employee firms, bank credit equals 12.5% of sales on average, while for the largest firms it represents only 7.3%. Hence, small firms have fewer short-term loans, but these loans are relatively important to their business operations.[29]

In the same survey, firms were also explicitly asked about possible difficulties with obtaining bank credit. The results are in the right panel of Table 6. 22% of the firms reported that they did not get all the credit they asked for, although they would be willing to pay a higher interest rate. Again, large differences between small and large firms exist, as is predicted by asymmetric information theories. Small firms are four times as likely to be confronted with credit rationing than large firms (8% versus 31%). In their panel data study on investment behaviour of Dutch firms in the period 1983-92, Van Ees et al. (1996) estimated that one-third of the companies was debt-constrained.

Of course, firms will attempt to hedge the risk of credit rationing or a deterioration of lending terms. Theories stressing the lending channel of monetary policy predict that small firms will hold a relatively large stock of liquid assets as an insurance against reductions in the availability or cost of short-term credit (see, for example, Gertler and Gilchrist (1994) and Kashyap and Stein (1997)). Moreover, small firms will retain more of their profits than large firms because of the barriers to external finance. Table 7 presents recent data that confirm these predictions. The smallest firms have liquid asset holdings equal to about 19% of total assets, while the largest firms have less than 6%. De Haan (1997) also found that firms often do not completely pay back their short-term bank loans even if they have the financial surpluses to do so. A similar pattern can be discerned with retained earnings.[30]

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[29] The Dutch Council for SMEs (1995) found that about 50% of SMEs are 100% financed by internal funds. However, the true number is probably lower as some firms apparently did not view short-term credit as debt.

[30] The category of smallest firms (total assets less than one million) retains less of their earnings than the next three categories. This is probably a statistical artifact, reflecting the fact that this class contains a relatively large number of marginal firms with very low or negative profits.

Table 7
Liquid assets and retained earnings of Dutch SMEs, 1996

Balance sheet total (guilders)	Liquid assets (% of total assets)	Retained earnings (% of total earnings)
Less than 1 million	18.9	64.5
1-5 million	16.0	82.3
5-10 million	13.9	76.9
10-25 million	12.8	67.8
Greater than 25 million	5.7	46.5
Total	8.1	52.7

Source: Central Bureau of Statistics (1998), Table 4.

A recent survey by the Dutch Council for SMEs (1995) found that 60% of the small firms and 50% of the medium-sized firms think that financing problems inhibit the expansion of their company. 70% of the firms expect that future growth will primarily be financed by internal funds. Firms that planned a large investment project in the next few years were asked whether they expected financing problems. Of the firms that had invested large sums before, only 30% expected financing troubles, which illustrates the value of a track record. Most (three quarters) of the large investments are entirely or partially financed by bank loans, with banks asking for collateral in 70% of the cases.

Dutch firms usually have a special relationship with a particular bank that provides the majority of financial services (the so-called "huisbank"). Has the increasing concentration in the banking sector affected the financing of small and medium-sized enterprises? The survey by the Council for SMEs found that Rabobank is the bank of choice of over 50% of the small firms, while 50% of the large firms is with ABN Amro. Along with ING Bank, the three largest Dutch banks between them have a market share of over 80%, which might raise the question whether these three have too much market power. Firms can still vote with their feet, however. One out of three firms has in the past few years changed to another bank, 41% of the medium-sized firms and 26% of the small firms.[31] In line with expectations, small firms, for which informational asymmetries are more serious, are more reluctant to sever the relation with their bank. These turnover rates suggest that competition between the Big Three is not dead. Moreover, the evidence presented above that Dutch banks earn low margins and have low costs (compared to banks in other industrial countries), also suggests that the extremely high degree of concentration in the Dutch banking sector does not appear to impair efficiency.

Dutch SMEs are confronted with considerable credit constraints, and as a consequence do not invest as much as they would like. This is not necessarily a bad thing. One of the functions of financial intermediaries is to distinguish good projects from bad projects. There is no welfare loss if an ill-conceived investment project is cancelled for want of money. However, banks and other financial intermediaries can perform this selection process better, the smaller the problems of asymmetric information are. Furthermore, one should keep in mind that a part of Dutch businesses effectively do not use external finance by choice. External finance naturally involves the partial surrender of control and greater transparency of business operations and results. Compared to their foreign counterparts, Dutch firms are less prepared to accept these consequences of external financing (Jonkheer et al. (1997)).[32] The resulting heavy reliance on internal finance puts of course restrictions on their growth opportunities.

