DNB Occasional Studies
Vol.12/No. 3 (2014)

Bank lending and capital

DNB Occasional Studies

Gerbert Hebbink, Mark Kruidhof, Jan Willem Slingenberg

De Nederlandsche Bank
Eurosysteem

Central bank and prudential supervisor of financial institutions

Authors
Gerbert Hebbink, Mark Kruidhof, Jan Willem Slingenberg

The aim of the Occasional Studies is to disseminate thinking on policy and analytical issues in areas relevant to the Bank. Views expressed are those of the individual and do not necessarily reflect official positions of De Nederlandsche Bank.

Subscription orders for DNB Occasional Studies and requests for specimen copies should be sent to:

De Nederlandsche Bank NV
Communications
P.O. Box 98
1000 AB Amsterdam
The Netherlands

Internet: www.dnb.nl

Occasional Studies

Vol.12/No. 3 (2014)

Gerbert Hebbink, Mark Kruidhof, Jan Willem Slingenberg [1]

Bank lending and capital

1 The authors would like to thank Robert-Paul Berben, Ron Jongen and Jasper de Winter for their contributions to parts of this study. They would also like to thank Tijmen Daniëls, Marco Hoeberichts and Koen van der Veer for their valuable comments on previous versions.

Contents

Summary and conclusions

Capital requirements for banks have been become much more stringent since the financial crisis. Strengthening capital has made the banking sector more resilient and reduced the likelihood of new crises. Over the next few years, Dutch banks will have to continue to strengthen their capital in order to meet the requirements of Basel III. In addition, new requirements are being introduced, such as compulsory advance contributions to a deposit guarantee and resolution fund (ex-ante funded system). Moreover, the leverage ratio is being raised to 4%, as a response to the Government View on the Financial Sector.

This study considers how these requirements can be satisfied and what consequences this may have in terms of lending. Whether banks will be able to meet their capital needs depends on their future profitability and access to market funding. To explore future developments in this area in a consistent manner, we have developed four scenarios.

- The *base scenario* is a scenario where growth in profits in the banking sector is in line with the outlook for macro-economic growth. Moreover, banks have sufficient access to capital market funding. Banks will then be in a position to meet all requirements (including the 4% leverage ratio) and be able to accommodate the demand for credit associated with the projected level of economic growth.
- In the scenario based on a *recovery in investment*, strong business investment growth will result in a sharp rise in demand for credit. This could create a discrepancy between credit demand and credit supply, which would have a negative impact on real spending and hence dampen economic growth. These effects will not be seen to the same extent, if at all, if banks are willing and able to raise additional capital or if other financial institutions increase their credit supply.
- A discrepancy between credit demand and credit supply also arises in the *prudent* scenario. In this scenario, growth in the supply of credit is limited because bank profitability stagnates at the relatively low level seen in 2012/2013. Access to capital market funding is also limited.
- In the *shortfall* scenario, banks do not build up enough capital because profits are insufficient and opportunities for issuing debt and capital are more limited. In this scenario, there is little banks can do apart from reducing their balance sheets, which will be accompanied by a reduction in lending.

Even if their capital positions could fully accommodate the demand for credit (as in the base scenario), banks may decide to limit credit growth in order to further strengthen their capital positions. In addition, a bank may wish to comply with the requirements at a faster pace, or wish to hold additional capital on top of the requirements, or wish to distribute dividend or increase dividend distributions. Banks may also limit lending for reasons unrelated to their capital position, for example with a view to reducing their concentration risk associated with certain activities.

As regards the period after the financial crisis, there are strong indications that lending has been affected by supply limitations as well as by the fall in demand for credit. Increased credit risk is the main reason why banks limit their lending. Banks have indicated that their capital position also plays a role when it comes to limiting credit supply.

Large, often listed, companies have considerable financial buffers, and there is currently little demand for bank loans at such companies. The situation is different, however, for small and medium-sized enterprises (SMEs). Smaller companies in particular, which are often not very solvent or profitable, may find it difficult to secure loans. When it comes to taking out loans, the limiting factor for SMEs is in fact their equity, rather than bank capital.

1 Introduction

The capital rules that banks have to comply with have become much more stringent since the financial crisis. The financial crisis brought home the fact that the capital buffers of banks were too small to absorb shocks. Financial aid from the state was required on a wide scale to avoid more serious consequences for the financial system. In reaction to the crisis, the Basel Committee developed a new regulatory framework to make the banking system more resilient (Basel III). In Europe, Basel III is being implemented through the CRD-IV/CRR legislative package.[2] At the heart of the reforms, which should prevent new problems arising at banks, are the stricter rules governing bank capital.[3]

Banks must also comply with other requirements that affect their capitalisation. Rules are being developed that should make winding up banks easier (Bank Recovery and Resolution Directive, BRRD). One important aspect of these rules is a bail-in regime under which liabilities can be reduced or cancelled, or converted into equity when a bank is ailing or collapses. In the context of the banking union, a single European resolution fund (SRF) will be built up, for which advance contributions will be levied (ex-ante funding). This fund can be used for various purposes, including the provision of liquidity, recapitalisation or the provision of guarantees. Banks also have to make contributions towards a fund related to the deposit guarantee scheme (DGS).

The benefits of a better-capitalised banking sector come in the form of a reduced likelihood of crises and less procyclicality in lending. Increasing capital levels may entail costs, however. These costs are principally associated with the potential impact on lending during the transitional phase. It may, for instance, transpire that banks adapt to the stricter capital requirements by reducing their balance sheets. This is because capital requirements are expressed as a percentage of assets (risk-weighted or otherwise), and banks can therefore also increase their capital ratios by

2 Wherever Basel III is referred to below in this study, this is in fact a reference to the transposition of Basel III guidelines into the CRD-IV/CRR legislative package.
3 Stricter rules for bank liquidity are being introduced at the same time. These rules are outside the scope of this study.

cutting their balance sheets. Such moves may be prompted by scarcity of capital, but may also be down to the priorities of banks.

This study will look at the capital needs arising at Dutch banks as a result of the new rules, and it will explore the implications for potential credit supply and for the real economy. This is done on the basis of various scenarios. These scenarios are not predictions; instead their purpose is to explore the circumstances under which lending could come under pressure due to the more stringent capital requirements for banks.

The final section takes a closer look at recent developments in lending. To interpret these developments, a distinction needs to be made between factors affecting demand and those affecting supply. This is particularly true in the case of lending to SMEs.

2 Capital needs of Dutch banks

In connection with the preparations for Basel III, Dutch banks have strengthened their capital positions significantly in recent years, and they are now ranked above average within Europe. The core capital ratio of the Dutch banking sector rose from 9.5% at the start of 2012 to 11.9% in the third quarter of 2013. The leverage ratio (LR) improved from 3% to 3.5% (see box 1 for an explanation of the Basel capital requirements and definitions).[4] Over the next few years, Dutch banks will need to continue to strengthen their capital in order to comply with Basel III. The full implementation of Basel III in 2019 will lead to an additional capital need of

4 The ratios for Q3 2013 have been calculated in accordance with Basel III. They are based on the capital definitions that will apply in the end (i.e. the end-state definitions). This means that no account has been taken of the phasing out of existing debt instruments.

Table 1 Additional loss-absorbing capital needed in the period leading up to 1 January 2019 (EUR billion)

Capital requirements and rules	Capital instrument		
	CET1	AT1	T2
Basel III: risk-weighted capital requirement	1.5	6.6	11.9
Basel III: Leverage ratio of 3%		2.1	
Leverage ratio rises from 3% to 4%		7.8	-5.7
Repayment of state aid	2.3		
DGS/Resolution fund	2.4		
Bank tax	3.0		
Resolution levy related to SNS	1.0		
Total	**10.2**	**16.5**	6.2
TBD: Leverage ratio rises from 4% to 5%		21.2	-6.1
TBD: Total	**10.2**	**37.8**	**0.2**

22.1

26.7

Note: The first two amounts in the Total row make up the additional capital need of EUR 26.7 billion used in the rest of the analysis (Section 3). Calculations have been based on figures for Q3 2013, using the capital definitions that will apply when the end point has been reached (January 2022), on the assumption that banks will comply with these requirements before 1 January 2019. The following parameters were assumed when calculating the capital needed. (i) an average Pillar 2 requirement of 1%, consisting of CET1 capital, (ii) a countercyclical buffer of approximately 0.5%, and (iii) a capital buffer for systemic relevance amounting to 1%-3% (see also box 1).

