

DNB Research programme 2013

The DNB Research programme 2013 has four thematic themes:

1. *Monetary strategy, business cycles, and price stability;*
2. *Financial stability and macro-prudential supervision;*
3. *Micro-prudential supervision and conduct of financial institutions; and*
4. *Financial literacy and behaviour of households and companies.*

The focus on the themes listed below does not mean that *all* research should fit into these thematic themes. A substantial part of research capacity will continue to be directed towards modelling (Delfi, our macro model of the Dutch economy, and Dcube, our DSGE model) and forecasting. That is why the fifth theme in the DNB Research programme is:

5. *Modelling and forecasting.*

In 2013, DNB will publish a document outlining its view on the use of econometric models in policymaking.

As part of our increased emphasis on modelling the interaction between the real and financial sectors, in 2013 a major effort will be made to include this interaction better in both models. A taskforce under the leadership of Maarten van Rooij will be responsible for further developing Delfi. The primary ambition for our DSGE model in 2013 is to introduce a financial friction into the model in order to capture the interaction between the real and financial sectors of the Dutch economy in a meaningful way.

Also several specific projects in the DNB research programme 2013 focus on the interaction between the real and financial sectors.

As follows from the specific projects for 2013 (as listed below), the distribution of research time across the various themes is non-proportional.

The research projects for 2013 are listed below. Some fit into more than one theme.

Research projects 2013

1. Monetary strategy, business cycles and price stability

The optimal tenure length for MPC members (project started in 2012)

Jan Marc Berk, Beata K. Bierut

We construct a model exploiting trade-offs in a longer tenure and a lower turnover of MPC members: a higher potential for information sharing and learning on the one hand and a higher homogeneity and a lower inflow of new ideas and heuristics on the other hand. The modelling will be done combining macroeconomic elements (inflation and output dynamics in the economy) with committee decision-making elements (such as the MPC size and members' characteristics). The outcomes should allow us to link the optimal tenure on the MPC both with the underlying characteristics of the economy and with the characteristics the MPC and its decision-making processes. The final element will be the empirical verification of the theoretical hypotheses.

Capital market frictions and aggregate fluctuations

Roberta Cardani (University of Parma), Andrea Colciago, Pierre Lafourcade

We develop a DSGE model characterized by frictions in the market for capital. Frictions are modelled in a way similar to that commonly assumed in the labour search literature. We adopt a matching function which combines households' savings with the amount of capital demanded by firms. This delivers an endogenous price of investment and an endogenous aggregate leverage. We plan to study (i) the conditions for efficiency of the allocation in the presence of search frictions in the market for capital; (ii) the cyclical properties of the main macroeconomic variables in response to shocks, in particular in response to a shock to the efficiency of the matching process in the capital market.

Who creates jobs over the business cycle?

Andrea Colciago, Antonella Trigari (Bocconi)

We will analyze the business cycle dynamics of job creation (JC) and job destruction (JD) by different categories of firms, grouped according to size, age and other criteria. Next we will quantify the contribution to overall JC and JD variability over the business cycle and decompose it between the variability due to each category. To give an example, we plan to identify the cyclicity and variability of JC and JD by new firms versus that played established firms and will assess their contribution to overall JC and JD variability. Initially we will focus on the U.S. adopting the rich dataset provided by the Business Employment Dynamics (BED) program. BED consists of a quarterly series of statistics on gross job gains and gross job losses. Gross job gains and gross job losses reveal some aspects of business dynamics, including establishment openings and closings and establishment expansions and contractions. The micro data used to construct the gross job gains and gross job losses statistics are from the Quarterly Census of Employment and Wages (QCEW), or ES-202, program. These data include all establishments subject to State unemployment insurance laws and Federal agencies subject to the Unemployment Compensation for Federal Employees program. Subject to data availability, we also plan to provide empirical evidence at an international level.

Communication about unconventional monetary policy (project started in 2012)

Jakob de Haan, Jan-Egbert Sturm (ETH, Zürich), David-Jan Jansen

We examine communication by the Federal Reserve, the Bank of England, and the ECB about unconventional monetary policy measures. We focus on the announcement effect on financial markets. Following the standard literature on exchange rate interventions, we use event-studies to analyze the response of financial markets participants to communication, rumours and actual purchases. An important question is whether the announcement effect has decreased over time.

