Transforming for trust

Lending, saving and paying in the data age

DeNederlandscheBank

EUROSYSTEEM

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Contents

Summary 4

1 Introduction 7

2 State of banking activities in the Netherlands 9
2.1 Lending 9
2.2 Managing savings 14
2.3 Payments 18

3 Trends for the future 24
3.1 Technology 24
3.2 Economy 27
3.3 Society 28
3.4 Regulation 31

4 Scenarios for banking activities 34

5 Findings and policy conclusions 39

Summary

The data age has dawned and with it come fundamental changes to the markets for lending, saving and paying. New financial ecosystems will emerge in the 2020s that call for more emphasis on the supervision of activities alongside entities. Cross-border activities will require more cooperation and stronger European supervision. But above all, the growing use of data requires more focus and adaptability from financial players. This is why the key message of this report is that change is necessary to maintain trust.

State of the sector

The market for banking activities is becoming increasingly competitive and challenging. New players are entering all the sub-markets that were studied, i.e. lending, saving and payment transactions. Banking business models are under increasing strain due to persistent low interest rates. Interest income is by far the main source of profit for Dutch banks, with interest margins in the mortgage market having been particularly high in recent years. Banks are facing competition from pension funds and insurers in the mortgage market, with a third of new mortgages being provided by these institutions. In the corporate loans market, large corporates in particular make increasing use of alternatives to bank loans, especially bond issues. Alternative sources of finance for SMEs are still limited in size. Despite interest rates having fallen to almost zero, the savings market has grown. Product homogeneity has resulted in increased price transparency and potentially increased mobility of savings. The price of certain forms of market financing has been below that of deposits for some time now, which means that savings are still a stable, but no longer a low-cost way of financing for banks. In the payments market, the sale of other financial products will need to compensate for the decline in indirect income from payment accounts and high infrastructure renewal costs. New fintech players and big tech initiatives are making the payments market more competitive and innovative. The revised Payment Services Directive (PSD2) gives payment service providers access, under certain conditions, to the transaction data of bank customers, which means that the regulations create new commercial opportunities.

Trends and future scenarios

The availability of large amounts of data and the use of technology are changing the core processes of lending, saving and payment transactions. Barriers to entry into the market for providing activities can be lowered by using technology solutions such as cloud computing, tokenisation and more open data sharing. The use of artificial intelligence changes customer interaction and lending processes.

Dutch banks show a higher adaptive capacity in comparison to neighbouring countries. The Dutch are known for their willingness to welcome innovations, which is why the Netherlands is a good breeding ground for innovations. But the Dutch consider the careful handling of personal data essential in being able to trust their own bank. When it comes to sharing payment data, Dutch consumers are more cautious than consumers in

other countries. And banks are clearly trusted more than large technology firms, for instance, which also means that banks should deal carefully with the greater trust placed in them.

Two uncertainties are of particular importance for the future market structure, namely, which party is dominant in the customer contact and to what degree is the market fragmented or consolidated. When it comes to customer contact, banks no longer necessarily enjoy a monopoly. Tech firms are trying to take over the primary contact with private individuals or retailers, in which case banks will be pushed more into the background, with far-reaching implications. This could put further strain on the profitability of banking activities and make it more difficult to safeguard the integrity of the financial system. The dominant market service providers of the future could be non-European.

Legislation will be extremely important with regard to the fragmentation or consolidation of the market. The measures included in the "Basel 3.5" package will level the playing field for smaller banks compared with big banks. The completion of the European banking union could strongly change the landscape in favour of internationally active banks. Privacy legislation and competition regulations with regard to large tech firms are also determining factors.

Findings and policy conclusions

The banking services ecosystem will change dramatically over the coming years as a result of these trends. The following key themes, together with their associated policy conclusions, are important in all scenarios for the future.

1. The increased use of data offers opportunities, but calls for the prioritisation of careful data protection, and the adequate use and quality of data. This is necessary to maintain trust in the financial sector and for future-proof institutions. In its supervision, DNB will address institutions more on the quality and future-resilience of their data management.
2. Changing relations in markets and elsewhere reinforce the importance of supervisory authorities focusing on activities alongside entities. Ongoing supervision and licensing requirements must keep pace with changing market conditions.
3. As financial services become increasingly cross-border in nature due to digitisation and "EU passporting", further strengthening of European supervision and resolution is called for as this reduces risks of policy competition and regulatory arbitrage and can better counterbalance large global players.
4. Sector-wide collaboration is needed to effectively safeguard public interests in combating financial crime, availability of services and sustainability. DNB enables a productive interchange on this.

1 Introduction

Working on trust is DNB's mission. This is why DNB is prepared for any changes in banking activities such as lending, saving and paying. These are the core activities of banking services, and consumers and firms use them frequently, if not on a daily basis. All three activities are in a state of flux due to developments such as technological innovation and the growing importance of data. The main question in this report is how DNB, and in particular supervision of the banking sector, can respond to this changing financial ecosystem in the coming years.

Market distortions and tax incentives that encourage excessive growth of banks have diminished over the past years. This means that a first step has been taken along the lines of an important policy recommendation of the 'Perspective on the structure of the Dutch banking sector' report[1], published in 2015. The Dutch banking sector is still concentrated, but the diversity in the market for lending, saving and paying is increasing due to the arrival of new, mostly tech-driven firms that are not rooted in the banking sector. Both traditional banks and these new players are trying to shape the market of the future using technological innovations.

This new forward-looking vision shows that working on trust calls for change. The report provides an overview of the current state of the sector (Chapter 2), identifies trends (Chapter 3) and develops these trends into possible future scenarios (Chapter 4). Finally, these scenarios are assessed in the light of DNB's objective to ensure sound institutions and financial stability (Chapter 5).

We would like to thank all of our discussion partners, from market players, coordinating bodies and academics to supervisory peers, for the fruitful discussions on the playing field of the future. This study provides the basis for further dialogue on these matters as both the sector and supervision continue to change.

1 DNB (2015). Perspective on the structure of the Dutch banking sector

2 State of banking activities in the Netherlands

This chapter shows how the markets for lending – in particular mortgages and corporate lending – savings and payments have developed in the Netherlands. This includes changes in market volumes and developments in margins.

2.1 Lending

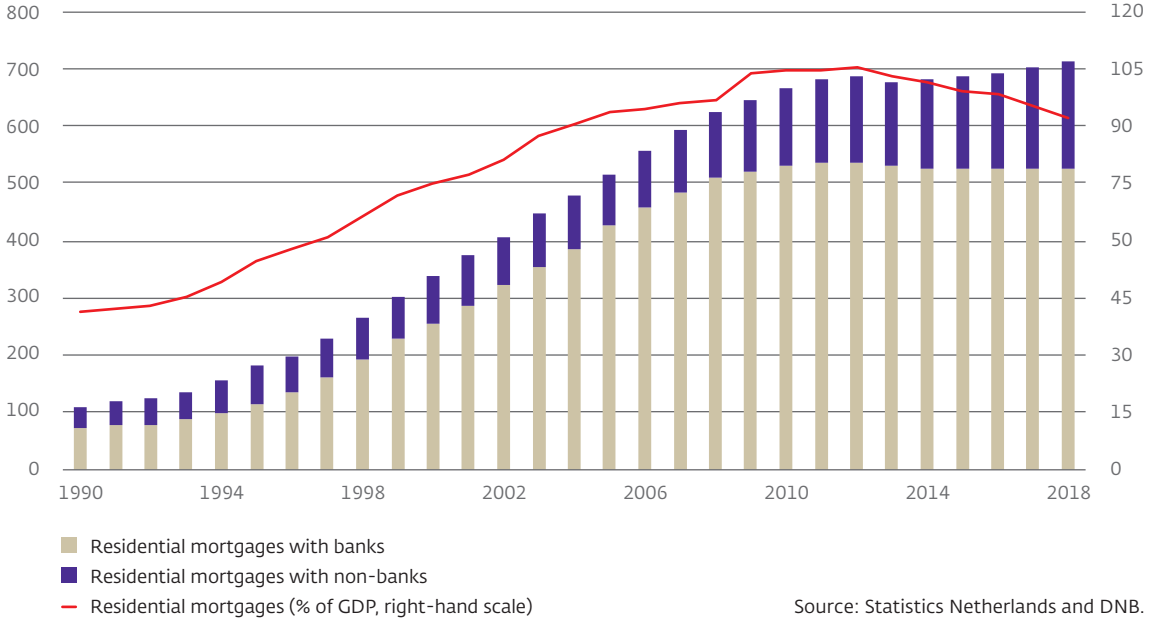
2.1.1 Mortgage lending

The growth in outstanding mortgage loans has levelled off in recent years. Compared to the development of the gross domestic product (GDP), total outstanding mortgage loans have decreased significantly, from 105% of GDP in 2012 to 91% of GDP in 2018 (Figure 1).

On the one hand, the rising house prices and the low interest rates are conducive to mortgage lending while, on the other hand, the gradually less favourable tax treatment and the encouragement of redemption have an inhibiting effect. These measures have also resulted in increased standardisation of mortgage loans. The debt level of Dutch households remains high in an international perspective: almost twice as high as in Germany and 75% higher than average in the euro area.

Figure 1 Mortgage lending market growth is declining

Billion EUR



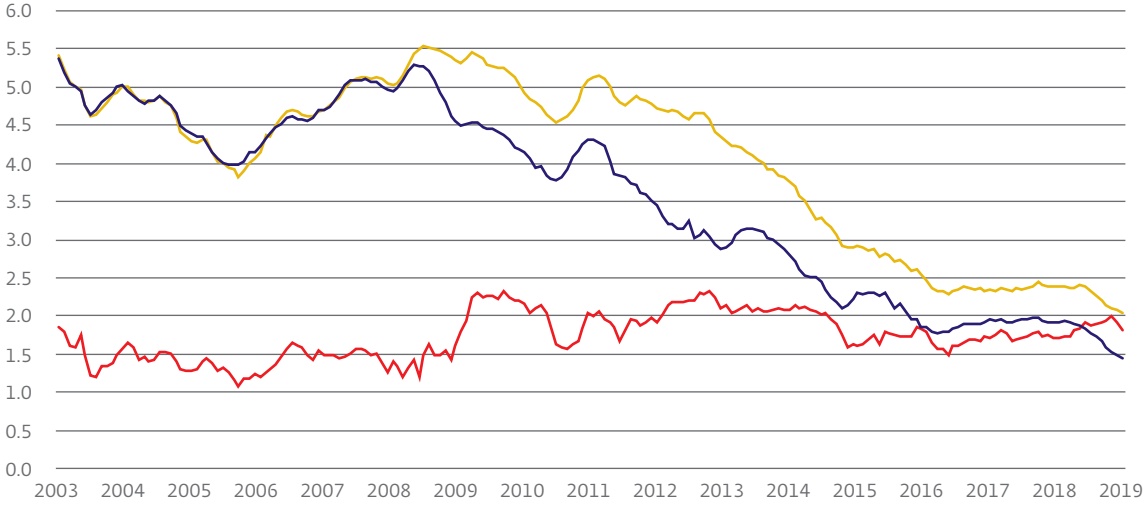
Source: Statistics Netherlands and DNB.

Mortgage loans are an important source of profit for banks. Interest income from mortgages has been the main source of profitability for Dutch banks since a number of years. Despite the relatively high loan-to-value and loan-to-income ratios in the Netherlands, mortgage loans carry relatively low risks, and operating costs are low in relation to the amount lent.[2] The mortgage interest rate in the Netherlands is well above the European average, although the difference has fallen compared to a number of years ago (Figure 2).

An analysis by DNB based on bank data shows that the gross interest margin on mortgages, although slightly lower than the peak 10 years ago, is still high (Figure 2). After deducting operating costs, risk costs and taxes, the return on assets for bank mortgage loans for 2016-2018 was approximately 0.5%. Because mortgages are relatively low risk, they also have a relatively low capital requirement, and the resulting return on equity is high, 17% for the period under review.

Figure 2 Mortgage margin not affected by falling interest rates

Interest rate and margin as percentages



Source: DNB and ECB.

Note: The average gross margin represents mortgage interest minus estimated funding costs and does not include other costs.

2 This is driven by the high level of legal protection for creditors (in this case providers of mortgage loans), which makes debtors' willingness to pay high.