EUR 22.1 billion. This is the aggregate of the amounts stated in the first two rows of Table 1, in which this sum is broken down into core capital (CET1) and additional tier 1 and tier 2 instruments (AT1, T2).

Box 1: The Basel III Accord

The Basel III Accord represents a significant toughening of capital requirements in terms of both quantity and quality. The criteria for capital instruments that are eligible for the capital buffer have become stricter. At the same time, capital requirements have been increased, and an unweighted requirement (the leverage ratio) has been introduced on top of the risk-weighted requirement (which is dependent on the degree of risk associated with the assets).[5]

Forms of capital under Basel III:

- Common Equity Tier 1 (CET1) capital generally consists of equity capital, reserves and retained earnings. This form of capital may be used for all components of the risk-based capital requirement and the unweighted capital requirement. Also known as core capital, CET1 capital is primarily intended to absorb going-concern losses.
- Additional Tier 1 (AT1) capital is a form of capital that generally consists of perpetual debt instruments. It may be used to a small extent for the risk-based capital requirement (up to a maximum of 1.5% of risk-weighted assets or RWA). AT1 capital counts in full towards the unweighted capital requirement. Like ET1 capital, AT1 capital is also intended to absorb going-concern losses.
- Tier 2 (T2) capital instruments are often subordinated debt instruments with a minimum maturity of five years. This type of capital may count towards the risk-based capital requirement to a limited extent (up to a maximum of 2% of RWA). T2 capital does not count towards the unweighted capital requirement. In contrast to CET1 capital and AT1 capital, T2 capital is intended to absorb gone-concern losses, i.e. losses in the event of a bank collapse or resolution.

The criteria applying to capital instruments have been made more stringent. As a consequence, some existing AT1 and T2 capital instruments no longer comply with the capital definitions. This effect goes some way to explaining the capital needs of banks. In Europe, a transitional regime applies to AT1 and T2 instruments that were issued prior to 1 January 2013 and are not eligible under the new definitions. These instruments will be phased out gradually by 1 January 2022 (to the extent that they do not contain any incentives for repayment).

5 In addition, stricter rules for bank liquidity are being introduced for the first time. These rules are outside the scope of this study.

Basel III capital requirements:

- The risk-based requirement consists of a number of components. First, banks need to hold core capital (CET1) corresponding to at least 4.5% of total risk-weighted assets. Moreover, there is a minimum capital requirement of 6% for the more broadly defined Tier 1 capital (which implies an Additional Tier 1 requirement of 1.5%), and the total capital requirement is 8% (which implies a Tier 2 requirement of 2%). Alongside the minimum requirements, additional risk-weighted capital buffers, which consist exclusively of core capital, are being introduced. These are a capital conservation buffer of 2.5%, a buffer for systemically relevant banks of 1%-3%, and a countercyclical buffer of up to 2.5%, depending on credit growth.
- The unweighted capital requirement (leverage ratio) demands that banks always hold capital representing a minimum percentage (provisionally 3%) of total exposures (including off-balance sheet assets). Banks can use core capital as well as AT1 capital for this purpose.

The increase in the leverage ratio to 4% makes this requirement binding (restrictive) for most Dutch banks. An LR of 4% results in an additional need of EUR 7.8 billion in AT1 instruments (Table 1, row 3). Much of this can be met by replacing T2 instruments (which cannot be counted towards the LR) with AT1 instruments. In that case, the increase in the additional capital that is needed would be only EUR 2.1 billion.[6] A potential further increase in the LR from 4% to 5% would result in an increase of EUR 21.2 billion in the amount of AT1 capital needed by banks, of which EUR 6.1 billion could be alleviated by substituting T2 instruments (Table 1, penultimate row).

It is not yet clear whether the planned introduction of a bail-in regime will lead to an additional need for capital in the period leading up to 2019. National authorities need to set a minimum percentage of liabilities that are eligible for bail-in (Minimum Requirements for own funds and Eligible Liabilities - MREL) for each bank. It has not yet been determined how high this percentage will be for Dutch banks, nor which liabilities will be eligible, or which convergence path will apply.

At some banks, specific circumstances mean that there is less opportunity to build up capital. ING Bank, for example, still has to repay EUR 2.3 billion in state aid (Table 1, row 4). Moreover, ING Bank and SNS Bank may need capital to pay back

6 In this calculation, it has been assumed that BNG and NWB Bank do not have to comply with the 4% LR requirement, in line with the comments made by the Minister of Finance concerning their special position (source: Parliamentary debate on the Government View on the Dutch Financial Sector, 6 February 2014).

double leverage at those financial conglomerates.[7] At the moment, ING Group currently has a double leverage of EUR 5 billion, while at SNS Reaal this figure is EUR 667 million. Both groups have been instructed by the European Commission to sell their insurance activities. If the proceeds from this sale exceed the double leverage, this will contribute positively to the bank's capitalisation. Given the uncertainty, the effect of this has not been taken into account in Table 1.

Finally, the opportunity to build up capital may be reduced by the mandatory creation of a national deposit guarantee fund (DGS), a European resolution fund, the bank tax and the resolution levy (Table 1, rows 5-7). Based on current estimates, banks will have to contribute a net amount of EUR 2.4 billion to the DGS and the resolution fund in the period leading up to 2019.[8] In addition, banks are subject to the bank tax, which amounts to EUR 3 billion in total (EUR 600 million a year). This tax is intended to make the financial system safer, and so it is conceivable that in the future the bank tax will be used to build up the European resolution fund. In addition, in 2014 banks will pay a one-off resolution levy of EUR 1 billion in relation to the rescue of SNS.

7 Double leverage may exist at financial conglomerates if part of the capital of the bank and/or insurance subsidiary is funded by the holding company's debt. In that case, the group's total capital is less than the total amount of capital held by the subsidiaries.

8 This is the total amount to be contributed for the years 2015, 2016, 2017 and 2018, which has been estimated at EUR 800 million a year. After tax (at a rate of 25%), the total net contribution amounts to EUR 2.4 billion.

3 Scenarios for potentially building up capital

3.1 Possibilities for satisfying additional capital needs

As the previous section showed, banks need to build up a substantial amount of additional capital by the end of 2018. This section looks at the possibilities for accomplishing this. Banks can retain earnings and add them to their equity in order to build up the necessary core capital (CET1). Cost reductions and other forms of rationalisation can help them in this. Insofar as earnings are not sufficient, the necessary core capital may be supplemented further by means of an issue (e.g. a rights issue) to raise share capital. If earnings are high enough, they can be used to cover some or all of the need for AT1 capital once the necessary core capital has been raised. The capital that is still needed after this can be raised by issuing subordinated debt (AT1 and T2), although it could, in principle, also be raised by issuing share capital. We assume, however, that banks will use AT1 instruments to meet any remaining need for AT1 capital.

The additional amount of capital needed for the period leading up to 2019 amounts to EUR 26.7 billion (Table 1). This sum consists of the amount needed in the way of core capital (EUR 10.2 billion) plus the total amount needed in the way of AT1 capital (EUR 16.5 billion). The amount of T2 capital needed has not been taken into consideration, because banks are expected to be able to meet their remaining need for T2 capital easily in all of the scenarios. This need is relatively limited, and there has been a great deal of activity on the market for T2 capital recently. It therefore follows that the extent to which banks will be able to meet their need for additional capital will be very much dependent on future developments and the possibilities for raising capital (debt instruments as well as core capital). Given that these factors are uncertain and hard to predict over a five-year horizon, a number of scenarios have been developed. The four scenarios are used to explore potential situations. Each scenario is a plausible combination of interconnected developments. The scenarios can be used to estimate how easily banks can comply with the capital requirements in the period leading up to 2019. In a scenario where there are sufficient earnings and free access to market funding, banks are in a better position to build up capital in excess of the minimum requirements, creating scope for additional lending. This will be more difficult in a scenario where earnings are lower or there is less access to market funding.