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[31] Among the large firms, 22% moved to another bank. This low percentage could reflect the fact that large firms usually do business with several banks. Alternatively, banks may make greater efforts to keep large customers happy.

[32] For example, the Council for SMEs (1995) found that even among those firms that were very satisfied with the services provided by their bank, 40% preferred to operate without a bank. 78% of the firms were strongly opposed to the idea of their bank becoming a shareholder in the firm.

The root cause of credit rationing is asymmetric information, and related to this, a strong preference for collateral by banks. Several measures have been suggested to reduce the asymmetry of information between lenders and borrowers, among them technology rating (which was introduced in 1995), and an independent rating agency for SMEs. Bruins et al. (1996) and Jonkheer et al. suggest programmes to increase the business skills of entrepreneurs, as the Council for SMEs (1995) found that only 20% of small firms and 40% of medium-sized firms had a business plan. A well-argued business plan may provide a favourable signal about creditworthiness to banks, informal investors and venture capital companies. In view of the shortage of collateral, Jonkheer et al. argue for making more SMEs eligible for the successful government loan guarantee scheme aimed at SMEs (BBMKB). The Council for SMEs and Bruins et al. have stressed the need for independent financial consultants specialised in SME finance in view of the large gap in knowledge in this area between SMEs and financial institutions.

5. Bank behaviour and the monetary transmission mechanism

In this section we briefly examine how Dutch banks react to changes in the money market interest rate.[33] The literature on the credit channel emphasises the role of banks in the transmission of monetary policy.[34] In this view banks will respond to a monetary policy tightening with a reduction in their loan supply. Because adjusting the loan portfolio is costly, banks will also try to hedge against the risk of monetary tightening by holding securities as a buffer stock against a reserve outflow. The sample period is 1983:III-1997:IV (58 quarters), the period in which Dutch monetary policy was first and foremost aimed at maintaining a fixed guilder/mark exchange rate, using the interest rate as the main instrument.[35] This exchange rate objective of course limited the scope for independent movements of the Dutch money market interest rate. Still, the band of ±2.25% around the parity allowed some interest rate flexibility vis-à-vis Germany.

Following the empirical literature on the monetary transmission mechanism we use a Vector Autoregression (VAR) model to investigate the impact of monetary policy changes. We estimate the following VAR model, which is a reduced form,

$$Z_t = A_1 Z_{t-1} + ... + A_p Z_{t-p} + u_t$$

where Z_t is a vector of variables observed at time t, and p is the maximum lag of the system. The VAR disturbance vector u_t is assumed to be serially uncorrelated and to have covariance matrix V. This reduced form can be thought of as being derived from the following structural model:

$$Z_t = B_0 Z_t + B_1 Z_{t-1} + ... + B_p Z_{t-p} + e_t$$

where e_t is the vector of the underlying structural shocks that we want to identify. e_t has as covariance matrix the identity matrix. The reduced form disturbances u_t are thus related to the underlying structural disturbances e_t by:

$$u_t = [I - B_0]^{-1} e_t = A_0 e_t,$$

implying $V = A_0 A_0'$. The impulse-response functions to the structural shocks e_t can be calculated via:

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[33] Originally, we planned to link changes in the monetary transmission mechanism to structural changes in the banking system. However, when we tried to document the changes in the monetary transmission mechanism, we found little evidence of any change.

[34] See Bernanke and Blinder (1992), Bernanke and Gertler (1995) and Kashyap and Stein (1997) for overviews of this literature.

[35] The last change in the guilder/mark parity occurred in March 1983 when the guilder was devalued by 2% against the mark.

$$Z_t = [I - A(L)]^{-1} A_0 e_t$$

We estimate our VAR by ordinary least squares to obtain estimates of the matrices V and $A(i)$, $i = 1, \ldots, p$. A_0 is calculated from V using the conventional Cholesky decomposition. Hence, A_0 is a lower triangular matrix, and u_t is assumed to be determined in a recursive fashion by e_t.