Banks are facing competition from institutional investors, which has improved the functioning of the mortgage market. These investors are equally attracted by the low risk and high return of mortgage loans compared to other low-risk investments. Moreover, the increased standardisation of mortgages, partly prompted by the tax incentive to redeem, makes mortgages an interesting investment product for these investors. About one third of newly issued mortgages are provided by non-bank investors; the market share of the outstanding stock is approximately 20%. Despite the high margins, there is no significant competition on the Dutch market from other European countries, which is generally attributed to the previously mentioned relatively high loan-to-value ratios in the Netherlands.

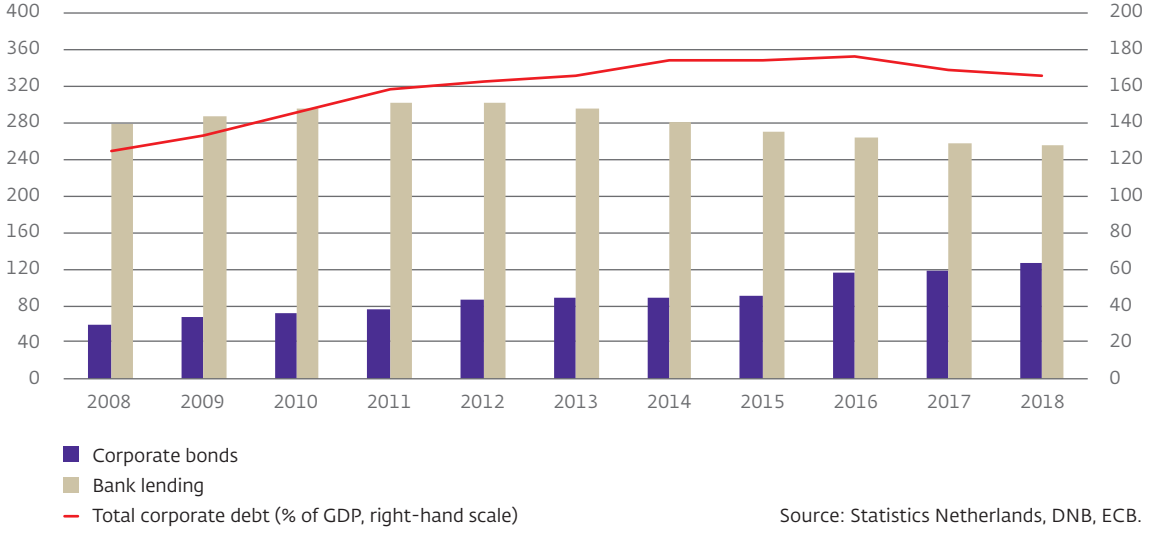
2.1.2 Corporate lending

Bank lending to businesses has fallen. According to Statistics Netherlands data, the total of loans and negotiable debt taken out by businesses amounted to more than 165% of GDP at the end of 2018 (Figure 3), with the share of credit from banks falling in the past years. In countries such as Germany and France, and to a slightly lesser extent Belgium, bank lending to businesses did increase. The absolute peak of corporate bank lending (lending by Dutch banks to Dutch companies) was reached at the end of 2012, totalling EUR 303 billion.

Since then, it has declined by an average of 2.7% a year to a level of EUR 256 billion at the end of 2018, below that of 2008. Although an exact breakdown of bank lending for SMEs and large corporates is

Figure 3 Corporate bonds replace bank lending

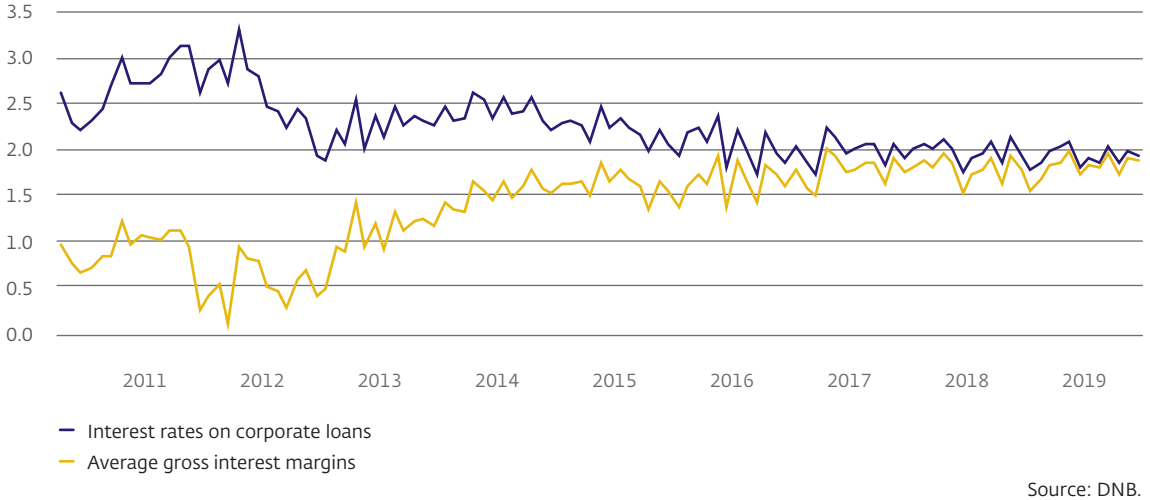
Billion EUR; outstanding amount at year-end



Source: Statistics Netherlands, DNB, ECB.

Figure 4 Gross margins on corporate loans have widened

Interest rate and margin as percentages



Source: DNB.

Note: The average gross margin represents interest on corporate loans minus estimated funding costs and does not include other costs.

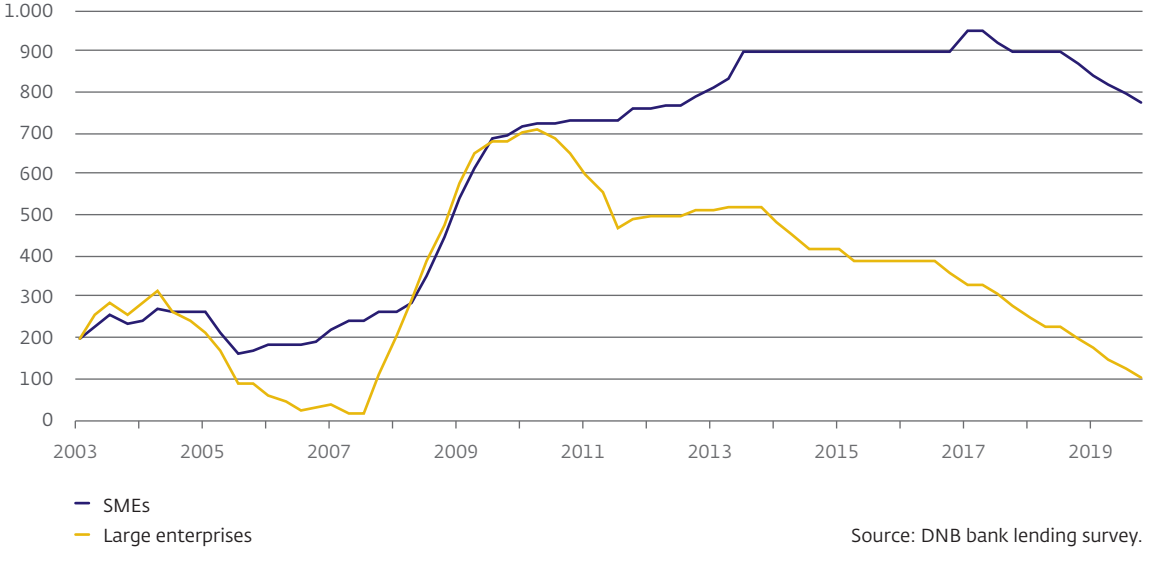
not available for the entire period, the decline in bank lending in recent years has mainly been driven by a decline in lending to large corporates. These have notably greatly increased their funding in bond markets (see Figure 3). SMEs are still highly dependent on bank loans.

For large companies, funding in bond markets is generally less expensive. The corporate bond market has become more attractive for a number of reasons. Since the crisis, banks have become more reluctant to provide credit, partly due to increased capital requirements. Measures to develop a European capital market and falling bond rates, partly driven by the ECB's bond purchase programme, are in fact encouraging larger companies to issue bonds. Furthermore, companies wish to be less dependent on a single source of funding.

Gross margins on corporate bank loans have increased. During the economic recovery phase that started in 2012, the gross interest margin on corporate bank loans gradually increased (Figure 4) and then stabilised.
Despite falling market interest rates, banks have managed to maintain their margins. Corporate loans have higher risk costs than mortgage loans. Moreover, the operating costs, particularly for small loans, are relatively high. After deducting operating costs, risk costs and taxes, the average return on assets for 2016-2018 was approximately 0.8%. The higher capital requirement means that the resulting

Figure 5 Discrepancy between credit standards for corporate bank loans widens

Cumulative change



Source: DNB bank lending survey.

Note: Cumulated difference between the share of banks reporting that credit standards applied to loan approval have been tightened and the share of banks reporting that they have been eased. The start value for January 2003 has been set at 200.

return on equity is much lower than that for mortgages, an average of 8%.[3]

It is more difficult for smaller companies to get loans. Banks charge higher interest rates for smaller loans because of the relatively high operating costs and the potentially higher risk. However, the interest rate differences are larger in the Netherlands than in other countries and are also larger than in the years prior to the financial crisis. This makes credit for small businesses relatively expensive as they often depend on smaller loans. Access to credit for smaller businesses is also hampered by the trend seen in credit standards. After the crisis, the credit standards were tightened for both small and large companies. Since then, however, the standards for large companies have again been eased, while this is only marginally the case for SMEs (Figure 5).

Cumulated difference between the share of banks reporting that credit standards applied to loan approval have been tightened and the share of banks reporting that they have been eased. The start value for January 2003 has been set at 200.

3 This concerns loans to SMEs and medium-sized enterprises (turnover up to EUR 250 million). Calculations are based on the 'through-the-cycle method', in which the credit facilities are calculated based on the expected loss on loans rather than on the default provisions effectively formed in the years in question.

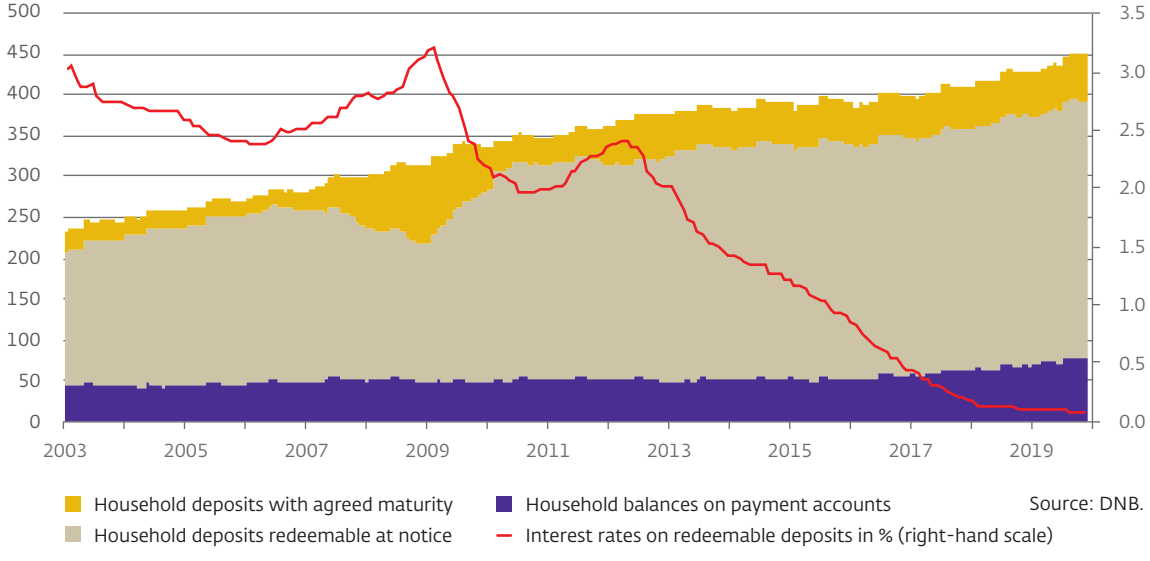
Alternative sources of finance for SMEs are still limited. Institutional investors provide very few corporate loans mainly because of their small ticket size, as well as information asymmetry and complexity. The lack of homogeneity also means that SME loans are not securitised, so that institutional investors cannot use this route to enter the market either. Crowdfunding for companies and alternative lending platforms are growing, but still only account for a few percent of the new corporate loans.[4]

2.2 Managing savings

The size of the private savings market has grown from about EUR 300 billion in 2008 to more than EUR 450 billion at the end of 2019, while interest rates fell in the same period. One explanation for the growth in the savings of private individuals is the savings goal effect: at lower interest rates more savings are needed to achieve the same target amount. The precautionary saving motive also offers a possible explanation, whereby households save in response to uncertainty regarding the economy or their own financial situation. Figure 6 shows the developments in the private savings market.