It has been assumed that banks retain 70% of earnings to make up the required core capital. This is the percentage that has been retained in recent years. The portion of earnings that is not retained is required for distributions to holders of hybrid capital instruments that are largely unavoidable. Moreover, state-controlled banks are expected to distribute a portion of their earnings as dividend, partly on the instructions of the European Commission.

3.2 Base scenario for building up capital

The base scenario assumes bank profits for the next five years that are in keeping with the macro-economic development of the Netherlands as projected by DNB for that period. For this purpose, we used the most recently published projection (DNB, 2013b), extended to 2018, in which real GDP grows by 1.2% a year on average.[9] Based on empirical research by DNB[10] we estimate that this rate of growth will lead to the banking sector achieving profits of EUR 6.7 billion a year (Table 2). This is more than enough to cover the need for core capital, in which case there will be no need for share issues. Additionally, in the base scenario, the access banks have to the market for debt instruments is sufficient for them to meet the need for EUR 16.5 billion in AT1 capital (by means of annual issues of EUR 3.3 billion). Although banks worldwide did not issue more than EUR 18 billion in AT1 instruments in 2013, market players expect that in the next few years investors will be more interested in absorbing issues of AT1 instruments. This is firstly because investors are becoming more familiar with these instruments and are better able to price them. Secondly, there are indications that institutional investors are currently revising their investment strategies so that hybrid instruments can also be purchased. Finally, banks can issue debt denominated in dollars, and the market for dollar-denominated debt is considerably larger than the European market.

In the base scenario, the assumed trend in profits and climate for issues result in a capital excess (i.e. an amount in excess of the capital needed) of EUR 15.0 billion. This amount was calculated by adjusting the retained portion of earnings and all AT1 capital that is raised to allow for inflation, aggregating the amounts for the five-year period, and subtracting the amount of capital needed.

9 This is an extrapolation of DNB's projections for 2014 and 2015, which was made for this study (DNB, 2013b).
10 See Bolt et al. (2012).

Table 2 Scenarios for capital excess compared to requirements in 2019

Scenarios for building up capital	Assumptions		Capital-excess compared to requirements
	Profits	AT1 issues	EUR
1 Base	as forecast (EUR 6.7 bn)	EUR 3.3 bn	15.0 bn
2 Recovery in investments	higher econ. growht (EUR 7 bn)	EUR 3.5 bn	16.8 bn
3 Prudent	level of 2012/2013 (EUR 5 bn)	EUR 3 bn	7.1 bn
4 Shortfall	disappointing (EUR 4 bn)	EUR 2 bn	1.8 bn (shorfall)

Note: See Sections 3.2 and 3.3 for a description of the scenarios. Calculation of capital excess in final column: the available capital is determined by aggregating the annual profit (column 2) and the AT1 issues (column 3) over a five-year period. In each scenario, profits and issues increase by 2% a year in line with inflation and profit is stated net of the portion that is not retained (30%). The available capital calculated in this way was then reduced by the amount of capital needed (EUR 26.7 billion, see Table 1).

3.3 Alternative scenarios for building up capital

We also considered three alternative scenarios in addition to the base scenario (Table 2). This is a way in which the uncertainties surrounding the base scenario can be taken into consideration. For instance, in the base scenario profit growth was projected using an empirical model in which the predictions are in a specific confidence interval. Profits may fluctuate within this confidence interval, for example because trends in loss ratios are more favourable, or less favourable, than projected. The alternative scenarios therefore use different expectations regarding profits. This is combined with varying levels of access to the market for debt instruments. The alternative scenarios thus give an impression of the margins within which the possible outcomes may be found. The selected scenarios are a scenario based on a recovery in investment, in which there is higher business investment growth, a prudent scenario, in which profits stagnate and the climate for issues is less favourable, and a shortfall scenario, in which profits are lower and the climate for issues is worse.

In the scenario based on a recovery in investment, growth in investments picks up strongly in the Netherlands and the rest of the euro area (see Section 4.3 for further

details). As a result, GDP growth increases to 1.4% a year. [11] In the empirical profit model, the higher rate of growth translates into better profit figures (EUR 7 billion a year). Debt issues by banks increase by the same percentage as bank profits. Thanks to these profits and debt issues, banks can satisfy their need for additional capital (even without share issues) and still have EUR 16.8 billion in capital left over.

In the prudent scenario, this capital excess decreases to EUR 7.1 billion. In this scenario, profits stagnate at EUR 5 billion a year, which is the same level as in 2012 and 2013. For Dutch banks, this is a relatively low level of profits compared with the past two decades. The only time in the last 30 years when profits were lower was during the financial crisis of 2008-2009. However, the possibility that profits will remain under pressure for the next few years cannot be ruled out. Since the financial crisis, the margins on mortgages have risen due to reduced competition on the Dutch mortgage market, but there are several indications that this was a temporary phenomenon (DNB, 2013a).

In the prudent scenario, the annual issuance of AT1 instruments is limited. This may be the case, for example, if the market for debt instruments does not grow as strongly as expected. In this scenario, the annual amount of debt issued by Dutch banks each year is assumed to be EUR 3 billion. This is in keeping with the entire volume of AT1 instruments expected to be issued throughout Europe for the whole of 2014 (EUR 30 billion), based on the weighting given to Dutch banks (approximately 10%). The annual issue volume will remain limited to that amount in subsequent years. In this prudent scenario, banks can build up sufficient capital even if profits and debt issues are lower. There is no need to increase capital by tapping supplementary sources, e.g. by means of share issues.

In the last scenario, the shortfall scenario, a shortfall of EUR 1.8 billion will arise in terms of the capital needed by banks. A profit level of EUR 4 billion has been assumed during the five-year period, which is 20% less than the already low level seen in 2012-2013. It has also been assumed that banks will be able to issue even fewer AT1 instruments. In this scenario, the annual amount to be raised is limited to EUR 2.0 billion, which is not enough to cover the need for AT1 capital. The possibility that banks could supplement the amount of EUR 1.8 billion from sources other than available profits and AT1 instruments has been ruled out in this scenario. We assume that the equity market will not be able to provide the solution, given the circumstances described in this scenario (low profits and poor access to the AT1 market).

11 Average for 2014-2018. We used an economic scenario recently published by DNB, which was extrapolated for the years beyond 2014-2015 (DNB, 2013b).

4 Implications for lending and growth

4.1 From bank capital to lending

It follows from the previous sections that banks will have additional capital needs in the period leading up to 2019, owing to the new capital requirements and other rules. If the banks are able to supplement their capital in a way that produces a capital excess, they will be able to increase their balance sheets to the point at which they once again comply with the minimum requirements.

In principle, an increase in the size of the balance sheet could consist entirely of additional lending. In practice, this is not expected to happen, as assets other than loans are also increasing.[12] Banks need to hold liquid assets in order to absorb liquidity risk, particularly if they use short-term funding for long-term credit. Furthermore, many banks have other factors to consider when determining the optimum composition of their assets, such as the expected return. This varies from bank to bank, and changes over the course of time. As little is known about this, we have made the assumption that the amount by which the combined balance sheets may grow will be distributed proportionately among all assets, including lending. The potential growth in lending at Dutch banks is therefore equal to the potential growth in their combined balance sheets. We can compare this potential supply of credit with the demand for credit as projected separately by DNB.[13]

4.2 Scenarios for the potential supply of credit

We used the leverage ratio to determine the maximum amount of growth in the balance sheets of Dutch banks in the four scenarios. For most Dutch banks, the LR is the binding capital requirement. When the LR is 4%, an additional EUR 1 billion in capital is accompanied by balance sheet growth of EUR 1 billion / 4%, or EUR 25 billion. In the base scenario, the combined amount of capital available is EUR 15 billion. If banks decide to use all of this amount to expand their balance sheets, this will result in annual balance sheet growth of EUR 75 billion (25 × EUR 15 billion /

12 Domestic lending comprises 37% of the banks' balance sheets.

13 It should be emphasised that the subject of this study is bank lending. It is expected that a portion of lending will come from providers of credit other than banks, such as insurers. In addition, alternative forms of business finance are gaining in popularity, although these are currently still very limited in scale. See also Section 4.5.