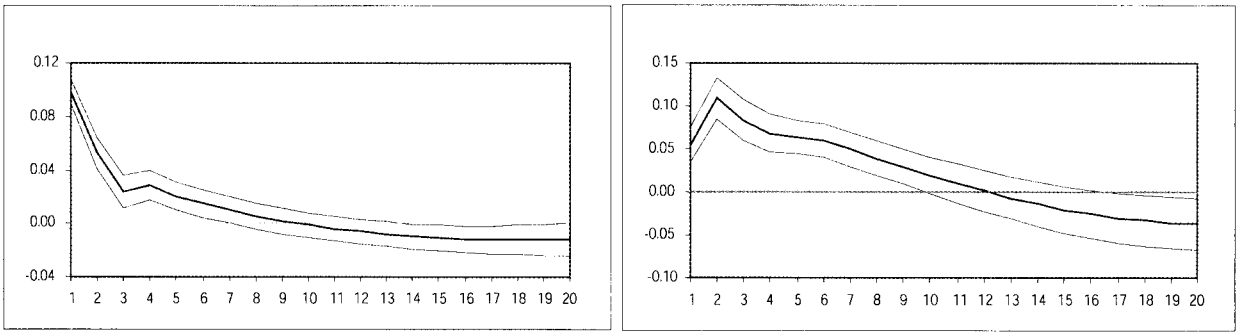
The maximum lag p is set at 3.[36] Given the limited length of the available time series, it is not possible to include all variables of interest in a single unconstrained VAR system. On the other hand, if we include too few variables in the VAR we run the risk of significant omitted variables bias. Given this trade-off we follow an intermediate strategy, which was also employed by Christiano, Eichenbaum and Evans (1996). We estimate a range of VARs for which the vector Z contains five variables. Z always includes the following four core variables: the log of the consumer price index (P), the log of the real GDP (Y), the log of the guilder/Deutsche mark exchange rate (E), and the interbank rate (R). To these four we add the specific variable we want to focus on, say X. X is different for every estimated VAR model.

The ordering of the variables in the VAR determines the pattern of recursivity, and thus may be of crucial importance for the orthogonalisation of the disturbances. Our main identifying assumption here is that output and the price level do not contemporaneously react to interest rates changes, hence they appear at the top of the ordering. As the money market interest rate is the policy variable, it is usually last in the ordering. Given the overriding importance of the exchange rate objective, the guilder/Deutsche mark rate precedes the interest rate. In case the additional variable is a balance sheet item or a real variable, it is the third variable in the vector Z. If it is an interest rate set by banks, it is the last variable in the ordering. Hence we allow for a contemporaneous response by the banks' interest rates to a change in the money market rate. As an exogenous variable we employ the German money market interest rate (current and three lagged values).[37] We thus assume that the German money market rate is set independently from the Dutch interest rate or the state of the Dutch economy, and that the Dutch central bank can react to any changes contemporaneously.

Figures 13-15 present the impulse response functions (IRF) of various variables after a one standard error shock to the Dutch money market rate. All IRFs show percentage points deviations from the baseline path for up to 20 quarters after the shock. The broken lines indicate one-standard error bands.

Figure 13 illustrates the working of the peg. A weakening of the guilder versus the mark is countered by a higher interest rate, and the exchange rate quickly reverts to its old value. Moreover, the interest rate falls back to the baseline at a slower pace, pointing to a vigorous and pre-emptive defence of the peg.

Figure 13
Response to a weakening of the guilder



[36] We fix p at 3 for degrees-of-freedom considerations. However, fixing p at 4, which is often done in empirical papers using quarterly data, does not change the results materially.

[37] Treating the German money market rate as an endogenous variable, i.e. including it in Z, does not change the basic results. Interchanging Y and P in the ordering is also irrelevant to the results.