Figure 6 Private savings deposits grow with falling interest rates

Billion EUR



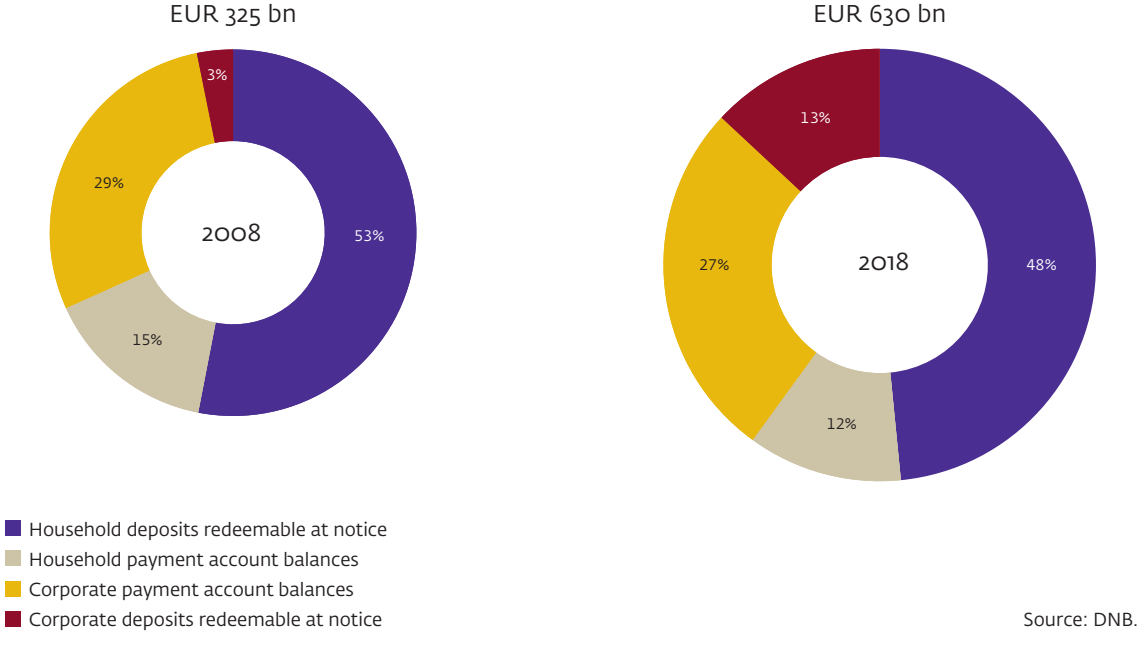
Source: DNB.

4 CBS Financieringsmonitor 2018 (Funding bulletin 2018 published by Statistics Netherlands).

As banks do not yet pass on the negative ECB interest rate to private savers with savings up to EUR 100,000, their borrowing margin is eroding. The borrowing margin is the difference between the interest rate that banks pay savers and the risk-free market interest rate. Whereas the borrowing margin amounted to an average of 1.2% in 2013, the estimated margin was almost half this by mid-2019. The eroding margin between savings interest rates and the risk-free market interest rate has a delayed impact on banks' interest income because savings balances are fixed in the market with different maturities.[5] The pressure on interest income will therefore gradually become evident in an erosion in profitability in the coming years (see Box 1). Banks have been passing on the negative interest rates to corporate deposits since 2016. About 80% of savings at banks are from consumers and 20% from businesses. Both market segments are growing at more or less the same pace (Figure 7).

Figure 7 Balances held with banks almost doubled

Share in percentages



Source: DNB.

5 Banks use a replicating portfolio, which is modelled on different maturities, varying from 3 months to as much as 10 years.

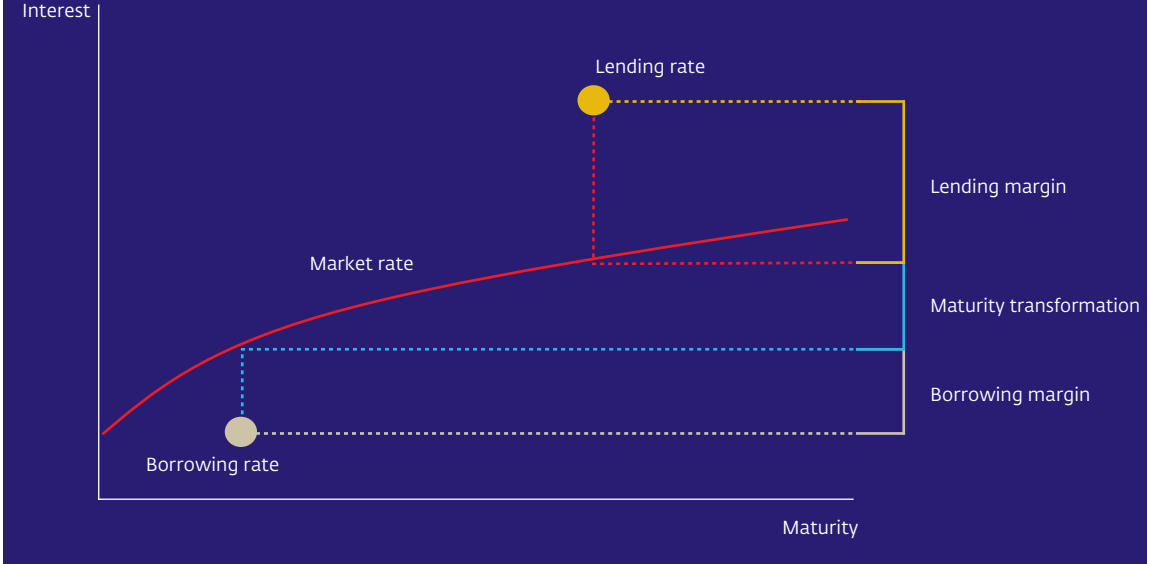
Box 1: Prolonged low interest rates – pressure on the profitability of banks

Dutch banks are dependent on interest margin for almost 80% of their income. If interest rates remain low for prolonged periods, it will put increased pressure on income. The net interest margin can be broken down into a borrowing margin, a lending margin and the effect of maturity transformation. All of these components are under varying degrees of pressure.

Margin from maturity transformation

The margin from maturity transformation is decreasing somewhat because the difference between short-term and long-term interest rates has narrowed over the past years (a flattening of the red line showing the risk-free market rate in Figure 8).

Figure 8 Simplified representation of the interest margin



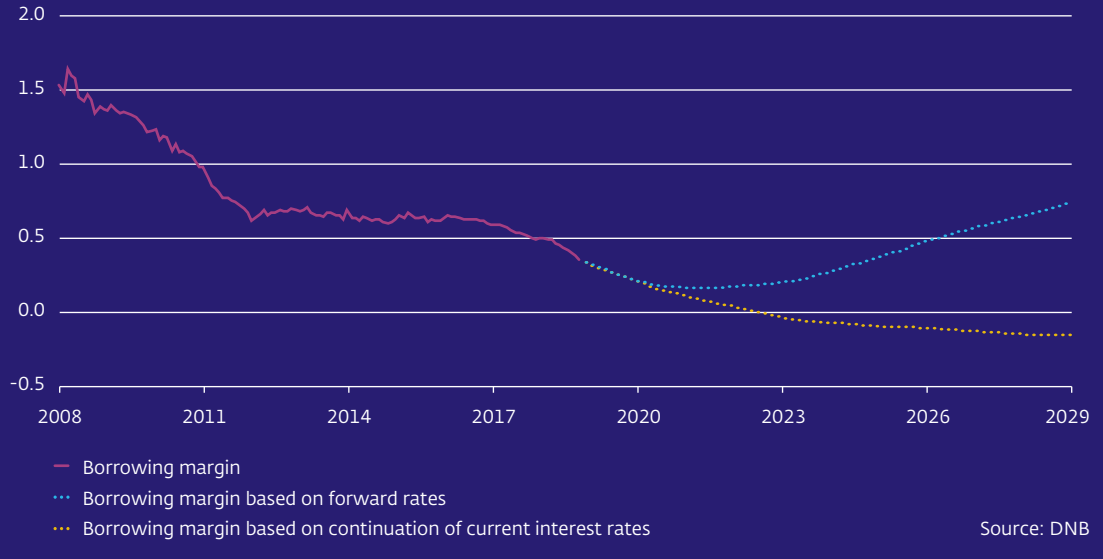
Borrowing margin

The borrowing margin is also under pressure. The borrowing margin is the difference between the interest rates paid by banks on savings and the risk-free market interest rate. Market interest rates are currently negative and are below the interest rates for payment and savings balances (the simplified example shows a risk free rate above the interest rate on savings balances). At present, end of 2019, the negative income on savings and payment account balances is partly offset by the fact that banks have locked in previous

interest rates via interest rate swaps. As more interest rate derivatives expire and need to be rolled over this set-off will no longer apply, and negative yields will gradually kick in. This is why banks' profitability will show a delayed response to the erosion of the borrowing margin in the coming years (Figure 9). Assuming a lower-for-longer scenario, in which current market interest rates are maintained, the borrowing margin will drop to below zero at the beginning of 2023 and remain in negative territory.

Figure 9 Borrowing margin shrinks at persistent lower rates

Percentages



Source: DNB

Lending margin

Finally, banks will try to offset falling borrowing margins through higher lending margins on mortgages and corporate loans. However, this might not be feasible since banks have to deal with competition from insurers and pension funds in the mortgage market.

Banks that rely more heavily on private savings are currently at a competitive disadvantage compared to banks that fund themselves more through the market. When adjustments are made for differences in maturity between freely withdrawable savings and longer-term market funding, the interest rates for some forms of market funding have been below the interest rates on savings since 2011. Conversely, savings are considered as a stable source of funding in liquidity ratios such as the Net Stable Funding Ratio (NSFR) and the Liquidity Coverage Ratio (LCR).

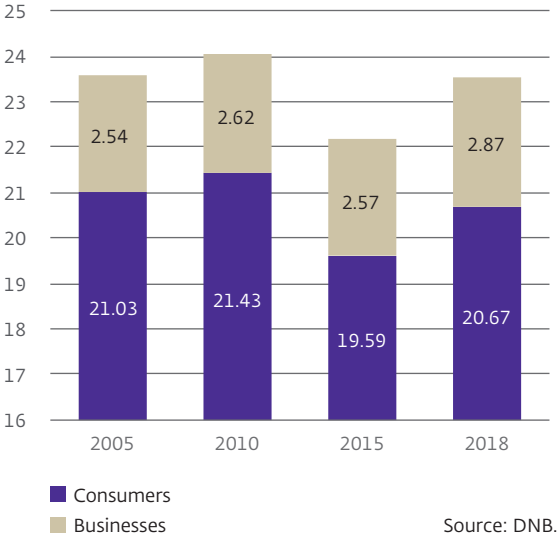
Opportunities for product differentiation have declined in the savings market. Savings products have become more homogeneous as a result of the abolition of tax schemes, such as the life-course savings scheme, tax-relieved employee savings schemes and tax-relieved bank savings schemes. Together with the low interest rate, this accelerates the declining importance of fixed term deposits (the ratio of fixed term deposits to freely withdrawable savings accounts is 15:85). The greater homogeneity of savings products could lead to more price competition, although shifts have been limited so far. The rise of online savings brokers (such as Savedo and Raisin) could lead to shifts from savings accounts to facilities with higher interest rates. These savings brokers are already active in the Dutch market and facilitate the transfer of savings to Dutch and non-Dutch banks that provide higher interest rates. On average, the probability of switching to another provider of savings accounts is 7%, according to research conducted for this report. Other factors, in addition to the interest rate level, that also affect choices made by households to switch include the security and certainty of the deposit guarantee scheme and whether or not the bank is Dutch. If the bank is Dutch and the deposit guarantee scheme is highlighted, 12.7% are likely to switch and 2.7% say they would certainly do so.