5 years). Based on the current combined size of the banks' balance sheets (EUR 2,400 billion), balance sheets could grow at an annual rate of 3.1% (Table 3, first column).

Banks are also able to grow lending in the two alternative scenarios with a capital excess. In the scenario based on a recovery in investment, the potential supply of credit grows by 3.5% a year. In the prudent scenario, the potential rate of growth in lending is much lower at 1.5%. In the fourth scenario (shortfall scenario), insufficient capital is built up because the possibilities for supplementing the required capital are inadequate. Banks will need to reduce the size of their balance sheets in order to comply with the requirements. In this scenario, their balance sheets shrink by EUR 8.8 billion a year, which corresponds to a contraction in lending of 0.4% a year.

Evidently, in three of the four scenarios banks are able to grow lending in the period leading up to 2019. The annual growth rates vary from 1.5% to 3.5%. By way of a comparison, after 2009 business lending and mortgage lending both grew by over 2% a year on average. Incidentally, this figure was much higher in the last few years prior to the credit crunch.

4.3 Projected growth in demand for credit

The potential growth in lending, i.e. credit supply, does not necessarily correspond to the demand for credit. The creation of demand for credit is, in theory, not dependent on the amount of bank capital available. Households and companies need bank loans to finance their spending Households primarily take out loans to purchase, build or remodel homes. Although companies have access to a number of sources of finance, bank loans are the most important source of working capital after internal funds, and are the most important source of finance for investments,

Table 3 Potential credit supply compared with projected credit demand (growth rate)

Scenario for building up capital	Potential credit supply	Projected credit demand	Projected GDP growth
	(%, annual average)	(%, annual average)	(%, annual average)
1 Base	3.1	2.4	1.2
2 Recovery in investment	3.5	4.2	1.4
3 Prudent	1.5	2.4	1.2
4 Shortfall	- 0.4	2.4	1.2

mergers and acquisitions. To make an estimate of this demand for credit, we once again used the macroeconomic projections made by DNB.

In the base scenario and in two of the alternative scenarios, the real economy grows by 1.2% a year. The corresponding total demand for bank credit is projected to grow by a nominal rate of 2.4% a year (Table 3, columns 2 and 3). The background to this growth rate is the relatively modest level of economic growth. The cautious growth in business investments is the main determinant of the rate of growth in corporate lending. The projected increase in demand for mortgage loans is low for the time being. Households are gradually starting to apply for mortgage loans again, but the main determinant in this area, i.e. income, is not rising quickly. Limited growth in the amount of available income is anticipated for the next few years, owing to the gradual recovery of the labour market and low levels of inflation. The unemployment rate will not start to fall until 2015, and then it will fall gradually.

In the base scenario, business investments grow by 4.3% a year. As an alternative to this, the scenario based on a recovery in investment assumes strong business investment growth of 6.7%. In addition, economic growth is increased to 1.4% a year.[14] The thinking behind this scenario is that business investment in Europe is currently at a very low level (down 20% in 2013 compared with 2007). Now that the economic recovery has been fuelled by exports for some time, a plausible scenario is that this will soon be followed by a pickup in business investment. Companies will need to replace or modify some of their outdated assets to be able to increase output again. Indications in this area are positive; growth in investment has been seen in the past few quarters, and there was a sharp increase in business confidence recently. An increase in real investments will create a greater need for financial resources. Some companies will have such resources available in the form of internal funds, while other banks will require bank loans. Growth in demand for credit is therefore stronger than in the base scenario at 4.2% a year (Table 3, columns 2 and 3).

4.4 Impact on economic growth

In the base scenario, the supply of credit can grow sufficiently and fully accommodate the projected demand for credit. In this scenario, companies and households will be able to obtain the bank credit they need to finance their transactions. This means that in this scenario there is no reason why the available supply of credit should slow down economic growth.

Less capital is built up in the prudent scenario and the shortfall scenario than in the base scenario, and the potential credit supply does not grow as quickly as demand for credit. Companies and households will therefore not obtain as much credit as

14 Average for 2014-2018. See DNB (2013b).

they apply for. Larger companies and businesses that generate sufficient profits will be able to fund their investment plans using internal funds (share capital or retained earnings). Other companies are more reliant on bank credit, which is not as readily available in these scenarios. Businesses that have little in the way of equity will be particularly affected by this. Households almost always have to rely on mortgage loans to purchase a home. Limitations on lending will in that case also be accompanied by reduced demand for residential properties and lower levels of consumer spending.

In the scenario based on a recovery in investment, banks are able to offer more credit than they are in the base scenario. At the same time, demand for credit is higher due to higher rates of economic growth, and in particular growth in business investments. In this scenario, the growth in the credit supply is not sufficient, on balance, to accommodate the demand for credit. This scenario shows that a pickup in economic growth, accompanied by strong demand for credit, can also lead to a situation in which demand for credit grows faster than the credit supply (Table 3). This gap can only be closed if banks raise additional capital.

A persistent discrepancy between credit supply and credit demand will affect economic growth, in terms of investments and consumption, among other things. An estimate of the negative impact on gross domestic product (GDP) can be made on the basis of the macro-economic projections.[15] In the prudent scenario, in 2018 GDP will be 0.2% lower (on a cumulative basis) than in the base scenario, in which the credit supply can grow sufficiently. The cumulative negative impact is somewhat less in the scenario based on a recovery in investment, and will amount to 0.1%.[16] In the shortfall scenario, in which the potential supply of credit shrinks slightly, GDP in 2018 will be 0.6% lower than in the base scenario.

Another way of looking at the tension between credit supply and demand is by considering how much additional capital (CET1 or AT1) banks would have to issue to be able to accommodate the demand for credit in the scenario. It should be borne in mind that this will be increasingly difficult in the more bleak scenarios. In the scenario based on a recovery in investment, an additional EUR 3.2 billion in capital would be required to be able to bring supply into line with demand. In the prudent scenario, this figure would be EUR 4.3 billion. Ensuring supply meets

15 DELFI, DNB's macro-econometric model for the Dutch economy, was used for this purpose. It has been assumed that growth in business lending and mortgage lending is limited to an equal extent. The limitation on business lending affects business investments, while the limitation on mortgage lending will have the effect of bringing down house prices, household wealth and private consumption. The link between scarcity of credit and economic growth in DELFI is covered in more detail on pages 40-43 of DNB (2011).

16 Compared to the scenario with a higher level of GDP growth.

demand in the shortfall scenario would require an additional amount of EUR 13.2 billion.

4.5 Assumptions behind scenarios in perspective

In the previous sections we presented exploratory scenarios for the supply of credit, which were then considered in the light of the demand for credit. The credit supply was found to lag behind demand for credit in three of the four scenarios. This discrepancy is a consequence of the assumed limit on the possibilities for supplementing and increasing bank capital. In a world in which capital is more freely available or even unlimited, the supply of credit would not be limited and the bottlenecks described above would arise less quickly.

The leverage ratio is binding in each of the scenarios and it has been assumed that banks will only issue AT1 debt to supplement their capital. Issuing share capital (CET1) is generally less appealing for banks, and in recent years it has proved difficult for them to do. The assumption in the prudent scenario and the shortfall scenario is that banks are limited in the extent to which they can strengthen their capital by the limited possibility of raising AT1 capital. In the scenario based on a recovery in investment, profits develop more favourably and there is more scope for supplementing capital by means of issuing debt (AT1). This will not, however, be sufficient to satisfy the demand for credit. Nevertheless, the strong demand for credit could lead banks to increase their potential supply of credit further. In order for this to happen, the expected margin on such additional lending needs to be sufficient, and funding such lending must not be prohibitively expensive.