Figure 14

Response to an increase in the money market rate

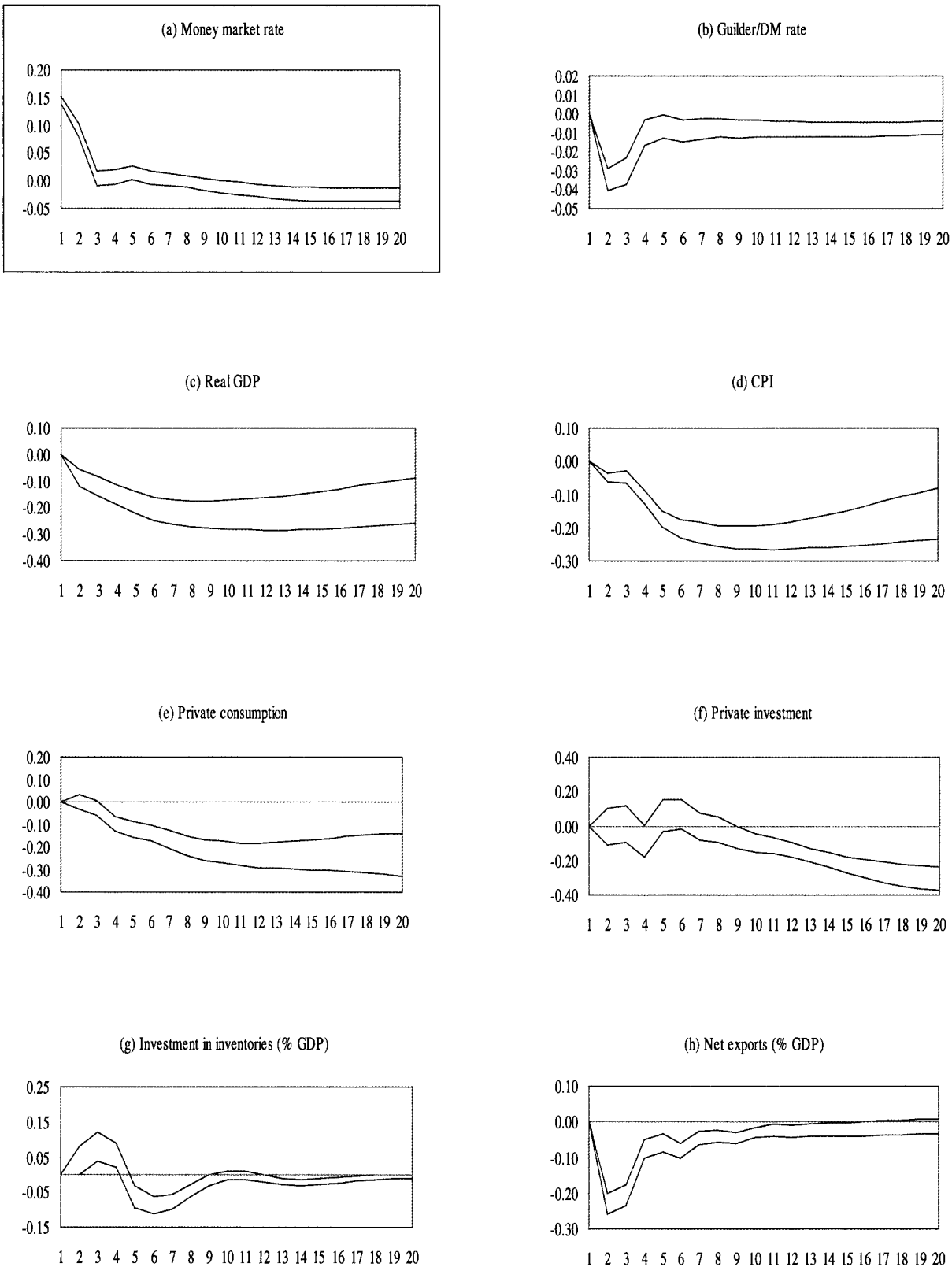
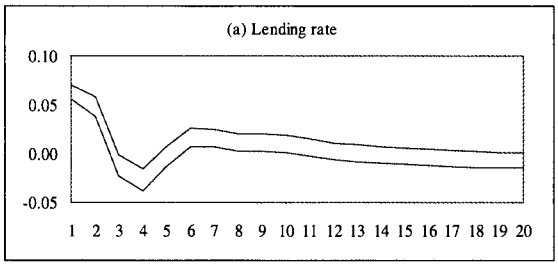
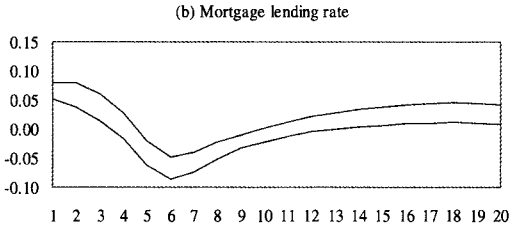
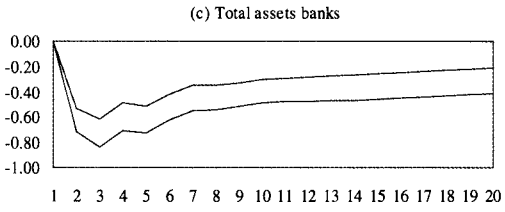