Cyclical changes in firm volatility

Emmanuel De Veirman, Andrew Levin (Federal Reserve Board and International Monetary Fund)

This paper characterizes the evolution of firm-level volatility in the United States over the course of the business cycle. The macroeconomic importance of firm volatility is embedded in the latest models focusing on financial frictions as well as the latest models focusing on firms' pricing decisions. In models with financial frictions, an increase in firm volatility implies an increase in the cost of credit, which can cause a recession. In models where firms can freely adjust their price at any time, an increase in firm volatility implies that firms change their prices more frequently. Therefore, when firms are more volatile, macroeconomic shocks –like changes in monetary policy– affect inflation more quickly. Most empirical evidence on how firm-level sales and employment volatility actually changes over time measures trends in firm volatility but does not indicate changes in firm volatility at business cycle frequencies. Having a cyclical measure of firm volatility is essential to test the above-mentioned theories. We therefore estimate a cyclical measure of firm volatility. We find that firm volatility increases during prolonged periods of economic growth. This can mean that firms take more risk if they haven't experienced a negative shock for some time. We also find that increasing firm volatility before 2001 may have contributed to the 2001 recession.

Switching between time and state dependent pricing: consequences for international price level differentials (project started in 2012)

Marco Hoeberichts, Ad Stokman

Shocks may create adverse effects for price differentials between countries. On the one hand, shocks like oil price rises or increases in exchange rate volatility may affect the distance between countries, thereby stimulating price discriminating practices across the border. As a result prices differentials between countries will rise. On the other hand, shocks might give rise to reconsidering the appropriateness of one's prices relative to competitors. Common shocks may cause price changes to be synchronized by strategic intermediate goods producers that anticipate and respond to their competitors' actions. Under such circumstance, companies switch from time-dependent pricing to state dependent pricing, and price differentials will shrink. In this paper we investigate the impact of three types of common shocks for price level differentials between European countries. The shocks we consider are changes in the business cycle position, changes in the level of exchange rate volatility and oil price shocks. The analysis is based on half a century of absolute price level data for 11 EMU member countries.

Does clear central bank communication on inflation reduce volatility in financial markets?

David-Jan Jansen, Ales Bulir (IMF), Martin Cihak (World Bank).

This paper studies the relationship between clarity of central bank communication about inflation and volatility in financial markets. Central banks have, over the recent decade, increasingly made use of communication. Few papers have so far studied to what extent the quality of central bank communication is relevant. This paper uses inflation reports and statements by various central banks to investigate the effect of textual clarity of communications on inflation outlook on volatility of bond markets and stock markets.

FDI and international business cycle synchronization: a structural analysis (project started in 2012)

Jos Jansen, Ad Stokman

Building on our earlier work, our paper aims to increase our understanding how deeper FDI relations may enhance business cycle co-movement, directly and indirectly. To this end, we plan to carry out an empirical analysis along the lines of Imbs (2004), exploring the structural relationships between FDI, international trade, financial integration, specialization and the similarity of economic structures and policies. The results of this project may serve as stepping-stones to the ultimate goal of including FDI into current macroeconomic structural models as a separate channel of international transmission (next to international trade and financial linkages).

Competitive devaluation and relative prices in Europe (project started in 2012)

Ad Stokman, Marco Hoeberichts

Some peripheral countries in EMU have difficulties in competing in international markets. Before EMU, these countries sometimes devalued their currencies to restore competitiveness. In the longer run, a devaluation of the home currency also leads to higher inflation through a higher price of imports. Our dataset covering 50 years of absolute price-level data for eleven EMU countries enables us to analyze the effect of devaluations on relative prices in the short and in the long run. We aim to shed light on the question for how long currency devaluations help competitiveness and whether in the long run, devaluations maybe harm competitiveness instead of improving it.

Unconventional monetary policy of the ECB during the financial crisis: An assessment and new evidence

Christiaan Pattipeilohy, Jan Willem van den End, Jon Frost, Jakob de Haan

We first sketch how central banks have used unconventional monetary policy measures by using three indicators based on the composition of the balance sheet of eleven central banks. Next, we take stock of research analysing the effects of unconventional monetary policy of the ECB after the onset of the crisis. A crucial question is to what extent these measures have been able to affect interest rates, thereby restoring the monetary policy transmission process and supporting the central bank objectives. Finally, we offer new evidence on the effectiveness of the ECB's unconventional monetary policy measures, i.e. extended liquidity provision (LTRO) and the Securities Market Programme (SMP).