In the three scenarios in which lending grows, the supply of credit increases because banks use all their capital in excess of their required capital to grow their balance sheets. In practice, however, banks are likely to want to hold a certain margin in excess of the required capital, which would limit growth in lending. On the other hand, it is conceivable that some banks could still have some capital in the balance sheets that is not yet tied up (e.g. capital gains on the divestment of operations), and this capital could be used for additional lending. That said, the possibilities for this are limited because banks have already made frequent use of this option in recent years. Finally, the scenarios do not make any pronouncement on the supply of credit from sources other than banks. Alternative sources of business finance may provide some support, although this market is currently still limited in scale. With regard to mortgages, the market share of insurance institutions and pension funds has already started to rise.

5 Recent trends in lending

5.1 Possible behavioural responses of banks to capital requirements and rules

An amount of bank capital is produced by each of the scenarios considered above, and it is assumed that this amount of bank capital determines the level of lending. In reality, however, this cannot be considered a rule. First, a decline in the supply of credit due to a shortage of capital has hardly any consequences for the real economy if the demand for credit falls more steeply than the credit supply. Second, banks may have reasons for adjusting the supply of credit that are unrelated to capital. In any event, banks will also have to take account of the expected return on loans. This is partly dependent on the expected credit risk. If the risk is higher, banks will revise their lending conditions, which will curb lending, and this may be concentrated in certain parts of the economy. In this section, we will take a more detailed look at recent trends in lending in an attempt to illustrate the different factors that affect bank lending, paying specific attention to SMEs.

5.2 Demand effects on lending

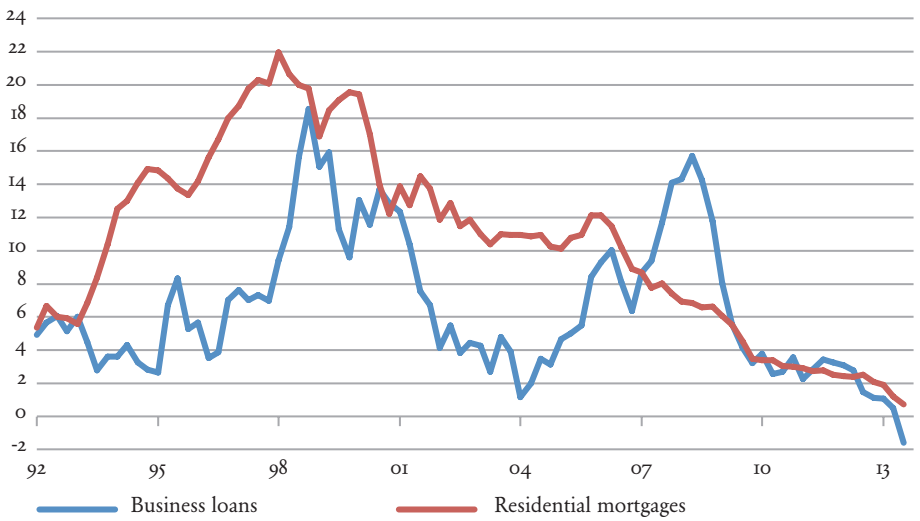
Growth in lending in the Netherlands has declined since 2009. Mortgage lending by banks to households is growing at a very low rate, and in January 2014 stood at just 0.4% on an annual basis. Growth in business lending has fallen sharply. Bank loans to non-financial companies have fallen since July 2013, and in January 2014 they declined by 2.4% on an annual basis. The average annual growth rate of 7% seen in the past two decades was much higher, although in hindsight it can be concluded that growth in lending was excessive during some of that period.

The recent slowdown in growth in lending is connected first and foremost to the fall in demand for credit, largely due to the fact the economic situation has deteriorated.[17] Mortgage lending is barely growing, and this reflects the low number of residential property transactions and the squeeze on household income. On top of this, compulsory annual repayments for tax purposes will keep demand for credit down permanently. Furthermore, the maximum amount that can be borrowed under a residential mortgage loan is limited, both by income and by the value of the property. Finally, some households are deciding to repay their mortgage loans.

17 See also Pattipeilohy, Hebbink and Kieft (2010).

Chart 1 Growth in bank lending in the Netherlands

As a percentage, annualised growth per month



Source: DNB, figures adjusted for securitisations and fractions.

Demand for credit among companies has also been under pressure in recent years. As the state of the economy continued to deteriorate, most companies reduced their need for finance for working capital and business expansion investments.

The economic recovery predicted for this year is not expected to result in stronger demand for credit until 2015. Demand for mortgage loans is very much dependent on real incomes, which have shrunk in recent years. The projected recovery in incomes is slow, partly because unemployment will only start to fall in 2015 and this fall will be gradual. The predicted recovery in business investment determines the demand for credit among companies. In the Netherlands, it takes on average approximately four quarters for a turnaround in growth in business investments to be reflected in business lending. In first place, this is because companies that are financially sound usually prefer to use internal funds to finance investments in the first instance. Large companies in particular have accumulated savings in recent years, and as a result they have plenty of internal funds they can use for financing purposes. Second, companies that are not in such robust financial health are deferring investments in order to first restore their buffers. Third, when conditions on the financial markets are favourable, large companies often prefer to raise finance on the capital market (shares, bonds) before turning to bank loans. This applies to the same extent to smaller companies, which often resort to bank

credit at an earlier stage. In addition, there have been recent indications that some of these companies have an additional need for working capital because the terms of payment for business-to-business transactions have increased.

5.3 Supply effects on lending

Besides falling demand there are also a number of supply factors that limit growth in lending. This is mostly due to the increase in credit risk. According to research by DNB, the more stringent lending policies followed by banks have kept growth in business lending down by an estimated 2 to 4 percentage points (Van der Veer and Hoeberichts, 2013; Van der Veer, 2013). Conditions governing the granting of loans have been revised on a regular basis since mid-2007. This was revealed by the Bank Lending Survey (BLS), in which banks provided qualitative information on whether they had toughened up or eased their lending conditions. Business loans and mortgages entail greater risks for banks than they did prior to the financial crisis. The increase in problem loans is an indication of this. There is a relatively high level of payment arrears among SMEs in particular. This has led banks to limit the supply of credit and charge higher rates of interest for new loans.

Apart from greater credit risk, the reasons why banks are limiting the supply of credit include the need to strengthen their balance sheets and funding considerations. The BLS revealed that during the past twelve months several Dutch banks reduced their volume of outstanding loans in order to meet capital requirements.[18] Moreover, some banks expected that they would continue to do so during the first half of 2014 (Chart 2). Banks indicated that they are working to improve their capital position at the same time. For many banks, dependence on market funding formed an additional reason to limit lending in recent times. Long-term loans in particular come with higher refinancing costs and risks. For this reason, banks are restricting long-term lending, partly by charging higher rates of interest. Until recently, this last effect had an impact on residential mortgages (DNB, 2013a). SME loans also have a relatively long term to maturity, and this factor may play a role in SME loans.

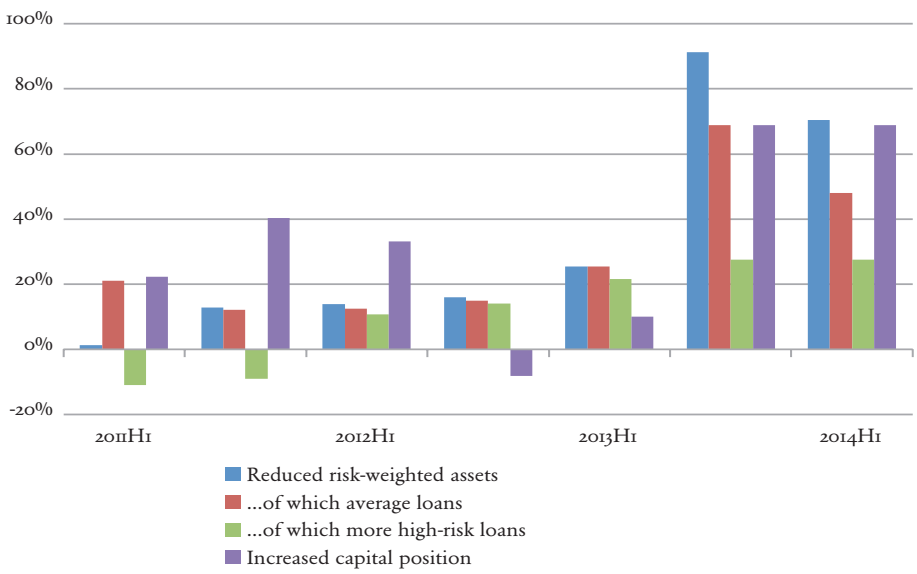
5.4 SME loans

The SME segment accounts for almost 70% of Dutch jobs. It includes many start-ups and innovative companies, which make an indispensable contribution in terms of capacity for economic growth. One disadvantage of the SME segment is that it is very much dependent on the domestic economy, in which the recovery has been slow to date. Only 8% of SMEs export goods, compared to almost half

18 This relates to an ad hoc question in the BLS. This question is as follows: 'With a view to meeting the new regulatory requirements, has your bank increased/reduced its risk-weighted assets or its capital position in the past six months, or does it have plans to do so in the next six months?'.