2.3 Payments

The number of payment accounts is relatively stable as are the banks' market shares. There are about 24 million payment accounts at Dutch banks, with balances totalling almost EUR 250 billion. Almost 90% of the accounts are held by private individuals (Figure 10), although three-quarters of the balance is held by businesses. More than 97% of the private individuals has an account at one of the

Figure 10 Number of payment accounts remains fairly stable

Millions



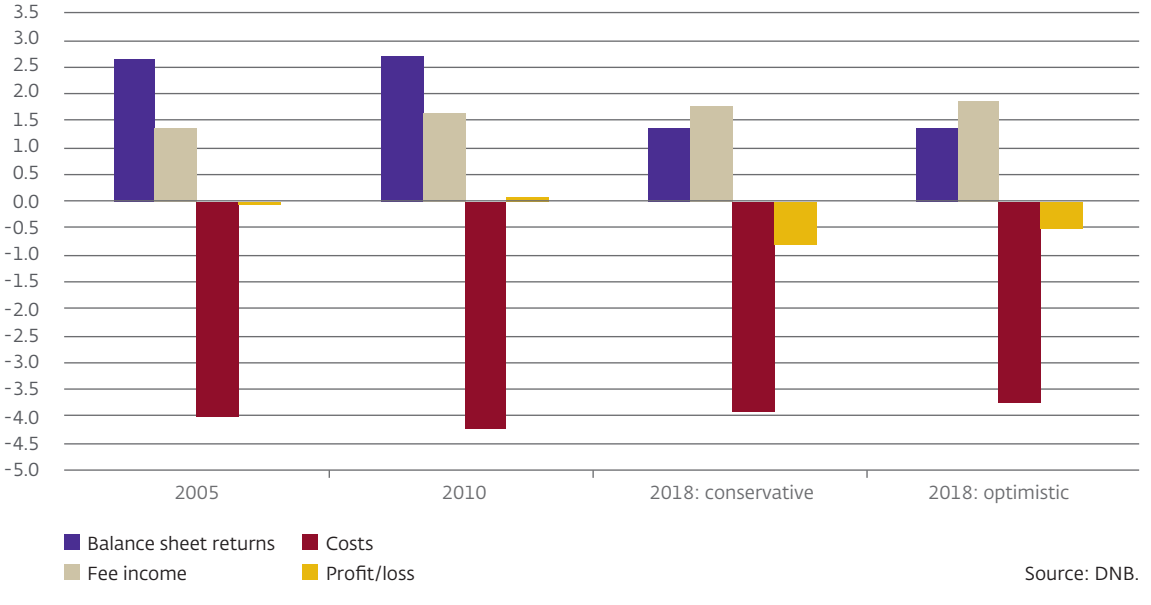
Source: DNB.

major banks, all of which are comparable in terms of facilities and terms and conditions. Account holders at challenger banks, such as bunq and Knab, usually have an account at a major bank as well.

Payment transactions are not a direct source of profit for banks due to low fees for consumers and retailers. Studies carried out for 2005 and 2010 showed that payment transactions as a whole are more or less break even. Since then, the most important source of income, the interest income on payment balances, has decreased, and substantial investment has been made in the transition to IBAN, protection against cyberattacks, know-your-customer measures and, more recently, in preparations for PSD2 and instant payments. This is outweighed by an increase in fees and cost savings, partly due to the declining use of cash, the reduction of paper flows and the downsizing of bank branch networks. All things considered, it is estimated that payment transactions are currently loss making for banks (Figure 11). Various studies have shown that, compared to many other European countries, Dutch payment transactions have relatively low social costs.[6] Moreover, consumers, in particular, but retailers as well also pay relatively low fees for payment services in the Netherlands from an international perspective. This does not seem to

Figure 11 Income from payment transactions is assessed to be negative

Billion EUR



Source: DNB.

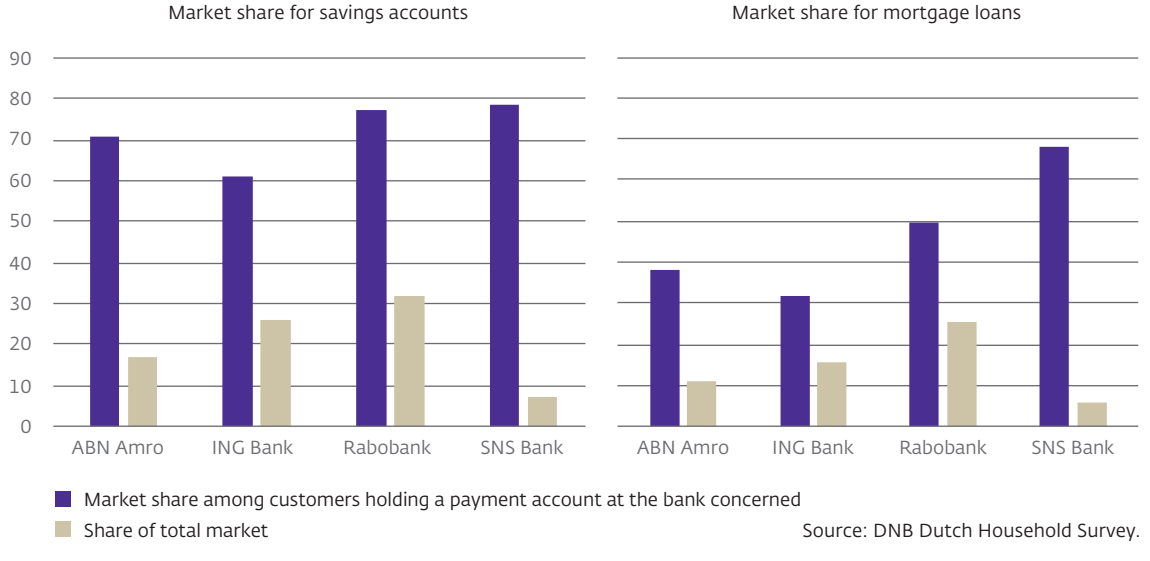
6 See DNBulletin: Costs of Dutch payment transactions are among the lowest in the EU.

have led to less innovation, for example judging by the rapid large-scale introduction of instant payments in the Netherlands. It is estimated that one-third of all credit transfers in the third quarter of 2019 were received by the recipient within five seconds, as opposed to 4% 'instant' payments on average in Europe.[7]

Banks can benefit from cross-selling. When bank customers open a payment account with a bank, this offers an opportunity for the bank to bring other financial products, such as savings accounts or mortgage loans, to their attention at a later date and have them make use of their services, as illustrated in Figure 12. Of the bank customers with a savings account, 61% to 78% keep this account at the bank where they also have their primary payment account (which means that 22% to 39% have this account at another bank). Of the bank customers with a mortgage, 31% to 68% took out their mortgage loan at the bank where they also have their primary payment account. These percentages are two to ten times higher than the shares of those banks in the market as a whole. Compared to ten years ago, the percentages have increased on average by four percentage points for savings and by eight percentage points for mortgage loans. The causality can also be reversed in certain cases,

Figure 12 Payment accounts are important for selling other products

Market shares in percentages; 2018



Source: DNB Dutch Household Survey.

7 Source: Dutch Payments Association, European Payments Council, DNB estimate. The European standard for instant payments is within ten 10 seconds rather than the five seconds in the Netherlands.

namely, a customer changes primary payment account when opening a savings account or taking out a mortgage. But given the low switching rate for payment accounts, even when a new mortgage is taken out, the cross-selling effect of a payment account appears to be more important.[8]

New fintech players and an increasing number of activities by big tech firms are making the payments market more competitive and innovative. The steady and almost complete digitisation of the payments market has resulted in a variety of specialist tech companies playing a role in the payments chain. Online payments for e-commerce transactions in particular are dominated by non-bank service providers, mostly payment institutions that generate a substantial part of the revenue in that sub-market (Box 2). There are also 'neobanks' that have a full banking license and focus on the payments market (bunq, N26, Revolut), while service providers such as Adyen have expanded their payment institution license to a banking license. Banks also develop their own fintech initiatives, which they can use to improve their own systems (Tikkie; IBAN-Name-Check) or are marketed as spin-offs (payment service Payconiq; investment service Peaks). Some of these new services already make use of the new possibilities offered by the revised European Payment Services Directive (PSD2), to access a consumer's or firm's payment account.

Box 2: Payment institutions – 'new kids on the block' challenge banks

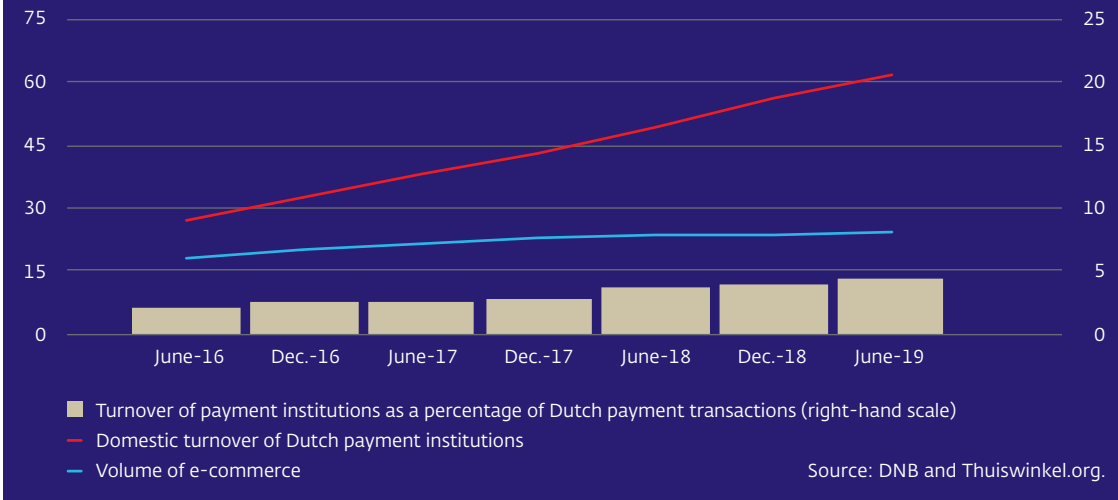
A new type of licensed financial institution was introduced in 2009: the payment institution. In the Netherlands, payment institutions mainly provide services to online retailers. They are IT-driven (fintech) companies that make it possible for consumers to pay in different ways (e.g. iDEAL, direct debit, credit card, etc.). The payment institutions receive the payments from the customers, and they aggregate and transfer these to the retailer.

Payment institutions are almost always involved in online consumer spending transactions, a market that has grown steadily in recent years and generated a turnover of more than EUR 25 billion in 2019 (estimated by Thuiswinkel.org). Growth in domestic turnover of payment institutions was even greater (Figure 13). Compared to domestic payment transactions as a whole, the share of payment institutions is modest, at less than 5%.

8 The average probability of switching for the primary payment account is 5.3% for the coming year. Source: DNB (2019), survey on switching banks, in collaboration with CenterERdata. Data from the Dutch Household Survey show only four payment accounts being switched simultaneously to a new primary payment account for more than 300 new mortgage loans taken out.

Figuur 13 Turnover of payment institutions is growing rapidly, but its relative share is limited

Billion EUR



Source: DNB and Thuiswinkel.org.

Note: Turnover of payment institutions includes Adyen, which has had a banking license since April 2017.

Payment institutions play a role in an increasing number of segments of the payment market. In addition to online consumer spending, they also facilitate business-to-business online transactions, donations to charities and payments for subscriptions. Not only do they offer various payment options, they also facilitate risk management and administrative processes for payees. Payment institutions, and payment service providers licensed as electronic money institutions, can also, to a limited extent, hold customer funds and provide credit. The removal of a few remaining constraints, such as the barrier to access to the central banking payment system TARGET2, may further increase these institutions' ability to compete with banks. However, care must be taken to prevent a situation in which institutions avoid supervisory requirements by opting for a lighter supervisory regime ("regulatory arbitrage").

In 2018, it is estimated that approximately three-quarters of commission income in the online consumer purchases segment was earned by payment institutions. A few large payment institutions based in the Netherlands generate a large proportion of their turnover abroad. The annual domestic payment volume of Dutch payment institutions was more than EUR 60 billion in mid-2019, while the volume of payments outside the Netherlands was almost five times as high in the same period, at approximately EUR 300 billion.

3 Trends for the future

Having outlined the current state of banking activities in the Netherlands in the previous chapter, this chapter discusses possible future developments. The trends can be divided into the categories technology, economy, society and regulation.