2. Financial stability and macro-prudential supervision

Housing markets and heterogenous agent models (project started in 2012)

Wilko Bolt, Maria Demertzis, Cees Diks (UvA), Marco van der Leij (UvA)

This research project falls within the DNB project on Complexity undertaken in collaboration with CeNDEF, at the University of Amsterdam. This project was set up as a result of the economic crisis and is aiming at looking at new tools that capture better existing non-linearities in the system than our current models do. The housing market is a very appropriate example for these techniques, both because it is subject to abrupt stops as a result of changes in confidence, as well as being crucially important in driving the business cycle. The objective is to help identify bubbles in the market and depending on how rigorous these techniques are, also contribute an early warning mechanism for the policy makers to use. Building on our previous DNB working paper, in the current setup we aim to extend our model by accounting for a number of other variables, including interest rate costs (mortgage costs) as well institutional aspects that dominate the differences between countries (fiscal treatment of home ownership). In this respect we would also like to estimate our model for a number of additional countries, including the UK and Switzerland.

Impact of innovation on retail payments pricing (project started in 2012)

Wilko Bolt, Heiko Schmiedel (ECB)

This project aims at analysing consequences of innovation in the retail payment landscape regarding pricing decisions, competition, and adoption of new electronic payments. An important question arises whether conventional balancing mechanism using interchange fees, e.g. card payments, will also apply to the emerging modern (online) and competitive payment space. Important aspects to be considered in such analysis may include: the use of interchange fees and surcharges, the role of public authorities, infrastructures and network effects, incentives, barriers of entry and competition, and effects on overall social welfare. Building on previous work by Bolt and Schmiedel (2011) and Bolt, Foote and Schmiedel (2011) on competition and efficient pricing in payment card markets, a novelty is that the paper allows for incorporating the impact of innovation and new technologies on payment prices, cost sharing, and distribution of benefits and overall economic welfare.

Early warning for currency crises: what is the role of financial openness?

John Frost, Ayako Saiki

We explore the role of financial openness – capital account openness and gross capital inflows – and a

newly constructed gravity-based contagion index to assess the importance of these factors in the run-up to currency crises. Using a quarterly data set of 46 advanced and emerging market economies (EMEs) during the period 1975Q1-2011Q4, we estimate a multi-variable probit model including in the post-Lehman period. Our key findings are as follows. First, capital account openness is a robust indicator, reducing the probability of currency crisis for advanced economies, but less so for EMEs. Second, surges in gross (but not net) capital inflows in general increase the risk of a currency crisis, but looking at a disaggregated level, gross portfolio flows increase the risk of a currency crisis for advanced economies, whereas gross FDI inflows decrease the risk of a crisis for EMEs. Third, contagion has a very strong impact, consistent with the past literature, especially during the post-Lehman shock episode. Last, our model performs well out-of-sample, confirming that early warning models were helpful in judging relative vulnerability of countries during and since the Lehman crisis.

Financial globalization or global financialization? The impact of capital flows on credit and crises

Jon Frost, Ruben van Tilburg

Rising cross-border capital flows and the increasing size of national financial sectors are both a reality and a policy challenge. This project empirically examines the impact of capital flows on credit growth, credit excesses and banking crises in advanced (AEs) and emerging market economies (EMEs). We use panel data on a number of macroeconomic indicators, capital flows, domestic credit, “credit gap” (i.e. deviation of credit to GDP from a slow-moving trend) and banking crises (defined using Laeven and Valencia, 2012). Correlations confirm the finding that total gross inflows are associated with strong credit growth, and that especially portfolio and other flows are pro-cyclical, co-moving with GDP growth. Regressions look at the extent to which capital inflows and other factors precede credit growth and credit excesses. Going one step further, we look at the relative importance of capital flows and credit excesses for banking crises in a two-step regression. Decomposing credit gaps into components explained by domestic factors, capital flows and a residual allows us to study whether domestic or international drivers more frequently precede banking crises. The goal is to understand whether “financial globalization” or “global financialization”, i.e. the build-up of excessive domestic (credit) intermediation in countries around the world, is a stronger indicator of bank crises.

A theory of bazookas, or “how to design large-scale official support”

Jon Frost

This project aims to develop a theoretical model for “big bazookas”, a term coined by US Treasury Secretary Hank Paulson in the immediate pre-Lehman period. The intention behind such support funds is to provide so much available financing (“firepower”) as to trigger a complementary market reaction, in turn reducing the probability that support will actually have to be used. At the same time, such support could be posited to have a number of other effects, including borrower and creditor moral hazard. Based on the post-crisis archetypes of official support, we construct a simple theoretical model of a deep-pocketed (sovereign or multilateral) creditor and distressed (private or sovereign) borrower. With a number of simple parameters, we attempt to formalize the conditions under which a “bazooka” will be credible enough to have the desired market effects. Among other things, we examine the size of official support funds compared to potential borrowing needs; the creditworthiness of (sovereign or multilateral) financiers; the conditions under which support is available; and the pricing of support. These parameters are assessed not only based on the (short-term) market reaction, but on the (longer-term) consequences for crisis prevention and moral hazard.