Chart 2 Portion of banking sector indicating that RWA has been reduced and/or capital position has been increased in order to meet new capital requirements (Basel III and national capital rules)

Percentage of banking sector (weighted)



Source: DNB, Bank Lending Survey.]

of all companies in the large business segment.[19] This means that SMEs are still vulnerable and will not be able to benefit from the economic recovery until a relatively late stage.

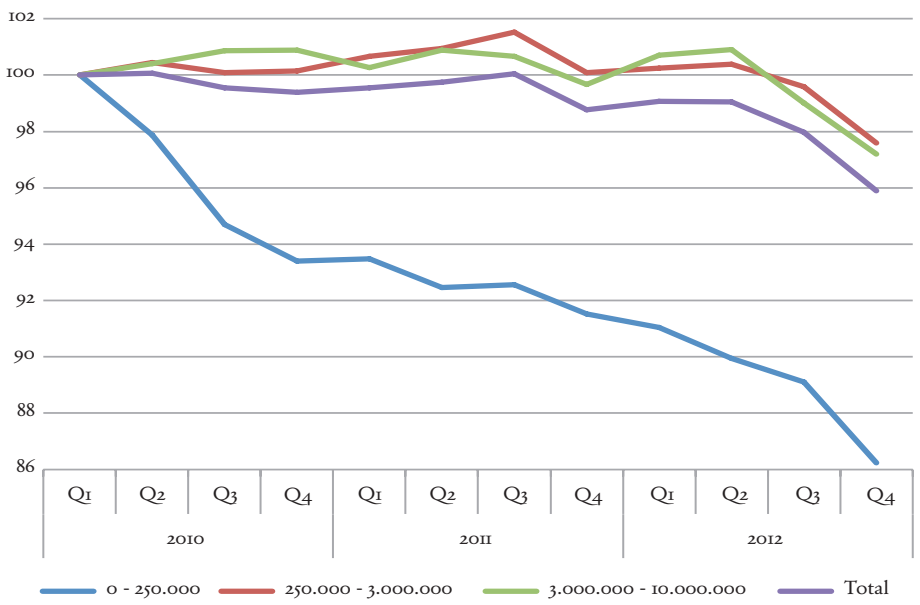
The SME segment is more reliant on bank credit for finance than the large business segment.[20] As the number of employees decreases, companies make more use of lines of bank credit and overdrafts, and less use of business loans and leases (based on surveys conducted between 2009 and 2013). Statistical information on outstanding loans to the SME segment is not directly available. There has, however, been a sharp fall in lending in the form of smaller loans (Chart 3).[21] This amounted to 14% during the period 2010-2012, compared to a fall of 4% for lending as a whole. It is likely that most of these smaller loans are to SMEs.

19 Panteia/EIM, SME export index. SMEs are primarily active in professional and other services and in the construction sector.

20 Besides this, SMEs are cautious when it comes to non-bank forms of finance, as this often means giving up some of their say in the company (Carnegie Consult, 2012, *Beleidsevaluatie Groeifaciliteit, Corporate Finance Expert Group, 2011, Naar een gezonde basis: bedrijfsfinanciering na de crisis*).

21 DNB is investigating whether data on lending to SMEs can be supplied on a structural basis.

Chart 3 Sharp fall in small loans



Source: Lending Steering Group, May 2013.

5.5 SME loan applications more likely to be rejected, partly due to greater risk

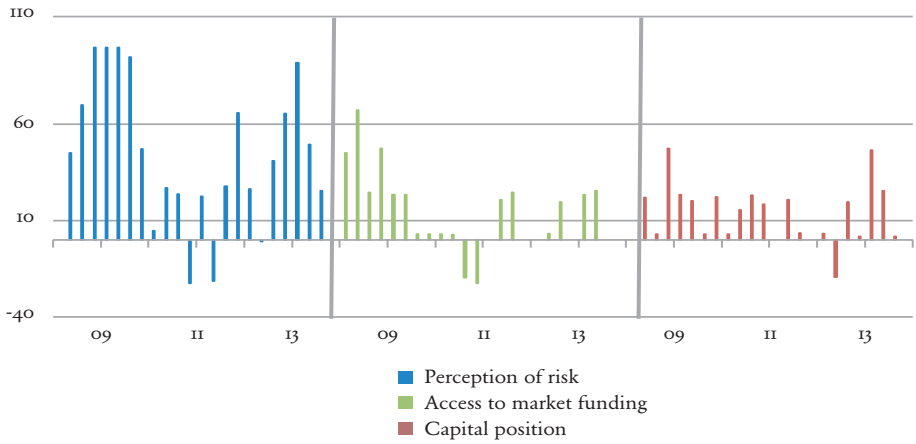
The BLS revealed that the lending conditions for SMEs had only been made stricter since the start of the financial crisis, and that this had been done to a greater degree than for large companies. The increased risk associated with lending to SMEs is the factor mentioned most frequently by banks as a reason for introducing stricter conditions (Chart 4). Many SMEs have been hit hard by the recession, and this is reflected in reduced financial buffers, lower profitability and a decline in the collateral value of assets (these often consist of property). The fact that banks are having to contend with greater credit risk is reflected in the amount of problem loans as a share of total credit outstanding. There has been a sharp increase in payment arrears in the SME segment, including in comparison to large companies (Chart 5).

There are several other characteristics of SMEs that make lending to them a less appealing prospect for banks. Their main need is for finance of working capital.[22]

22 EIM, Financieringsmonitor 2011

Chart 4 SME lending policy more stringent

Percentage of banking sector; positive figures indicate more stringent



Source: DNB, Bank Lending Survey.

Chart 5 Increase in problem loans

Percentage of total loan volume

Based on a sample of large banks. Problem loans are defined as loans with payment arrears of at least 90 days.
* Large business portfolio includes exposure to commercial property.
Source: DNB.

While this may have increased recently, as payment terms seem to have increased since the financial crisis, including for business-to-business transactions, it is difficult for banks to evaluate the risk and return on general working capital. This can be overcome by demanding collateral, but where this is not easily available this form of finance becomes less appealing. Surveys have revealed that applications for finance are more likely to be rejected if the finance is for additional working capital than if it is for housing or capital assets, for example.[23]

There are several other characteristics of SMEs that make lending to them a less appealing prospect for banks. Their main need is for finance of working capital. While this may have increased recently, as payment terms seem to have increased since the financial crisis, including for business-to-business transactions, it is difficult for banks to evaluate the risk and return on general working capital. This can be overcome by demanding collateral, but where this is not easily available this form of finance becomes less appealing. Surveys have revealed that applications for finance are more likely to be rejected if the finance is for additional working capital than if it is for housing or capital assets, for example.