3.1 Technology

Technology is changing the market structure for banking services as platforms develop and value chains are unbundled. Platforms are emerging in the financial sector just as they have done in the travel and taxi industries (Booking.com and Uber). A platform's business model is based on acting as an intermediary between buyers and sellers of services. There are various types of platforms: specialists in a particular segment (providing the highest savings interest rate, for example) and platforms with a wide range of products (one-stop shops). Service providers can offer third parties' online products (complementary or even competing) on a single platform, and by using data analytics they can even include personal preferences. Platforms are characterised by network effects, where the added value for individual users increases as the number of participants grows. Financial services can be offered as separate building blocks on a platform, partly thanks to the technology of application programming interfaces (APIs). This results in the unbundling of traditional value chains.[9]

The availability of increasing amounts of data and the use of artificial intelligence (AI) are changing customer interaction and credit provision processes.[10] The days when you actually had to go into a physical bank branch to arrange almost all your banking affairs are over, although there are still barriers to more intensive data use (Box 3). Nowadays, chatbots can communicate with customers and thus speed up quotation processes. The need for close personal contact between banker and customer is decreasing in lending, for instance, because more and better data is available for risk assessment. For example, new information, such as transaction data or unstructured text data, can be fed into credit risk models for a better understanding of customer behaviour and the resulting risks. Moreover, it is easier to extract relevant information from existing sources if machine learning (as part of the broader concept of AI) can be used to identify complex patterns and relationships in data sets (Box 4).

Cloud computing is changing the market for banking services because it provides new and existing players the opportunity to adapt computing power or processing capacity easily and quickly. Previously, new entrants had to make large IT infrastructure investments to be able to offer banking services, but this barrier to entry has

9 DNB (2018) Unchained, Supervision in an open banking sector

10 AI is the theory and development of computer systems able to perform tasks that conventionally require human intelligence. Machine learning is a subset of AI that uses technologies to enable computers to learn without being explicitly programmed. For further information see General principles for the use of Artificial Intelligence in the financial sector.

been greatly reduced thanks to cloud computing. Incumbents are moving IT processes to the cloud as well. It is also possible to purchase banking infrastructures, such as payment account services, externally and run them in the cloud. Both cases involve the outsourcing of an important support activity as part of the value chain and the European Outsourcing Directive must be complied with.

Box 3: Barriers to data use: technology and the public

Traditionally, banks have processed large amounts of data, and yet despite this, they are being challenged on several fronts by tech companies.

Technology: dated IT systems

Banks are investing heavily in data analytics (Figure 14). Research shows that most efforts are concentrated in the area of fraud detection, but considerably less so in the area of analysing customer preferences. Although data is in banks' DNA, the sector is unable to fully exploit its potential because data is often trapped in obsolete IT systems. The banking sector is known for using a multitude of systems simultaneously that are at times incompatible, inflexible and do not generate enough information. Some banks choose to set up their own separate fintech alongside their existing business in a trend known as greenfielding.

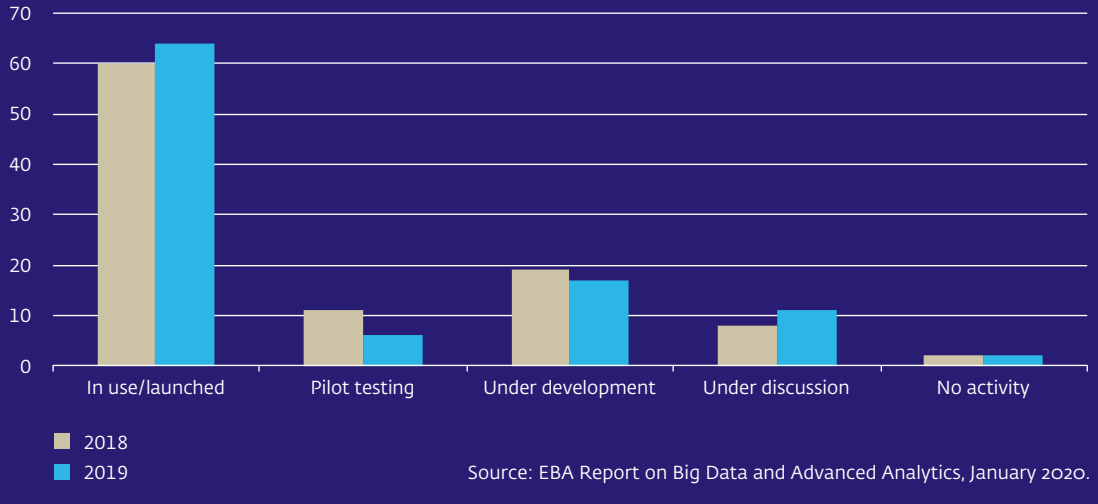
The public: use of bank data is a very delicate issue

For banks it is not just a matter of technology, but also of public acceptance. The Dutch are reluctant to share their data. And when it comes to financial data this reluctance is even greater (Figure 15).[11] In that light, capitalising on the opportunities of optimal data utilisation is a major challenge for banks, and in doing so, they will have to compete with technology firms that the public know want their data. Tech firms also use alternative data sources, such as online search behaviour, telephone usage or social media data. These unstructured data are used in combination with structured data and used for personalised offers or tailored advice, such as market insights or the optimisation of working capital for entrepreneurs. Banks can only keep up with this development if and when they are sure that it is appreciated by the customer.

11 Sebastian Doerr, Sharon Chen, Jon Frost and Leonardo Gambacorta (forthcoming), "Data versus privacy: the role of gender and social norms", BIS working paper, and EY (2019), "Global FinTech Adoption Index 2019".

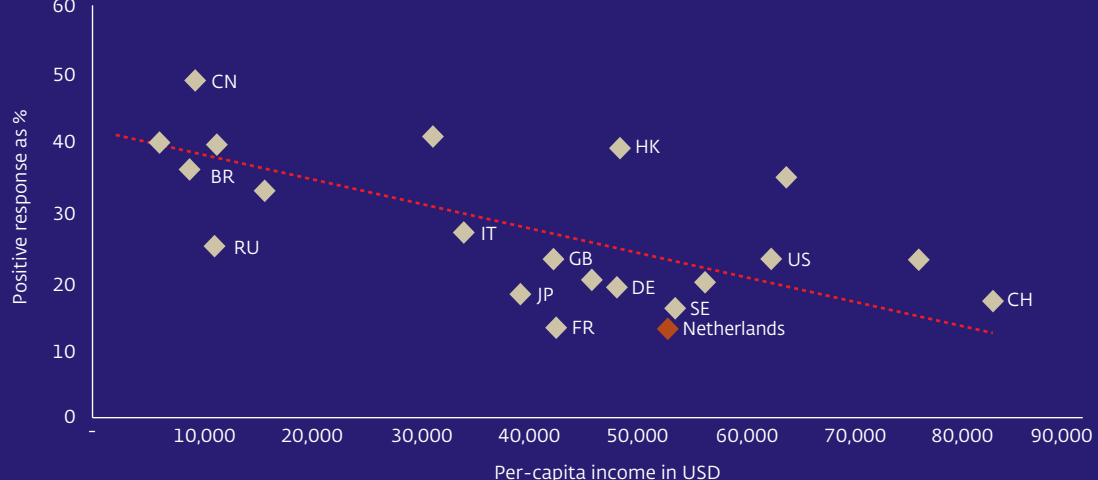
Figure 14 Use of data analytics among banks is increasing

% of total



Source: EBA Report on Big Data and Advanced Analytics, January 2020.

Figure 15 Willingness to share data in exchange for benefits falls as income increases



Source: BIS/EY.

Tokenisation offers new opportunities for credit and payment transactions that involve working outside a centralised system.[12] On a distributed ledger, such as the blockchain[13], transactions are verified so that a stock exchange, clearing institution or public notary is no longer needed as a central registering party. As a consequence, transactions can take place more smoothly and terms and conditions can be linked to transactions (so-called smart contracts). This might, for instance, include an automatic payment that is executed as soon as the delivery by container ship arrives in the port. In Germany, there are small scale examples of tokenisation of SME loans (Bitbond), with which small business loans are traded. Stablecoins are a specific form of a payment token.[14] A number of international banks are developing stablecoins for interbank payments, and Facebook is working on the digital currency Libra.

Finally, various technological developments can reinforce each other, and quantum computing can further accelerate developments. The large-scale deployment of quantum computing is expected to take quite a number of years but quantum computing will enable an enormous leap forward in computing power thanks to a fundamentally new technology.[15] This, in turn, will enhance the possibilities of artificial intelligence.[16] The risk arising from quantum computing itself is that the most commonly used encryption techniques for accessing financial services are no longer sufficient to protect the confidentiality and integrity of sensitive data during storage or transmission. It could even undermine encryption-based blockchain technology.

3.2 Economy

The low interest rate environment exerts pressure on banking business models. The ECB introduced negative key policy rates in mid-2014 and also put pressure on capital market interest rates with its programmes to purchase debt instruments. Because market interest rates are lower than savings rates, banks' interest margins are under pressure. As mentioned in the previous chapter, this exerts pressure on profitability. Relevant examples of banks that charge their private customers negative interest have thus far been limited and only concern large balances (starting from EUR 100,000). Corporate deposits have been subject to negative interest rates since 2016. Thus far, this has not led to a significant drop in corporate deposits.

12 Tokenisation is the digital representation of an asset (value) on a distributed network (Hileman and Rauchs, Global Blockchain Benchmarking Study, 2017). Tokenisation allows the transfer of (illiquid) asset values such as a mortgage or loan without the need for a central intermediary/organisation.
13 The blockchain is a system used to store data without the need for a central authority. The data can include payment transactions, but also certificates of ownership or agreements.
14 Stablecoins are digital assets linked to another asset, asset basket or currency to reduce the volatility of the stablecoin.
15 Virtually all modern information technology is based on computers that work with bits (on and off switches). Developments in quantum mechanics have enabled a new type of computer based on a qubit. A qubit can exist in a superposition, which means that numerical solutions can be explored not only in succession, but simultaneously as well. As a result, certain complex problems can be solved much faster.
16 "IBM's Dario Gil says quantum computing promises to accelerate AI", MIT Technology Review (2018).

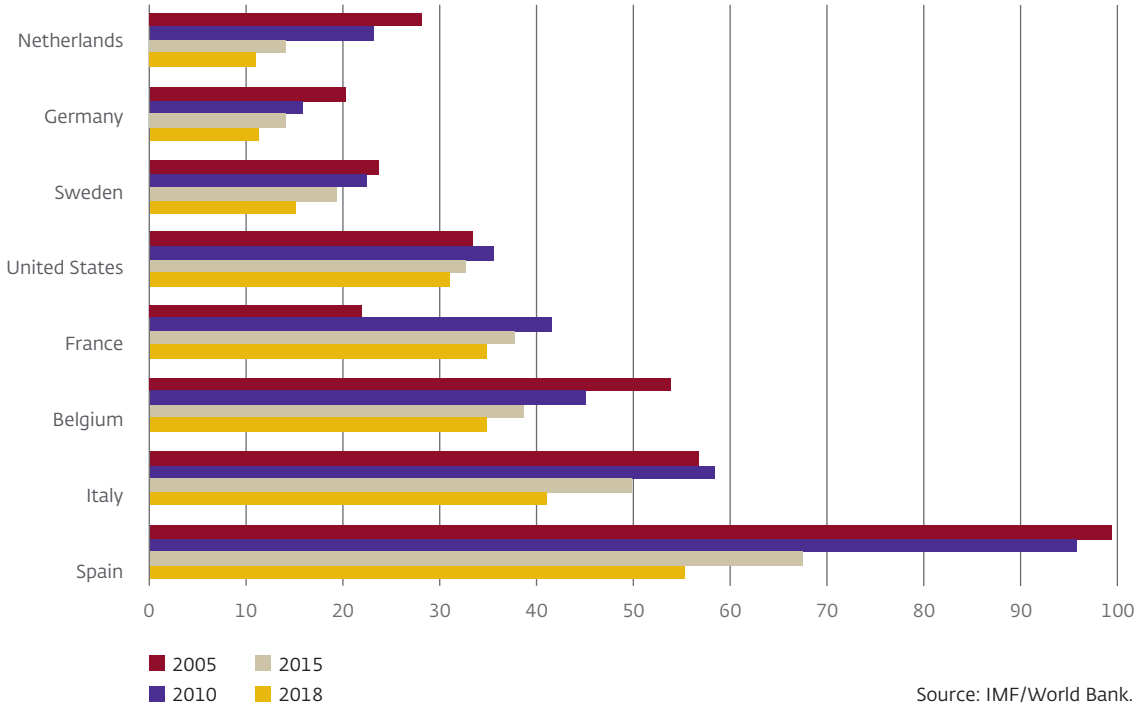
The low interest rate environment draws investors to less liquid assets such as mortgages and corporate loans. This leads to more competition, particularly in the segment of mortgage loans with longer maturities. Pension funds and insurers have long-term liabilities and their solvency levels have come under pressure because of the low interest rates. By investing in mortgages or corporate loans, they aim to receive compensation for the low marketability of the loans (illiquidity premium) in addition to the risk premium. However, the absorption capacity of these institutional investors has its limits precisely because of the illiquidity of the loans.