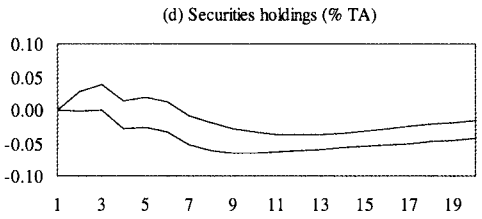
Figure 15

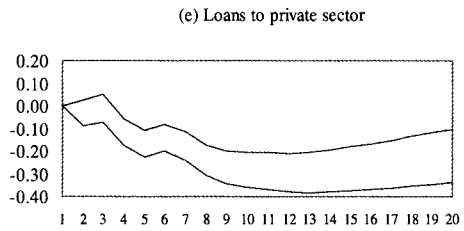
Dutch banking sector's response to an increase in the money market rate

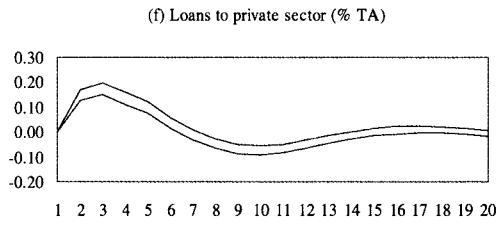


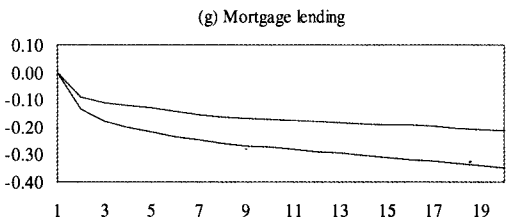


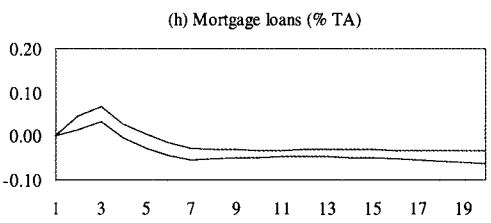


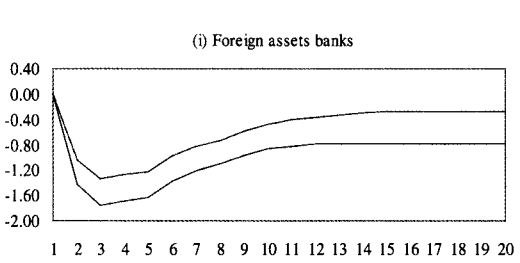












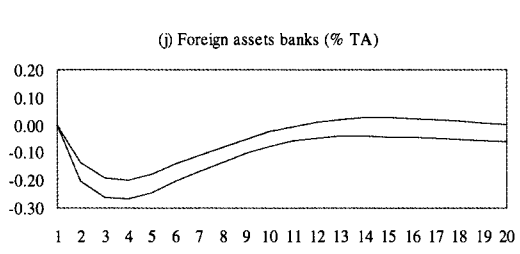


Figure 14 shows the effects of an increase in the Dutch money market rate.[38] The estimated coefficient of the current German interest rate in the interest rate equation of the various VARs is around 0.92, while its standard error is about 0.10. This coefficient is thus clearly insignificantly different from one. The interest rate shock can therefore be interpreted as a deviation from the German interest rate that is consistent with the guilder/mark peg. The typical shock is only 15 basis points and short-lived (Figure 14a), illustrating the limited room for independent interest rate movements in the Netherlands. However, this does not imply that monetary policy is powerless. A rise in the money market rate is followed by a temporary appreciation of the guilder (Figure 14b). Output gradually declines for 8 quarters to 0.17% below the baseline, before turning around (Figure 14c). Prices are sticky, as the price level remains unaffected for 2 quarters, before it gradually falls to 0.19% below the baseline (Figure 14d). After bottoming out the price level slowly starts to rise towards the baseline. The so-called "price puzzle" is thus remarkably absent.[39] In the short run, the economy's response is determined by the interplay of net exports and investment in stocks. Net export sharply contract for two quarters, reflecting lower exports and temporarily higher imports (Figure 14h). Inventories rise for two quarters due to falling foreign and domestic demand and decline as the level of output is adjusted (Figure 14g). In the medium term, lower output and spending mainly translates into lower consumption (Figure 14e). For investment we get a counterintuitive result, but the estimates are rather inaccurate as the confidence interval around this IRF is unusually wide (Figure 14f).