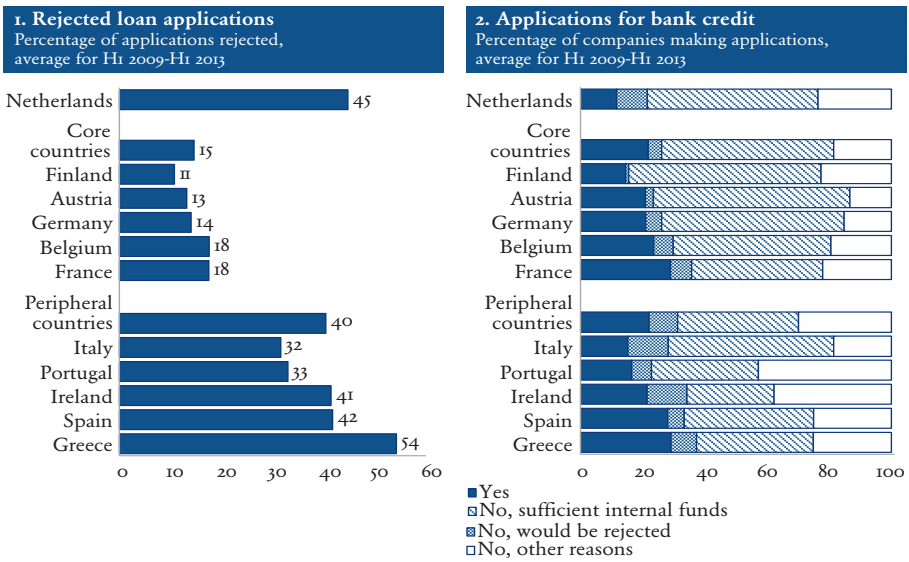
As far as contributing equity is concerned, which is required in order to obtain bank credit, smaller companies often resort to property. Property values have fallen sharply, and in many cases have become uncertain. Banks have therefore indicated that a considerable portion of the SME segment would have virtually no chance of obtaining credit as their equity is insufficient.[24] Other small companies, such as start-ups in the technology sector, do not have any collateral that they can use for bank credit. This means that some companies need equity in the first instance. In the Netherlands, however, there is hardly any market for risk-bearing investments in companies of this kind. This limits the possibilities for raising loan capital (bank credit) that exist for companies with little in the way of collateral.

The proportion of SME loan applications that are rejected in the Netherlands is relatively high compared to other countries in the euro area. This was revealed by the survey on the access to finance of small and medium-sized enterprises in the euro area (SAFE), which has been conducted every six months since early 2009. The percentage of applications that are rejected in the Netherlands is remarkably high compared to the other core countries in the euro area (Chart 6, left).

In addition, a relatively low percentage of SMEs apply for loans in the Netherlands (Chart 6, right). On average, 12% of Dutch SMEs have applied for bank loans

23 EIM, Financieringsmonitor 2011.
24 A threshold of 10% is sometimes mentioned. On average, small companies had a solvency ratio (ratio of equity to total assets) of 36%, compared to an average solvency ratio of 43% for large companies (Financieringsmonitor 2013-2).

Chart 6 SME loan applications and rejections



* Aggregate of companies whose applications for credit are rejected in full or to a large extent (less than 75% of requested sum) and companies that have turned down the bank's offer due to excessive costs.
Source: SAFE, calculation by DNB.

each year since measurements began, compared to 22% in other countries in the euro area. As in other countries, some SMEs do not apply for credit because their internal funds are sufficient.

Further analysis of the SAFE data reveals that the relatively high percentage of rejected applications in the Netherlands is partly attributable to the deterioration in the financial situation of those SMEs that apply for loans.[25] The findings of the survey also showed there is a relatively large difference between SMEs in the Netherlands that apply for bank credit and those that do not. The financial position of the former has, on average, deteriorated to a greater extent than in the other core countries in the euro area (including Germany). This is different to the situation in the peripheral countries (Greece, Spain, etc.), where the financial position of all companies (those applying for credit as well as those that do not) has weakened much more than is the case in the Netherlands. The relatively high percentage of rejections in the Netherlands compared to other core countries is therefore partly

25 Other company-specific and country-specific factors may also have had an impact. We can only correct for changes in the financial position of a company, owing to a lack of information on actual levels of leveraging (gearing), etc.

due to the fact that loan applications tend to come from SMEs with weak financial positions. Even when we allow for this small difference, it is still remarkable that the percentage of rejections in the Netherlands is of a similar order to the level seen in peripheral countries such as Ireland and Spain. The findings of the SAFE survey do not provide clues to a sound explanation for this.

5.6 Considerations regarding policy initiatives

There are a number of government schemes aimed at removing obstacles to accessing finance for the SME segment. They are based on the idea that SMEs that are essentially healthy are currently unable to satisfy all of their borrowing needs. Such government intervention is justifiable in the event of market failure. A well-known kind of market failure is the fact that it is difficult and relatively expensive for banks to evaluate the creditworthiness of smaller companies. Banks require information based on which they can form an opinion regarding creditworthiness, and smaller companies are not always able to supply this information on time or in full. Banks could, in theory, translate this uncertainty into higher risk premiums. In practice, however, this is only possible to a limited extent, because excessive risk premiums tend to lead to more high-risk loan applications ('gambling for resurrection'). Instead, banks will also make their acceptance criteria more stringent, so that loan applications from smaller companies will be rejected more frequently. This will become even more of an issue when companies are unable to put up as much collateral, which is currently the case owing to the fall in property prices and the ongoing crisis. Owing to inadequate information, viable companies are also having to contend with the more stringent criteria and the possibility that their loan applications will be rejected.

In this case, government guarantees may prove effective. The following are key conditions for success when designing such a scheme:

a) the state bears part of the risk: to address the type of market failure described above, the government will have to provide a subsidy for some of the uncertainty associated with lending to small companies;
b) the banks share in any losses: the incentive for banks to distinguish between viable and non-viable businesses needs to remain in place. The state cannot take over responsibility for credit assessment as it does not have the necessary resources or experience. If the incentive is not strong enough, the scheme will not be cost efficient, it will attract the wrong risks, and it will be susceptible to fraud.

It is therefore not easy to design a successful scheme. It is balancing act, which involves avoiding providing too few and too many guarantees, and the best way to design the scheme cannot be determined directly by the state.

Interestingly, existing government schemes in this area, such as the BMKB and GO schemes, are not being made full use of.[26] It would, however, be too hasty to conclude that the subsidies contained in these schemes are not large enough, as there may be other reasons why their uptake has been limited. For example, surveys have revealed that SMEs are not very familiar with the existing schemes. The fact that the schemes have not been made full use of could also be down to there being fewer major problems with obtaining finance than previously suspected. The economic downturn also plays a role in this, as it has led to fewer business expansion investments being made. It would be advisable to carry out a more detailed study of the instruments' design, and awareness and accessibility within the target group, so that the set of instruments can be made more effective.

Smaller companies also have an important role to play themselves when it comes to overcoming the problems related to supplying information referred to above. Companies that apply for loans are responsible in the first instance for providing up-to-date information on their financial position. According to reports, a considerable proportion of loan applications cannot be assessed due to necessary documents not being provided.[27] The banking sector could provide extra support and more detailed information in this area. A number of initiatives have already been launched, but more targeted information could be helpful.[28] The backlog in terms of supplying annual figures seems to be a matter that requires attention.

As mentioned above, some SMEs are more in need of equity than loan capital. Government policy could play a facilitating role in this area, too. There are plans for two new tools ('early stage finance' and a 'business angels investment facility'), which are aimed at business start-ups in need of risk-bearing capital, particularly in the SME segment (Letter to Parliament, 16 September 2013). These tools are related to a form of market failure touched on previously in this study: the inadequate infrastructure for risk-bearing start-up capital, particularly when compared to the infrastructure in countries such as the United States. Although these new tools are still very much in the start-up phase themselves, their further implementation should focus specifically on this problem regarding the market and infrastructure. The business angels investment facility in particular could make a contribution in this area.

26 BMKB is a guarantee scheme for loans to SMEs, GO is a guarantee scheme for business finance.
27 Source: BNR radio interview with ING's marketing manager, quoted online at Ondernemerskredietdesk.nl.
28 In addition to existing initiatives in this area, such as the MKBServicedesk.nl and Ondernemerskredietdesk.nl websites.