3.3 Society

Compared to the European average, Dutch society is willing to embrace innovations relatively quickly, and is leading in the use of mobile internet. Together with Sweden, the Netherlands, and more recently Spain, are among the leaders in mobile internet use.

Figure 16 Netherlands has relatively efficient branch network following rapid decrease in bank branches

Number per 100,000 inhabitants



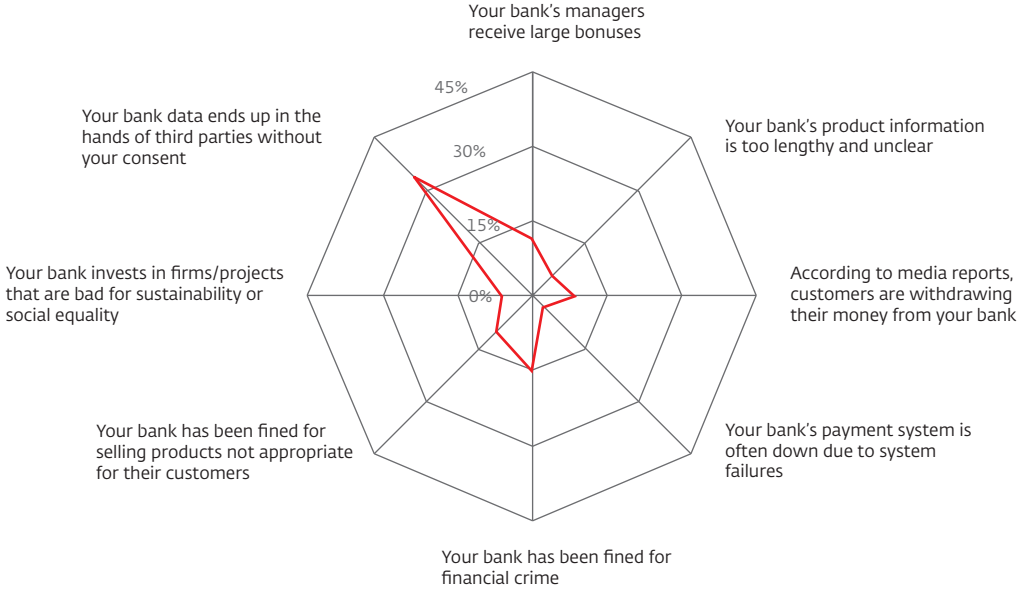
Source: IMF/World Bank.

In 2018, on average two-thirds of the European population aged between 16 and 74 accessed internet using smartphones, in the Netherlands this was 84%. Internet penetration is also high with 98% of the population having internet at home. In the Netherlands, the penetration rate has been over 90% since 2010, while this level has still not been reached in broader Europe. The digitisation of banking activities is reflected in the lower number of bank branches in the Netherlands compared to surrounding countries (Figure 16).

Dutch households consider careful handling of personal data crucial if they are to trust their bank. Almost three-quarters of respondents state that their trust would decline sharply, very sharply or disappear completely if bank data were to end up in the hands of third parties without their consent.[17] Respondents said, for instance, that trust would be more greatly affected if their bank data ended up in the hands of third parties without their consent than if the bank were involved in money laundering or other criminal activities or if bank managers were given large bonuses (Figure 17).

Figure 17 Trust adversely affected by privacy issues

Percentage of respondents that cited extremely negative impact



— Extremely negative impact

Source: DNB Survey on trust, 2019

17 DNB (2019), annual survey on trust in collaboration with CentERdata.

Box 4: Artificial Intelligence (AI) – competence and integrity

The use of artificial intelligence for banking services is on the rise. Of the 'large' institutions – with assets topping USD 1,000 billion – 57% use smart algorithms in their production environment, while another 30% are developing these.[18] Dutch banks are also working hard on developing algorithms.

The use of artificial intelligence can make core banking processes such as lending more effective. Self-learning algorithms detect data patterns that humans would not recognise. Moreover, they help banks to reduce costs through staff cuts. A study by McKinsey estimated that algorithms can achieve a 36 percentage point increase in the Gini coefficient compared to traditional models for calculating credit risk.[19] Where the latter results in an effectiveness rate of 50%, this rises to 86% for algorithms. A study conducted by Frost et al. (2019) using data from South America confirms the findings of the McKinsey report.[20]

Obtaining and maintaining sufficient public trust is an essential condition for using artificial intelligence in the core banking processes. The risk that social biases embedded in historical data are magnified by algorithms needs to be addressed. A study with data from the US, for example, shows that algorithms used in mortgage lending adversely affect already disadvantaged groups of the population such as Latinos and African Americans compared to Americans of European descent.[21] Such effects are undesirable. The risk of public distrust is also evident in the unrest that arose over the Apple Card. The algorithm developed by business partner Goldman Sachs turned out to be sensitive to gender discrimination. A man discovered that the credit card gave him a 20 times higher credit limit than his wife even though they were married in a community of property and income.

18 Institute of International Finance (2019) Machine Learning in Credit Risk.
19 The Gini coefficient expresses the effectiveness of a credit model with a value of 0 (random) to 1 (perfect). McKinsey (2018) Special Edition on Advanced Analytics in Banking.
20 Frost, J., L. Gambacorta, Y. Huang, H.S. Shin and P. Zbinden (2019), "Bigtech and the changing structure of financial intermediation", BIS working paper.
21 Institute of International Finance (2019) Bias and Ethical Implications in Machine Learning.

The population of the Netherlands is ageing fast, creating new challenges in the banking services industry. From a life-cycle perspective, wealthy elderly people are interested in more risk-free banking and savings options. New products such as family mortgages – where a wealthy parent or grandparent, for example, can lend money to children or grandchildren – is a response to this need. In addition, it could be beneficial for some elderly people with illiquid assets – such as their homes – to convert these into cash without incurring disproportionately high or unbearable debt burdens.

Climate change and the need for an energy transition present major challenges for society and banks. The Dutch climate change agreement envisages a 50% carbon emissions reduction by 2030 compared to 1990, and nitrogen emissions must also be drastically reduced. These objectives, intended to get climate change under control, call for a joint effort by the private sector and the government. As market players, banks are called upon to demonstrate their sense of responsibility. By pursuing their own sustainability policy and offering customers appropriate forms of financing, providers of banking services play an important role as financiers in achieving the climate objectives.

3.4 Regulation

As of the autumn of 2020, the risk weights for mortgages will have a minimum floor. This will result in banks' capital buffers increasing as needed in light of the risks the Dutch housing market poses. Under the Basel 3.5 agreement, which will be phased in from 2022 onwards, the risk weights for mortgages will in fact show an increase of a similar order. The introduction of Basel 3.5 also implies that the playing field will be more level for small banks compared with large banks. The sophistication bias of large banks will be reduced by restrictions on the use of internal risk models and the introduction of the 'output floor'. This is relatively more advantageous for small banks, that often use the standard approach rather than their own risk models, and it can also lower the entry barrier.

The completion of the banking union with a single deposit guarantee scheme (DGS) and an unambiguous bankruptcy regime for banks could radically change the landscape in favour of internationally operating banks. The banking union would then operate more as a single jurisdiction for supervision and resolution than is currently the case. At present, national supervisory authorities still have room to impose requirements at the level of subsidiaries operating in their country. This means, for example, that deposit funds collected in one EU Member State cannot automatically be used for credit provision in another Member State. Furthermore, the introduction of a European deposit guarantee scheme could improve mobility of deposit funds.

The revised Payment Services Directive, PSD2, will create new business opportunities, for banks as well as non-banks. PSD2 requires banks to give third parties access to payment accounts if the customer consents. This allows non-banks such as large tech firms to take full advantage

of opportunities because they can now combine their own data that they have on individuals and companies with payment data of banks, to the extent PSD2 and the General Data Protection Regulation (GDPR) allow this. Such combined data can, for example, help to better understand personal preferences, purchasing behaviour and creditworthiness of consumers. It must be noted, however, that an important element of the GDPR is that the processing of personal data is not permitted for purposes other than those for which the data were obtained, unless the consumer provides their explicit consent.

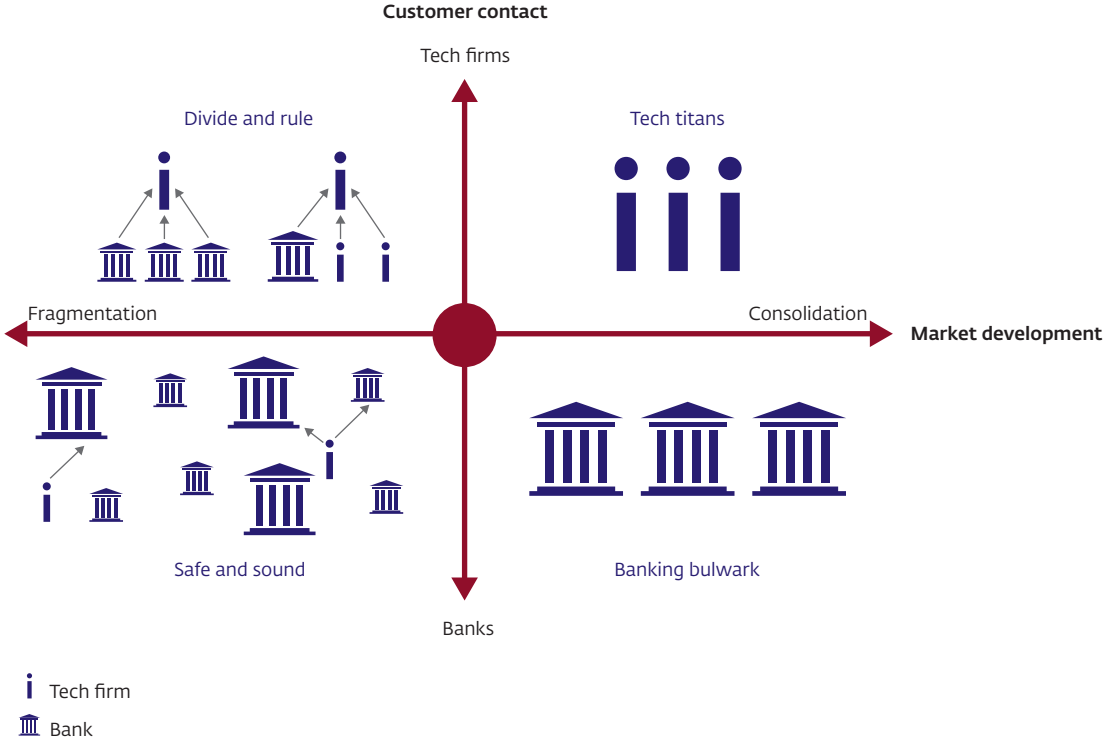
In the coming years, the European Commission will start discussions on additional requirements with respect to open data. The basic principle in Europe in this regard is that consumers should be given control over data that third parties have collected on them. This means addressing questions such as whether customer data should also be shared in other industries if the consumer so requests, so that other service providers can use these data to offer financial services.[22] This issue particularly affects large tech companies that have data about purchasing and online search behaviour. In an evaluation of PSD2, the European Commission will examine whether data access should be expanded from payment accounts to savings and investment accounts.

22 The GDPR already provides for this, but has a grace period of 30 days and does not contain any sharing requirements similar to PSD2.

4 Scenarios for banking activities

Many different scenarios for the banking market can result from the outlined trends in technology, regulation, economic climate and society. In this chapter we highlight what the market could look like. The scenarios are the result of many discussions, both within and especially outside DNB. Many uncertainties were considered, but the discussions focused on two important developments (Figure 18). On the one hand, who will be in charge of customer contact and the distribution of banking services. Will banks remain dominant or will there be a shift towards the large technology companies, also called big techs?[23] And on the other hand, whether there will be further consolidation in the market or more fragmentation with room for new market players. Driven by regulation and technology, it can become easier for existing players and new entrants to enter a niche, as start-up costs can be lower for a lean internet-only model, for instance. However, technology can also generate economies of scale and scope because high initial investment in IT will subsequently imply low

Figure 18 Scenarios



23 For recent discussions, see (BIS, 2019) – *Annual Economic Report 2019*, Big Tech in Finance: opportunities and risks.

marginal costs of the product, which is conducive to upscaling and consolidation.

These scenarios offer plenty of scope for discussion and interpretation and have deliberately been described to be thought-provoking. They are therefore explicitly not intended as predictions or preferences for the future, but only as possible scenarios for the future. They provide a framework for thinking about the future and make it possible to define issues for the sector, supervisory authorities and policymakers that need attention.