Real and financial cycles

Gabriele Galati, Irma Hindrayanto, Siem Jan Koopman (VU University)

The goal of this project is to examine the statistical properties of the financial cycle and its relationship with the business cycle. The focus is on the following questions: To what extent can financial cycles be described by the behavior of credit and property prices? To what extent does the frequency of the financial cycle differ from that of the business cycle? Has it changed over time? And has the ratio of the two frequencies changed? Is the amplitude and length of the financial cycle regime-dependent? What is the match between peaks in financial cycles and financial crises? To address these questions,

we plan to look at a panel of data on macroeconomic and financial variables for a selected group of industrial and (subject to data availability) emerging market countries over the past decades. Techniques such as the time-varying multivariate model-based bandpass filter provide useful econometric approaches to characterize the time-varying cyclical characteristics.

Financial crises and macroeconomic performance (project started in 2011)

Gabriele Galati, Chen Zhou

There is a need to improve analytical tools that allow us to make realistic assessments of risks in the financial system and their impact on the macro economy. An important aspect is to investigate empirical relationships between financial crises and macroeconomic performance. This research paper aims at verifying the existence of changes in the distribution of financial variables over time. In the extreme value literature, these changes can be classified into three categories: changes in shift, in scale or in shape. A change in *shift* would reflect the influence of time-varying factors. A change in *scale* could be interpreted as a change in underlying risk, to the extent that movements in explanatory factors translate into movements in the variance/scale of financial variables, which change the risk propositionally. Such a change may influence both the frequency and the magnitude of a crisis if one fixes the magnitude/frequency in the definition of a crisis. In the case of a change of the third type – in the *shape* parameter – the relation between magnitude and frequency of crises is affected. This research project aims at identifying the relative importance of possible changes of each type, and tries to relate their occurrence to structural changes in the properties of macroeconomic variables.

What determines the size of the fiscal multiplier? A literature review (project started in 2012)

Niels Gilbert, Jakob de Haan, Pierre Lafourcade

During the crisis one of the central questions faced by economic policy makers was how much discretionary stimulus would do to boost their economy. Currently, the main question is to what extent fiscal consolidation is likely to hurt growth. The usual way to estimate the effects of fiscal policy on the real economy is through the use of fiscal multipliers. The economic literature however struggles to come up with reliable estimates of the multiplier. In much of the empirical work estimates vary all over the place, in part because most studies ignore the multipliers' state dependency. The crisis however sparked a great deal of new work. The realization came that *the* multiplier does not exist, and that multiplier values are instead highly dependent on for instance the monetary policy regime. In this article we will survey the recent literature, and try to answer the question: what determines the size of the fiscal multiplier?

Central bank's influence in solving disruptions in RTGS: an experimental approach (project started in 2011)

Peter Heemeijer (UvA and ABN AMRO), Ronald Heijmans

This paper builds on the experiment conducted by Abbink, Bosman, Heijmans and Van Winden (2010). Their paper conducts a laboratory experiment based the game theoretical model by Bech and Garrat (2006). Their paper used disruptions to investigate how the dynamics of a game can change from a desired equilibrium to an inefficient one but excludes the influence of an authority like a central bank. This paper builds upon this work but includes the influence of the authority by changing the pay off of the game or the information level within the game. The experiment is conducted in laboratory at CREED (UvA).

Financial sector development and external shocks in small open economies (project started in 2012)

Steven Poelhke, Thorsten Beck (Tilburg University)

Sustained and stable real economic growth is most countries' ultimate goal. In theory, financial sector development should be able to smooth fluctuations. In practise, this is not always true. To what extent is the financial sector able to smooth shocks in small open economies, and what are the sector characteristics that constrain this function? What limits pro-cyclical lending by banks and credit booms in general? The paper will combine aggregate data with data on individual banks and firms and

examine exogenous external shocks. In addition, the paper will examine the influence of the degree of competition and regulation in the banking sector and the political connectedness of firms.