References

Berben, R.P., B. Bierut, J.W. van den End, J. Kakes (2010), Macro-effects of higher capital and liquidity standards for banks, DNB, Occasional Studies, Vol. 8/No. 3.

Bolt, W., L. de Haan, M. Hoeberichts, M. van Oordt, J. Swank (2012), 'Bank profitability during recessions', *Journal of Banking and Finance*, Vol. 36(9), pp. 2552-2564.

DNB (2011), DELFI: DNB's Macroeconomic Policy Model of the Netherlands, Occasional Study, no. 1.

DNB (2013a), Funding problems in the mortgage market, Occasional Study.

DNB (2013b), Economic Developments and Outlook, December, No. 6.

Pattipeilohy, C., G.E. Hebbink, J. Kieft (2010), 'De zakelijke kredietgroei nader verklaard', *Economisch Statistische Berichten* (4584).

Van der Veer, K.J.M., M. Hoeberichts (2013), 'The level effect of bank lending standards on business lending', DNB Working Paper, No. 396.

Van der Veer, K.J.M. (2013), 'Banken beperken zakelijke kredietverlening', *Economisch Statistische Berichten* (4651).

Publications in this series as from January 2003

Vol.1/No.1 (2003) Requirements for successful currency regimes:
The Dutch and Thai experiences
Robert-Paul Berben, Jan Marc Berk, Ekniti Nitihanprapas, Kanit Sangsuphan, Pisit Puapan and Piyaporn Sodsriwiboon

Vol.1/No.2 (2003) The blurring of distinctions between financial sectors:
fact or fiction?
Annemarie van der Zwet

Vol.1/No.3 (2003) Intermediation, integration and internationalisation:
a survey on banking in Europe
Jaap Bikker and Sandra Wesseling

Vol.1/No.4 (2003) A Survey of Institutional Frameworks for Financial Stability
Sander Oosterloo and Jakob de Haan

Vol.2/No.1 (2004) Towards a framework for financial stability
Aerdt Houben, Jan Kakes and Garry Schinasi

Vol.2/No.2 (2004) Depositor and investor protection in the Netherlands:
past, present and future
Gillian Garcia and Henriëtte Prast

Vol.3/No.1 (2005) Labour market participation of ageing workers
Micro-financial incentives and policy considerations
W. Allard Bruinshoofd and Sybille G. Grob

Vol.3/No.2 (2005) Payments are no free lunch
Hans Brits and Carlo Winder

Vol.4/No.1 (2006) EUROMON: the multi-country model of
De Nederlandsche Bank
Maria Demertzis, Peter van Els, Sybille Grob and Marga Peeters

Vol.4/No.2 (2006) An international scorecard for measuring bank performance:
The case of Dutch Banks
J.W.B. Bos, J. Draulans, D. van den Kommer and B.A. Verhoef

Vol.4/No.3 (2006) How fair are fair values?
A comparison for cross-listed financial companies
Marian Berden and Franka Liedorp

Vol.4/No.4 (2006) Monetary policy strategies and credibility – theory and practice
Bryan Chapple

Vol.4/No.5 (2006) China in 2006: An economist's view
Philipp Maier

Vol.4/No.6 (2006) The sustainability of the Dutch pension system
Jan Kakes and Dirk Broeders

Vol.5/No.1 (2007) Microfinanciering, deposito's en toezicht:
de wereld is groot, denk klein!
Ronald Bosman en Iskander Schrijvers

Vol.5/No.2 (2007) Public feedback for better banknote design 2
Hans de Heij

Vol.6/No.1 (2008) Towards a European payments market: survey results on
cross-border payment behaviour of Dutch consumers
Nicole Jonker and Anneke Kosse

Vol.6/No.2 (2008) Confidence and trust:
empirical investigations for the Netherlands and the
financial sector
Robert Mosch and Henriëtte Prast

Vol.6/No.3 (2008) Islamic Finance and Supervision:
an exploratory analysis
Bastiaan Verhoef, Somia Azahaf and Werner Bijkerk

Vol.6/No.4 (2008) The Supervision of Banks in Europe:
The Case for a Tailor-made Set-up
Aerdt Houben, Iskander Schrijvers and Tim Willems

Vol.6/No.5 (2008) Dutch Natural Gas Revenues and Fiscal Policy:
Theory versus Practice
Peter Wierts and Guido Schotten

Vol.7/No.1 (2009) How does cross-border collateral affect a country's central bank
and prudential supervisor?
Jeannette Capel

Vol.7/No.2 (2009) Banknote design for the visually impaired
Hans de Heij

Vol.7/No.3 (2009) Distortionary effects of crisis measures and how to limit them
Jan Willem van den End, Silvie Verkaart and Arjen van Dijkhuizen

Vol.8/No.1 (2010) The performance of EU foreign trade: a sectoral analysis
Piet Buitelaar and Henk van Kerkhoff

Vol.8/No.2 (2010) Reinsurers as Financial Intermediaries in the Market for Catastrophic Risk
John Lewis

Vol.8/No.3 (2010) Macro-effects of higher capital and liquidity requirements for Banks - Empirical evidence for the Netherlands
Robert-Paul Berben, Beata Bierut, Jan Willem van den End and Jan Kakes

Vol.8/No.4 (2010) Banknote design for retailers and public
Hans de Heij

Vol.9/No.1 (2011) DELFI: DNB's Macroeconomic Policy Model of the Netherlands

Vol.9/No.2 (2011) Crisis Management Tools in the EU:
What Do We Really Need?
Annemarie van der Zwet

Vol.9/No.3 (2011) The post-crisis world of collateral and international liquidity - A central banker's perspective
Jeannette Capel

Vol.9/No.4 (2011) What is a fit banknote? The Dutch public responds
Frank van der Horst, Martijn Meeter, Jan Theeuwes and Marcel van der Woude

Vol.9/No.5 (2011) Housing bubbles, the leverage cycle and the role of central banking
Jeroen Hessel and Jolanda Peters

Vol.9/No.6 (2011) Is there a 'race to the bottom' in central counterparties competition?
- Evidence from LCH.Clearnet SA, EMCF and EuroCCP
Siyi Zhu

Vol.10/No.1 (2012) Is Collateral Becoming Scarce? - Evidence for the euro area
Anouk Levels and Jeannette Capel

Vol.10/No.2 (2012) Cash usage in the Netherlands: How much, where, when, who and whenever one wants?
Nicole Jonker, Anneke Kosse and Lola Hernández

Vol.10/No.3 (2012) Designing Banknote Identity
Hans de Heij

Vol.10/No.4 (2012) The CentERpanel and the DNB Household Survey: Methodological Aspects
Frederica Teppa (DNB), Corrie Vis (CentERdata)

Vol.10/No.5 (2012) Het schaduwbankwezen: een verkenning voor Nederland
Menno Broos, Krit Carlier, Jan Kakes en Eric Klaaijsen

Vol.11/No.1 (2013) Financieringsproblemen in de hypotheekmarkt
Jos Jansen, Melle Bijlsma, Mark Kruidhof en Christiaan Pattipeilohy

Vol.11/No.2 (2013) Social costs of POS payments in the Netherlands 2002–2012: Efficiency gains from increased debit card usage
Nicole Jonker

Vol.11/No.3 (2013) A descriptive analysis of the balance sheet and monetary policy of De Nederlandsche Bank: 1900-1998 and beyond
Christiaan Pattipeilohy

Vol.11/No.4 (2013) The irrationality of payment behaviour. Conclusions based on literature and direct observations in a virtual-reality and a neuroscientific study
Frank van der Horst and Ester Matthijsen

Vol.11/No.5 (2013) Financial imbalances and macroprudential policy in a currency union
Aerdt Houben and Jan Kakes

Vol.11/No.6 (2013) Challenges for financial sector supervision
Paul Cavelaars, Jakob de Haan, Paul Hilbers and Bart Stellinga

Vol.12/No.1 (2014) Overwegingen bij de loonontwikkeling
Jurriaan Eggelte, Jos Jansen, Guido Schotten en Diederik Dicou