A. Divide and rule

In no more than a decade, the landscape for banking services has been totally transformed by technological innovations. Big techs have monopolised customer relationships in banking services provided through their platforms and are appropriating the bulk of the profits in the sector. Increasingly, banks have to settle for a role as subcontractors of payment, savings and lending services on an open platform. Banks need to be constantly on the lookout for cost savings and distinctive services to survive.

Big tech players are in control and have taken over primary customer contact, in particular the contact with consumers and small business customers. It has become clear that big techs have an advantage in the use of Big Data and AI for personalised services that cannot be matched by banks. Mortgages and business loans are offered not only by banks, but also by pension funds, insurers and fintech service providers, all of which compete on the same platforms. Competition in the product markets has increased due to transparency in price and product conditions imposed by platforms. This is reinforced by the ongoing search for yield in a low interest rate environment. Through the platform customers can buy banking services and products from different suppliers. This has diminished the possibilities for banks to cross-sell their products. Legacy problems and a lack of adaptability mean that change at existing banks is too slow. Big techs have therefore been able to capture the lion's share of commission income, forcing current banks to rely even more on interest margins, which are declining, and on providing the underlying infrastructure. These developments cause revenues to fall, while on the other hand maintenance and renewal of the banking infrastructure is expensive. This combination puts banks' cost-to-income ratios under pressure. As a result, traditional banks tend to become utility companies that provide the infrastructure and are subject to strict regulation, while the more profitable services provided on that infrastructure are offered by other providers.

It is appealing for big techs to remain outside the traditional regulatory perimeter for financial institutions. Through lobbying they are trying to influence the structure of the market to the advantage of entrants. Within the EU, big techs have been able to secure the loyalty of a number of smaller jurisdictions to influence regulation to their advantage. Politicians and other authorities are trying to create regulations that safeguard data and privacy (revised GDPR), but these are inherently lagging behind the speed of technological developments. Big techs are happy to leave the products for which the financial privacy of

customers is safeguarded by regulation to the growing number of fintechs and neobanks in the market.[24] It is becoming increasingly unclear to the banks and their customers who in this system is responsible for safeguarding a sound financial system, in which everyone knows their customers, money laundering and terrorist financing are combated and consumer protection is ensured in the event of an institution failing. This is an area where big techs do not assume control.

In this scenario, price elasticity for savings services rises to unprecedented levels, making the banks' funding very volatile. Smart algorithms are constantly searching for the highest interest rates on big tech's platforms. The market is rapidly changing to a 'winner-takes-all' model in which savings respond instantly to minute interest rate changes. Banks are looking for 'sticky money' to stabilise their funding sources, which means that term deposits enjoy renewed popularity. As a result, banks are increasingly neglecting the market for demand deposits because of the increasing funding volatility and its negative impact on liquidity ratios.

B. Tech titans

A few big tech companies are integrating and consolidating the entire value chain for banking services. The now dominant technology companies are doing everything they can to trap consumers in their ecosystem's web. The market has become a battlefield between American and Chinese big techs. Getting credit through a platform means also having to make use of payment services there. Banking services are becoming bundled lifestyle products, with which consumer groups identify as they do with clothing and music styles. For banking service providers, brand value is more important than product innovation, and they use this to try to create high switching barriers for customers.

In a one-stop shop for banking services on a closed platform, economies of scale create an integrated value chain. Apple Pay, for example, is expanding its platform role for its own users to a wider range of financial services, in which not only payment data, but also all smartphone data are used to sell tailored banking services. Consumers exhibit privacy paradox behaviour. The majority of consumers state that they are concerned about their privacy, but the promise of financial benefits prompts many to sacrifice privacy for limited financial gain. Value is created from Big Data and AI primarily by the Chinese and American big techs that already have a significant head start in this area.

In this scenario, too, big techs have become dominant in customer contact and distribution at the expense of banks, due to their technological lead. This battle has been won by big techs, but among them Chinese and American big techs are engaged in a battle for Europe. In China, virtually all mobile payments are already being processed by WeChat and AliPay, and they should achieve a similar position in Europe. This is not possible without a fight as the American big techs see the western world as their exclusive territory. In this scenario, the consolidation or resolution of Europe's

24 New, often fully digital, operators that provide banking services and have a banking license.

too-little-to-survive banks accelerates, with 20-40% of the banks disappearing in the next decade, especially banks that prove unable to provide services to private individuals and SMEs at low cost. On the other hand, the systemic relevance of big techs and the impact of their failure increases. The remaining banks take to cherry-picking by moving towards a number of business models where customisation and personal contact are important, including complex services for large corporates and private banking.

C. Safe and sound

The role of big techs in the banking market has remained small. Scandals with discriminatory algorithms and violations of privacy have fuelled distrust in the tech giants. Banks pick up the gauntlet and create platforms for banking services based on trust and safeguarding privacy. In addition to their own products, they leave plenty of room for other service providers, and products are offered unbundled to allow maximum freedom of choice. Product innovation is a focus area for both existing and new providers, that can all address part of the fragmented market by differentiating themselves with products such as reverse mortgages, credit for the self-employed or efficient payment services. The platform helps greatly in shifting banks' dependence on interest income to commission income.

In this scenario, trust and confidence in banks have been restored greatly as banks have taken on their role as a protector of personal data more extensively and made it the core of their services. Trust is the cornerstone of the banking system, and banks are trying to commercialise this through customer loyalty and strong brands. Transaction data unquestionably reveal so much about 'who you are' (associations, political party memberships, purchasing preferences, the persons you engage with and send a Tikkie – online payment app), so that the main question for consumers is: which financial service provider do I trust the most when it comes to protecting my personal data? One of the ways that banks respond to this issue is by developing an app that enables the bank to authorise ID data, to exercise the right to remove the personal data institutions have gathered on you and provide a dashboard about who knows what about you. This has neutralised the dominance of the big techs, something that has been reinforced by regulatory intervention on data use and EU competition fines for big techs.

Banks retain in control of customer contact and the distribution of banking services. Some of them have grown to become platforms, but there is also room for niche players. Neobanks are growing strongly with a focused business model, but pension funds and insurers are also benefitting from the platform role of banks by providing capital to businesses and consumers. The platform banks are assuming their responsibility in maintaining the restored trust and confidence in the financial sector by investing heavily in a joint approach to the integrity issues that will be relevant in the 2020s. Like the management of ATMs, the screening of customers and the fight against money laundering is brought together in a single entity.

However, for some the pace of digitisation is too fast, leading to a social divide. This creates space for a simple product range and personal attention, and some banks adapt their business models accordingly. Some customers attach great importance to physical bank branches and customer contact with bank employees. A small bank has made this its unique selling point and focuses specifically on a few regions where this need exists. Diversity of available products and providers increases, and this facilitates competition.

D. Banking bulwark

A few large European platform banks dominate the market for banking services. An attempt is made to curb the personal data big techs have. Politicians introduce strict regulations that curtail data-related business models and competitive advantages. Banks capitalise on the opportunity, and they recognise the benefits that platforming offers them. They have free rein to take over smaller fintech players and competing banks.

In this scenario, the continued loss of reputation of big techs gives a few big pioneering banks the time to transform into financial services platforms. Based on the fact that customers tend to trust who they already know and on the greater caution and inertia of customers to rapid changes, they have just enough time to do so. For ten years big techs tried to take on the role of platform, while banks tried to create enough time for their own transformation to a platform bank. The battle was fought on many fronts, with regulation being a very important one. In terms of financial data use, privacy legislation and dismantling of data monopolies, restrictions that are advantageous for existing banks are introduced, supported by public opinion as citizens increasingly see data and privacy as a right. Banks thus remain important as reliable front ends and marketplaces for financial services and also take on a kind of 'market supervisor role' as to who they allow on their platform.

Pressure on margins due to attacks by fintechs and big techs on profitable services, high investment in IT, and reorganisations make it necessary to operate on a large scale and to standardise processes extensively. However, by no means all banks can hold their own in this ferocious environment, which accelerates consolidation in Europe among those banks that cannot themselves take on a platform role. They cannot make a successful digitisation transition and cannot keep up with the speed of reorganisation of offices, staff and IT. Banks as a sector will remain in the lead, but the gap between a few banks that are successful as platforms and banks that are being marginalised is widening. The consolidation taking place makes it difficult for small banks to survive in all European markets. Banks with too many legacy problems and a product range that is not distinctive enough are, whether or not forced by supervisory authorities, taken over, cease their activities or go into resolution.

5 Findings and policy conclusions

The banking services ecosystem will change dramatically in the coming years as a result of the aforementioned trends in technology, the economy, society and regulation. The future scenarios outlined in the previous chapter all highlight four main themes that need to be addressed:

1. The increased use of data provides opportunities, but calls for the prioritisation of careful data protection, and the adequate use and quality of data.
2. Changing relations in markets and elsewhere reinforce the importance of supervisory authorities focusing on activities alongside entities.
3. As financial services become increasingly cross-border in nature due to digitisation and "EU passporting", further strengthening of European supervision and resolution is called for.
4. Sector-wide collaboration is needed to effectively safeguard public interests in combating financial and economic crime, availability of services and sustainability.

The themes are elaborated below and include conclusions for policy, supervision and resolution. These policy conclusions stem from DNB's mission to ensure sound, ethical and resolvable financial institutions and to contribute to financial stability and sustainable prosperity. They are meant to serve as a frame of reference for national and international consultations and for the sector.

1. The increased use of data provides opportunities, but calls for the prioritisation of careful data protection, and the adequate use and quality of data.

The market for banking services is changing as a result of the increasing importance of data. Consumers attach great importance to the careful handling of data, according to DNB research. Being aware of this trust component is important for all service providers offering banking services and in particular for operators with whom consumers have a relationship of trust. This creates an obligation to handle data with care, especially now that data are becoming more accessible. With the advent of PSD2, consumers must give their explicit consent if they wish to share payment data. The Dutch Data Protection Authority is responsible for compliance with the GDPR. At the same time, the greater importance of data also needs to be addressed by DNB. The incorrect use of data, for instance, has a negative impact on trust, while inadequate data lead to incorrect risk assessments. It can also be hinder the execution of DNB's tasks relating to resolution and the DGS. Both have an impact on the soundness and integrity of financial institutions. A sustainable business model requires high-quality data ('garbage in, garbage out').

The use of data will affect the future profitability of institutions on both the cost and the income side. Although investment in data analytics will initially lead to higher costs, they should contribute to process improvement, cost reduction and revenue increase. The use of data, for example, is necessary to work more efficiently at preventing financial crime and reducing the cost of fraud. The use of

data also makes it possible to provide personalised digital customer contact. Data analytics can change the core process of lending. In specific cases, credit scores based on new types of data and AI already show better results than traditional credit assessment methods. More extensive datasets and these new data applications are likely to result in winners and losers, with risks accumulating for those that fail to keep pace, or in shifting market shares. DNB is a forward-looking supervisory authority and ensures that institutions can be scaled up or down or be resolved in good time. DNB supports the call by the Bank for International Settlements to gain a better understanding of the role of data in the financial sector.

Specific policy conclusions:

- Improvements in data availability and quality are essential. Traditional players, in particular, still have a lot of work to do. Supervisory investigations conducted in recent years have shown that data quality, management and risk reports are often inadequate on several fronts. The need for improvement in this area is urgent so as to be able to take advantage of innovation opportunities and to attain a high level of competitiveness in the field of financial services. This requires adaptability (Box 5). DNB will call institutions to account for the quality and future resilience of their data management. Furthermore, as part of the sound and ethical operational management, DNB will monitor the governance arrangements with regard to the data used in the core processes.

Box 5: Banks' adaptability

Dutch banks show a higher adaptive capacity in the digital age in comparison to institutions in some of the neighbouring countries. Substantial progress has been made in embracing fintech. Partly as a result of this, costs are being saved and the sector is competitive. Dutch banks are digitising their services to a large extent. In the Netherlands, 73% of consumers now use services such as online banking and mobile banking. This percentage is considerably lower in Germany (64%), Belgium (42%), Sweden (64%) and France (35%).

Present-day results...

The number of costly bank branches has been greatly reduced as a result of the digitisation of banks. The Netherlands now has only 11 bank branches for every 100,000 inhabitants, comparable to Germany but much lower than in countries like Belgium and France, where there are three times as many branches. As a result, the cost-income ratio has developed relatively favourably, although further cost cuts are desirable. For Dutch banks this ratio is 60 compared to 70 and 80 for France and Germany.