Systemic risk allocation in systems with a small number of banks

Xiao Qin (Shanghai Jiao Tong University), Chen Zhou

To establish a safe net for a financial system, an important issue is to allocate the total systemic risk to individual institutions in an accessible way. Acharya et al. (2010) proposes the marginal expected shortfall (MES) as a measure of systemic risk for individual financial institutions. The theoretical construction of the MES provides an automatic allocation feature: the aggregation of individual MES is equal to the total systemic risk defined by system expected shortfall. However, the estimation strategy proposed in that paper suffers from two drawbacks. Firstly, the estimated MES does not preserve the allocation feature. Secondly, the estimation strategy is valid only if the system contains a large number of banks. This project intends to develop an alternative estimation procedure for the MES based on multivariate extreme value theory. The alternative procedure overcomes the two drawbacks. Thus it can be considered as a systemic risk allocation procedure in systems with large or small number of banks. We intend to apply the method to the global systemically important financial institutions (G-SIFIs) released by the Financial Stability Board (FSB). We will further analyze whether the G-SIFIs contribute to the global systemic risk equally, or proportionally to their own characteristics such as size and individual risk.

Systemic risk decomposition: individual risk and systemic impact

Nikola Tarashev (BIS), Chen Zhou

The failure of a single financial institution can impose material losses on its own creditors but can also trigger generalised losses in financial system. This could be attributed to: 1) excessive risk-taking of the institution, 2) the failure of the institution has a strong systemic impact to the rest of the system. Thus, regulation that targets financial stability should be designed to limit both the riskiness of individual institutions and the inter-linkages among them. A negative relationship between individual riskiness and systemic impact would pose challenges for policy makers. Such a relationship would imply that a policy tool that reduces system-wide risk along one dimension would raise system-wide risk along another dimension. Indeed, Wagner (2010) illustrates in a theoretical context that a reduction of individual riskiness through diversification would lead to greater interconnectedness through common exposure. In the proposed study, we will first construct market-based indicator to measure the extent to which a bank contributes to system-wide risk. Then we intend to separate the bank's contribution into a component related to its individual riskiness and a component related to its systemic impact. One novel aspect of the project would be the decomposing methodology. Based on the decomposition, we can test empirically how the two components interact both within a cross-section of banks and over time.

Credit availability for Dutch homebuyers

Alex van de Minne (UvA), Johan Verbruggen

It is widely perceived that credit supply conditions faced by Dutch home buyers have been liberalized in the nineties, with strong implications for credit availability and house prices. To understand the development of house prices in the Netherlands in the last decades, insight into credit availability to homebuyers is essential. However, long time series for credit availability and credit supply conditions in the Netherlands are lacking. This project in cooperation with the University of Amsterdam tries to fill in this gap, by constructing a Credit Conditions Index (CCI) and Financial Liberalization Index (FLIB), based on an earlier empirical analysis of the Bank of England. The outcomes might contribute to improve forecasting the Dutch house price development in general and the impact of institutional changes to house prices in particular.

A macroprudential approach to address liquidity risk with the Loan-to-deposit ratio

Jan Willem van den End

This paper maps the empirical features of the Loan-to-Deposit (LTD) ratio with an eye on using it in

macroprudential policy to mitigate liquidity risk. We inspect the LTD trends and cycles of 11 euro area countries by filtering methods and analyze the interaction between loans and deposits by a panel VAR model. We propose that the trend of the LTD ratio is remained within an upper and lower bound to avoid bad equilibria. To prevent destabilizing upward and downward cycles in the LTD ratio we formulate two macroprudential rules. They stimulate banks to issue retail deposits in an upturn and create loanable funds to support lending in a downturn, facilitated by a sufficiently long adjustment period.

The impact of sovereign debt exposure on bank lending: Evidence from the European debt crisis
Neeltje van Hooren, Alexander Popov (ECB)

This paper studies the international transmission of tensions in sovereign debt markets to the real economy through the channel of bank lending. We examine the lending behaviour of 60 large European banks during the sovereign debt crisis. Using data from the EBA stress tests on sovereign exposure we determine for each bank in our sample its exposure to foreign sovereigns in general and GIIPS sovereigns in particular. Using data from the syndicated loan market we then examine whether increases in foreign sovereign risk (as measured by the CDS) to which the bank is exposed has a negative effect on lending by that bank. We subsequently examine whether a reduction in lending is mainly resulting from a withdrawal from cross-border lending or whether domestic borrowers are also affected. Furthermore, we test whether banks located in the periphery were acting differently compared to those located in the core of Europe. Our detailed loan level data allow us to isolate the impact of exposure to impaired sovereign debt on bank lending from other factors that might affect bank lending during the sovereign debt crisis such as the reduced capacity of domestic sovereigns to support the banking sector, changes in borrower demand and/or quality, or other types of shocks that concurrently affect bank balance sheets.