Figure 15 focuses on the banking sector's response to a contractionary monetary policy. Banks increase their lending rates in the same quarter by approximate half of the money market rate increase (Figures 15a and b). The central bank succeeds in shrinking the balance sheet of the banking system (Figure 15c). Total banking assets quickly fall by 0.5% after one quarter, and start to increase after the third quarter. Despite alternative sources of funding, Dutch banks appear to be unable to fully shield their operations from monetary policy actions. The decline of total banking assets is accompanied by an adjustment of the composition of the portfolio. The share of loans to the domestic private sector increases by 0.2% in two quarters, while the opposite can be observed for foreign assets. Initially, the share of the holdings of securities displays a modest rise. Banks protect their loan portfolio, as initially total loans even increase a bit despite the higher lending rate. This may reflect the temporary increase in short-term financing needs by firms due to higher inventory investment (see Figure 14g).[40] Banks treat households and firms differently, however. Mortgage loans start to decline quickly, although in percentage terms less than total assets.[41] The share of mortgages rises 0.07% in two quarter before coming down quickly, and it even falls below the baseline in the medium term. Banks also raise the interest rate on mortgages somewhat more aggressively than the short-term lending rate. Firms get preferential treatment as their loans appear to be less sensitive to interest rates changes in the short run. This finding, in combination with the evidence that small firms are much likelier to experience difficulties with credit availability, suggests that large firms especially are able to maintain and use their credit lines. Ultimately these loans decline too as the demand for credit falls with economic activity.

A remarkable aspect of the banks' behaviour is that foreign assets serve as the hedge against monetary tightening. The literature, which is mainly focused on the situation in the United States, assigns this role to holdings of securities. See, for example, Bernanke and Blinder (1992) for the United States, and Tsatsaronis (1993) for Germany. Our result also contrasts with Garretsen and Swank (1998) who

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[38] Figures 14a-14d are from the four-variable VAR with Z containing P, Y, E, and R (in that order). Figures 14e-14h and 15c-15h are IRFs of the variable X from five-variable VARs with Z containing P, Y, X, E, and R, while Figures 15a and 15b are derived from VARs where X is ordered last: P, Y, E, R and X.

[39] The "price puzzle" refers to the finding that the price level rises following a monetary policy tightening. See Sims (1992) and Christiano, Eichenbaum and Evans (1996) for a discussion.

[40] A similar finding is reported for the US economy by Christiano, Eichenbaum and Evans (1996), and for the German economy by Tsatsaronis (1993).

[41] A small part of the mortgages is recorded as corporate debt. However, an unknown part of the mortgages recorded as household debt is in fact debt of small unincorporated businesses.

for Dutch banks also found that securities act as a buffer.[42] Our results suggest that winding down positions in the international interbank market is the cheapest way to adjust the balance sheet quickly, and to shield the loan portfolio in this way from adverse short-run interest rate movements. It would be interesting to investigate whether the same adjustment pattern can be detected for other countries that have large and internationally oriented banks, like Switzerland and the United Kingdom.

The banks' response pattern is consistent with the prediction in the literature on the credit channel and the financial accelerator that following a contractionary monetary policy shock, banks will initially seek to protect their loans by drawing down a buffer stock of assets, and will primarily cut loans to those agents that are more bank-dependent (e.g. mortgages).

Finally, our analysis has some implications for the cost of monetary union. It has sometimes been argued that for the past fifteen years the Netherlands has in effect been in a monetary union with Germany, and that the approaching EMU does not represent any significant sacrifice in terms of monetary policy independence. However, our results suggest that the move from a quasi monetary union to a full monetary union still entails non-trivial costs. By taking part in EMU the Netherlands will give up the admittedly limited scope for discretionary monetary policy it still enjoyed in the past fifteen years, and which is summarised in Figure 14.

[42] There are a number of non-trivial differences between our analysis and theirs, however. Garretsen and Swank employ monthly data running from 1979 to 1993 in a seven-variable VAR involving Dutch and German variables, while our sample consists of quarterly data from 1983 to 1997 in which there was only one exchange rate regime. They measure output by industrial production which in the Netherlands accounts for 20 to 25% of the GDP, whereas we use GDP figures. Finally, they use changes in the German money market interest rate as the monetary policy shock. This issue warrants further research.

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