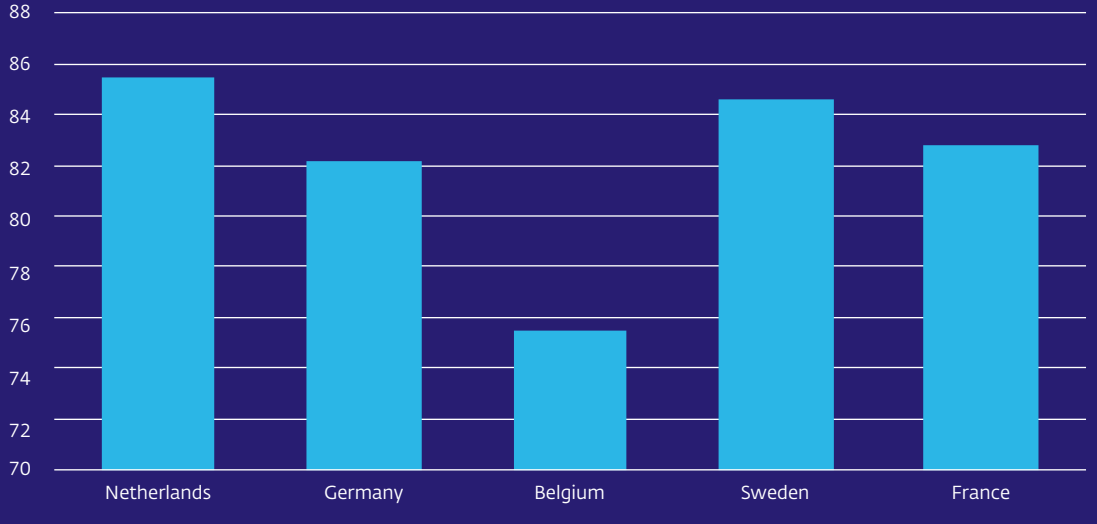
Adaptability also has a positive impact on the competitiveness of the banking sector. In the annual Global Competitiveness Report of the World Economic Forum, the Netherlands scores 85 points (see Figure 19). This puts our banks ahead of the Swedes, Belgians, French and Germans.

...are solid points of reference for the future

Banks can further improve their returns by using more artificial intelligence. Research by Deutsche Bank shows a positive relationship between the number of AI patent applications filed in a country and the ROA of that country's banks.[25] A report by the OECD shows that the Netherlands, which accounts for 10% of the EU's AI patents – against a GDP share of 4.8% – is relatively innovative.[26]

Figure 19 Competitiveness of the Dutch banking sector appears to be relatively high

Index; maximum = 100



Source: calculated by DNB using data from World Economic Forum, Global Competitiveness Index 4.0, 2019 editions.

25 Deutsche Bank (2019) Artificial Intelligence in Banking: A lever for profitability with limited implementation to date.
26 OECD (2019) Shaping the future of technologies and AI.

- Providers of banking services in a more dynamic market must also be able to scale up and down quickly. In terms of resolution planning and execution, DNB must ensure that the banks have high-quality data available for the execution of their resolution strategy or DGS payouts.
- From the point of view of maintaining trust, it is important for consumers and businesses to remain in control over access to their data. A secure data sharing architecture can facilitate the further development of technological applications for banking services. DNB will enter into discussions with the sector on principles for sensible use of AI, focusing on aspects such as soundness, accountability, fairness, ethics, skills and transparency.[27]
- Financial stability and security are important issues with regard to the further expansion of data access, which are relevant to policy matters concerning the expansion of 'PSD2 access' to services other than payment accounts, such as savings accounts and investments (PSD3). This could, for example, enable automatic transfers of savings deposits to institutions that offer the highest interest rates. A precondition is that neither financial stability nor bank account holders' DGS protection may be undermined. Moreover, expanding access should be combined with even stricter controls and safeguards than those already in place for access to payment accounts because of fraud risks and consumer protection.

2. Changing relations in markets and elsewhere reinforce the importance of supervisory authorities focusing on activities alongside entities.

Unbundling of banking services and changing market relations can facilitate market efficiency and broaden product ranges. However, these developments also create new challenges for supervision and resolution, with the distinctions between types of institutions such as between banks and payment institutions blurring. In addition, there is a tendency on the part of the market participants to push for as much business leeway as possible with as little regulation as possible. The scope of supervision keeps pace with the rapid changes in the market. The licensing system is not static; it is a dynamic framework. Activities that previously did not exist or that could be carried out without a license have already been placed under a registration regime, such as crypto services under the amended Fourth Anti-Money Laundering Directive, or under a licensing regime, such as payment initiation or account information services under PSD2. The great variety of licenses brings proportionality to regulation, but requires active monitoring to ensure that entities' activities are covered by the appropriate licenses. If, in the future, commercial firms that do not primarily provide banking services are also interested in attracting savings through a separate entity, the interests of deposit holders will always have be sufficiently safeguarded. This means that deposit holders should not be exposed to risks that may arise from activities in other business divisions. In addition, it

27 Further information: General principles for the use of Artificial Intelligence in the financial sector

should be clear to consumers to what extent their deposits are not covered by the deposit guarantee scheme if they deposit their savings with these service providers.

Another change in the market structure is that third parties are increasingly undertaking parts of the value chain, as also noted in the "Unchained" report.[28] These are partly activities for which no license as such is required, but that are a critical part of the chain or data processes, such as cloud services. Banks or other service providers remain responsible at all times for outsourced tasks or services provided by third parties. It must be possible for supervisory authorities and resolution authorities to have access to these third parties and, on request, third parties must provide the authorities with all the information necessary for them to perform their task. To this end, one of the first ways of ensuring this is through right-to-audit clauses in outsourcing contracts and provisions that see to it that services are continued in the event of a bank resolution. However, in the case of large service providers operating globally, this does not always give a national supervisory authority or resolution authority enough control, which means that additional measures are needed to get a firmer grip on this type of player. Ways in which these measures can be implemented as effectively and efficiently as possible are being explored internationally. This could be through regulation or through a form of European supervision.

Specific policy conclusions:

The blurring distinctions between institutions means that continuous monitoring is required to ensure that there are no regulatory gaps and that the scope of regulation is appropriate, so that institutions cannot unjustifiably avoid supervision and resolution. This means that new service providers such as platforms that facilitate payments or provide other important financial services on the basis of their intermediary role must be brought under the scope of supervision under the Financial Supervision Act (*Wet op het financieel toezicht – Wft*) and the Anti-Money Laundering and Anti-Terrorist Financing Act (*Wet ter voorkoming van witwassen en financiering van terrorisme – Wwft*) In that context, the scope of the DGS coverage of deposits should also be absolutely clear and should be reconsidered if necessary. This also means that developments related to the growth of electronic money institutions should be monitored as to whether the framework needs to be adapted from the perspective of prudential and resolution aspects.

- There should be enough control over service providers that are not subject to direct supervision, but that do carry out crucial support activities (such as cloud services). Without detracting from the responsibility of outsourcing parties that are subject to supervision, it is important from a financial stability perspective to have a clear picture of these ancillary service providers and to be able to exercise powers in respect of these service providers. This should preferably be done in an internationally coordinated manner, for example at the

28 DNB (2018), Unchained, Supervision in an open banking sector

European level, either through regulation or through a joint supervisory authority.

- DNB accommodates innovation in the financial sector through initiatives such as the InnovationHub, Maatwerk voor Innovatie (Regulatory Sandbox) and the iForum. Where possible, barriers for new players and services should be removed. A precondition for this, however, is that any potential new risks that this introduces to the financial system are adequately mitigated. For example, the legal and liquidity risks that any non-bank participants may introduce in accessing the Target2 interbank payment system must be adequately mitigated.

3. As financial services become increasingly cross-border in nature due to digitisation and "EU passporting", further strengthening of European supervision and resolution is called for.

The European framework for supervision and resolution must continuously adapt to market developments, with more and more non-bank players operating beyond national borders. Current frameworks show varying degrees of European integration. The supervisory and resolution framework, prudential treatment of bank loans and deposit management and DGS protection are, for example, largely European. At the same time, the frameworks and implementation for other financial service providers, such as payment service providers, leave more room for national differences, even in cases of maximum harmonisation. The capacity available to local supervisory authorities to carry out their tasks may also differ, and supervision itself is less aligned in many areas than is the case for banks. Despite these differences, EU passported services can be provided cross-border. This means that activities with licenses obtained in a relatively less strict jurisdiction can be carried out in EU Member States where local service providers are subject to stricter requirements.

To increase effectiveness, proposals for greater centralisation of supervision and/or resolution have been implemented or initiated in Europe in a number of areas. Examples include centralisation to combat financial crime, a framework for supervision and resolution for central counterparties, supervision of large investment banks and of trade repositories, and cautious steps towards a European deposit insurance scheme. Obviously, this trend should be continued if the effectiveness of supervision and resolution is at stake, with due regard for the principles of subsidiarity and proportionality.

Specific policy conclusions:

- DNB is in favour of completing the European banking union. This includes the creation of a European Deposit Insurance Scheme and a review of the directive on deposit guarantee schemes so as to further harmonise national practices. DNB also recommends further steps to strengthen the banking union and the capital market union, such as further harmonisation of insolvency law in Europe.
- In line with the banking union, a logical step would be to also structure the supervision of payment institutions and electronic money institutions on a more European level, for

instance by bringing it under the jurisdiction of the ECB.

- If and when large internationally operating institutions such as big techs play a greater role in the provision of banking services, some form of European supervision and resolution will also have to apply to these service providers.
- European supervisory authorities must use their instruments to ensure that rules and supervision in Member States do not differ too much, for example by using peer reviews and introducing further regulations.

3. Sector-wide collaboration is crucial to effectively safeguard public interests and needs in society.

In the new ecosystem, public interests could come under pressure because of coordination failure, market failure, free-rider behaviour or transition bottlenecks. The problem of coordination failure, for example, occurs when the view on financial flows is hampered by the involvement of multiple service providers in the chain and the increased mobility of assets and customers themselves. Effective control of financial flows by providers of banking services must be ensured. Each service provider must therefore report fraud detection and know-your-customer issues so that customers rejected by one service provider are not accepted by another service provider and thus bypass the system. Cooperation in the field of transaction monitoring and the know-your-customer principle can help to reduce coordination failure. Market failure occurs when public interests such as the availability of banking services deteriorate because service providers focus only on the most profitable areas. There will be certain groups in society who will have problems accessing digital channels, and this may call for cooperation to service these groups. This applies, for example, to the availability and accessibility of cash. There is a strong public consensus that even if the use of cash is declining, it is important to society that cash continues to be available and that the system functions properly.[29] Free-rider behaviour can cause damage to public interests if investment in banking infrastructures lags behind because individual providers make use of the underlying systems but do not contribute proportionally to them. This problem grows when the costs for an increasing number of individual service providers outweigh the benefits of maintaining them. Finally, transformation bottlenecks occur in relation to the challenge of making society more sustainable. To break through the 'inertia' of the existing system, all service providers in the financial sector must work towards agreements on standardisation, accountability and prioritisation in issues relating to sustainable financing.

Specific policy conclusions:

- Collaborative initiatives on cyber security, know-your-customer requirements and transaction monitoring can reinforce the effectiveness and efficiency of anti-fraud and anti-money

29 Reaffirmed in the meeting of the National Forum on the Payment System on 27 November 2019, Results from the NFPS meeting of 27 November 2019.

laundering measures.[30] DNB's underlying principle is that it is interested in such cooperation that includes the regulation of governance, responsibilities and data protection and the prevention of unfair competition. To maximise effectiveness, cooperation should be broad-based so that new service providers can join in. Cooperation clearly does not alter the fact that institutions remain responsible for ensuring that their own know-your-customer and anti-money laundering measures are adequate.

- Everything must be done to prevent vulnerable groups in society having access to a minimum services level only. Traditional banks are taking their responsibility in this respect, but this is less evident among new service providers, which has led to an uneven playing field. They will also be called to account for this. If moral suasion becomes less effective in the future ecosystem, more regulation may be needed.
- Ongoing investment in a strong and stable banking infrastructure is essential. If the infrastructure comes under pressure from free-rider behaviour, regulation may be needed. This could include introducing a fee for the use of infrastructure. There is social consensus that the cash infrastructure must also remain adequate.

30 The project to improve cyber resilience is Tiber (Threat Intelligence Based Ethical Red Teaming). Hacking tests at financial institutions are undertaken to make the core financial infrastructure more resilient by learning from best practices.

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