Credit and liquidity risk pricing in interbank markets (project started in 2011)
Iman van Lelyveld

Banks are inherently fragile institutions making them susceptible to bank runs when liquidity issues emerge, even though the bank might be solvent. Further, banks operate in a network with other banks. The state of this network will influence bank's behaviour and vice versa. Taken together this would mean that market participants would be quite keen to price counterparty risks correctly. We want to study the pricing behaviour of Dutch banks observed in the interbank market. Such pricing information, gleaned from payments streams, would reveal something about banks' view on the riskiness of their counter parties and the risks surrounding scarce liquidity. This can then be compared to both public (credit spreads observed) and private information (collateral banks have available). Understanding market behaviour is crucial for effective supervision and regulation. We would be able to contribute to the literature on risk assessment and price setting. A better understanding in this respect would allow us to develop (early) warning indicators of risks building up in the system. We use data from Heijmans *et al.* (2010). The algorithm developed links payments going out with a return stream consisting of the notional and the associated interest payment. We would then compare the private pricing information with publicly available risk measures and communication signals. Quoted bid-ask spreads (collected from Bloomberg) could, for instance, provide a 'public face' that could be compared with the private information contained in the bilateral prices.

The sensitivity of banks to system shocks (project started in 2011)
Maarten van Oordt, Chen Zhou, Valerie de Bruykere (University of Gent)

In this paper, we plan to use the methodology from 'Systematic Risk under Extremely Adverse Market Conditions' in order to measure which banks are more sensitive to severe shocks in the banking system. Subsequently, we will try to find the bank characteristics that can explain and/or forecast this sensitivity. The analysis may provide a better understanding and forecasting ability on which banks are more sensitive to severe shocks in the banking system.

Identifying the determinants of competitiveness: A value added trade share perspective

Robert Vermeulen, Martin Schmitz (ECB)

This project investigates the country level determinants of the gains from trade. Countries have different positions in the global value chain. What ultimately determines the gains from trade is the value added a country adds to a product and not necessarily its export growth per se. Because the value added content of exports is not a reported number we calculate it from the World Input-Output Database to estimate the value added a country gains by trading for 40 countries during 1995-2009. We empirically explain the change in the value added trade share by different (socio-)economic variables. These variables are based on previous literature explaining export growth. The outcomes can identify the important variables explaining value added trade growth. These can potentially provide policy makers with variables to target when aiming to improve the country's position in the value added chain. We also investigate the effect of FDI on value added trade growth. Do firms offshore the low of high value added part of the production chain?

Collective strategic defaults: Bailouts and repayment incentives (project started in 2011)
Razvan Vlahu

This paper shows that under a global games approach banks may be subject to risk of failure even when fundamentals are strong due to a coordination problem among debtors. As a result of collective strategic default a financially sound firm may claim inability to repay if it expects a sufficient number of other firms to do so as well, thus reducing bank's enforcement ability. This occurs in particular when financial environment is characterized by a poor quality of corporate sector. The paper provides a model in which participants take simultaneous actions on the basis of imprecise private signals about the ratio of bad loans in bank portfolio. The model has a unique equilibrium in which an attack against the bank occurs when the fundamentals are above a threshold level. The model also helps us understand the role of the Central Bank as a Lender of Last Resort under opportunistic behaviour from borrowers. While an ex-post bailout policy is often believed to reduce bank incentives, in this case it induces commercial banks to affect loan quality, which indirectly reduces incentives for strategic default. Within this framework we argue that the marginal cost of intervention incurred by Central Bank has a double-edge effect. While a higher cost helps to mitigate the moral hazard problem at the bank level by determining it to exert maximum of effort even when fundamentals are strong, it also increase the probability of bank failure by lowering the threshold that triggers collective strategic default. We also find that high bank expected profitability reduces the likelihood of collective strategic default.

Systemic risk decomposition: individual risk and systemic impact
Chen Zhou, Nikola Tarashev (BIS)

The failure of a single financial institution can impose material losses on its own creditors but can also trigger generalised losses in financial system. This could be attributed to: 1) excessive risk-taking of the institution, 2) the failure of the institution has a strong systemic impact to the rest of the system. Thus, regulation that targets financial stability should be designed to limit both the riskiness of individual institutions and the inter-linkages among them. A negative relationship between individual riskiness and systemic impact would pose challenges for policy makers. Such a relationship would imply that a policy tool that reduces system-wide risk along one dimension would raise system-wide risk along another dimension. In the proposed study, we will first construct market-based indicator to measure the extent to which a bank contributes to system-wide risk. Then we intend to separate the bank's contribution into a component related to its individual riskiness and a component related to its systemic impact. One novel aspect of the project would be the decomposing methodology. Based on the decomposition, we can test empirically how the two components interact both within a cross-section of banks and over time. We take a three-step approach. The first step is to quantify the risk one financial institution pose to the system, in other words, to define a measure of "systemic risk contribution" for a particular financial institution. We adopt the conceptualization of systemic risk contribution as in Huang et al. (2011), but will employ different empirical strategy in the estimation procedure. In the second step, we will decompose each bank's contribution to systemic risk into its individual riskiness and systemic impact. The measure of systemic impact should only reflect the

interconnectedness of the bank to the rest of the system without containing information on the individual risk. With the decomposition, the third step will empirically test whether the two components are negatively. The empirical tests will be conducted on both the cross-sectional level (i.e. across different banks) and the time-dimension (i.e. the changes over time). An additional extension is to investigate which bank characteristics are associated to each source of systemic risk.

3. Micro-prudential supervision and conduct of financial institutions

Bank hierarchies and risk taking (project started in 2011)

Itai Agur (IMF), Wilko Bolt, Chen Yeh (LSE)

This paper investigates the relationship between the hierarchical framework of a bank and its overall risk taking behaviour. A CEO divides funds among self-interested division managers. To elicit behaviour from them that is as close as possible to wider bank interests, the CEO designs their contracts. However, he has limited information on the type of investment opportunities that division heads have. Intra-bank competition for funds is shown to exacerbate bank risk taking. The paper proceeds to investigate how bank hierarchies affect optimal bank regulation.

The impact of bank creditworthiness on savings' interest rates: The effect of the financial crisis

Jaap Bikker, Dirk Gerritsen (University of Utrecht), Steffie Schwillens

The credit crisis has shown that holding bank deposits is not without risk. This has been experienced by professional investors (for example the province of North Holland has held deposits at Landsbanki) and by private savers (DSB Bank). Both banks were well known for their relatively high interest rates on savings accounts but savers did not seem to be aware of a potential risk-return relationship. Our paper will investigate the determinants of the interest rates on bank savings. Many factors determine interest rates on bank savings, among which the market conditions (particularly market rates), bank conditions (the need of banks for liquidity, the size of the bank and also its creditworthiness), and the conditions of the savings or current account. A second angle of our paper is the impact of the credit and government debt crises on these determinants. Did the role of creditworthiness increase? Did the impact of the size of the bank on the interest rates rise when it became clear that the large banks were too-big-to-fail? This paper focuses on the impact of these determinants and the change in their role over time. We use a unique dataset that comprises daily interest rates on saving accounts (2003-2011) and term deposits (2008-2011) of all Dutch banks. The dataset also contains information on the specific conditions of each account. This data set is complemented with market and bank related data from the ECB, S&P, Moody's, DataStream and with supervisory information from DNB. This dataset enables us to combine market, bank-specific, and account-specific data.

Efficiency and competition in the Dutch non-life insurance industry: effects of the 2006 health care reform

Jaap Bikker, Adelina Popescu (University of Utrecht)

This project will investigate the cost efficiency of Dutch non-life insurers and competitive behaviour of the non-life insurance market in the Netherlands over the period 1995-2010. The possible existence of unused scale economies may indicate the need for consolidation. We will particularly invest developments over time and consider each of the five different lines of business separately. Further investigation into submarket is a requirement in order to reveal appropriate targeted policy measures. We focus on the introduction of the new health insurance in 2006. Is it more efficient? Do health insurers compete stronger than before 2006? Measurement approaches with respect to competition and efficiency are restricted by data availability, e.g. lack of input and output prices and detailed cost figures. This paper measures efficiency by unused scale economies and competition by a new Performance-Conduct-Structure (PCS) indicator. Competition and efficiency complement each other as heavy competition forces insurers to increase efficiency. The estimation of scale economies allows comparisons with other countries. Both approaches enable measurement of developments over time, particular the PCS indicator allows annual estimates.

Regular equivalence in interbank markets (project started in 2012)

Wilko Bolt, Rod Garratt (UCSB), Iman van Lelyveld

Identifying classes of institutions that respond in a similar way to shocks or policy changes is of key interest. Two institutions that perform a very similar function in a financial system, and hence should be regarded as similar by a regulator, may not be connected at all. In fact, it is precisely this functional similarity that might preclude their interaction with each other. In a strong notion of equivalence, nodes in a network need to be connected to the same neighbouring nodes. We consider a less restrictive notion of equivalence called regular equivalence. Regularly equivalent nodes do not necessarily have the same neighbours, but their neighbours must be regularly equivalent. So, institutions are grouped together if they interact with other institutions that perform the same function. They do not have to interact with the same institutions. We intend to apply the notion of regular equivalence to the unsecured interbank money market using TARGET data. Our first task will be to compare the partitioning of banks generated by regular equivalence to that obtained by a connectionist approach. We will then examine whether our structural classification can be used to predict responses to shocks or policy changes. The classification could be useful for justifying differential regulation of subsets of banks.

Liquidity regulation and lending to non-financial institutions

Clemens Bonner

In December 2010 the BCBS proposed the Liquidity Coverage Ratio (LCR), a short-term ratio which requires financial institutions to hold high quality liquid assets to meet short-term obligations which are caused by sudden liquidity disruptions. While the purpose of the LCR is straightforward, both its exact setup and the induced side effects are still controversial. The holding of highly liquid but low return assets increases banks' operating costs, which are likely to be passed on to clients: Tighter lending standards, higher lending rates and active shedding of loans are the consequences. Using the Dutch liquidity rule 8028 as proxy of the LCR, I seek to add empirical evidence to the discussion about potential impacts of the LCR. I am combining data of the Dutch quantitative liquidity rule 8028 with data on lending from DNB's socio-economic reporting which is collected for the monetary statistics of the Eurosystem. I apply fixed effects panel estimations and use a dummy for the fulfilment of the 8028, seeking to analyse whether a binding liquidity requirement determines lending.

Regulation of nominal and real pension contracts

Dirk Broeders, David Rijsbergen

The Netherlands have a long tradition with collective pension arrangements. The pension system currently is going through one of its biggest modifications ever. A key element of redesigning the pension system is a new Financial Assessment Framework (FTK). Distinctive to the new FTK is that pension funds can choose in the future between two types of contracts: the nominal contract and the real contract. Both contracts must provide in advance how the risk sharing across stakeholders will be established. The nominal contract will need to have a complete set of policy ladders. The real contract needs to have a mechanism for absorbing financial shocks and a mechanism for absorbing shocks in life expectancy. The aim of this paper is to describe the key principles behind pension regulation, the instruments of regulation and their applicability for different contracts. At the two extremes of a scale we identify nominal contracts with a "hard" guarantee versus real pension contracts with a "soft" defined ambition. In the first case regulation focuses on solvency requirements. In the second case regulation should focus heavily on the communication of the scheme to its participants. This paper is relevant for the contemporary discussion in the Netherlands regarding the new pension contract and regulation, which present an even stronger focus on real pension benefits.

Interbank lending behaviour under stress and the role of the central bank (project started in 2012)

Leo de Haan, Ronald Heijmans, Richard Heuver, Jan Willem van den End

Heijmans and Heuver (2011) show how daily TARGET2 transaction and collateral data can be used to generate graphic representations of individual banks' behavioural patterns in the Dutch part of the

(unsecured) interbank money market. Lending to and borrowing from other banks, borrowing from and depositing at the central bank, the use and build-up of collateral, and payment delays may indicate that a particular bank is in distress. These signals in turn may affect other banks' behaviour with respect to that bank, in terms of volumes and prices for interbank lending to that bank. As a follow-up to that exploratory paper, we proceed by subjecting these and other behavioural patterns and relations to a number of econometric tests. We examine how a change in behaviour of one stressed bank prompts other banks to change their behaviour towards that bank as well, thereby taking into account both the role of the central bank in the money market and individual bank characteristics. We pay attention to possible interactions with the Basle III framework for bank liquidity. We first undertake this research for the Dutch part of TARGET2, with the aim to extend the analysis to the European banking sector.

Do banks manage earnings, risk, or both?

Abe de Jong (RSM), Lars Norden (RSM), Anamaria Stoian

Firms have various incentives to use accruals to manage their earnings. In banks, the most important type of accruals are the loan loss provisions. The latter should be used to recognize expected losses, while bank capital should serve as a buffer against unexpected losses. Banks' incentives to engage in earnings management depend on their governance structure and performance and may vary if the bank has positive or negative income or if the bank is capital constrained or not. If loan loss provisions are not used for loss recognition, bank capital has to absorb expected losses in addition to unexpected losses, potentially resulting in shortfalls in bank capital. Our study investigates banks' earnings management with loan loss provisions from an incentive perspective and sheds light on the general question whether banks manage earnings, risk, or both. We study banks' loan loss provisioning (LLP) behaviour and earnings management at Dutch banks during the period from 1998 to 2012 using quarterly supervisory data. For identification purposes, we take advantage of the fact that Dutch law stipulates that loan loss provisions are not included in Tier 2 capital under Basel I and the standardized approach under Basel II. Therefore, we can distinguish between banks' motives for managing earnings through accruals and relate these motives to their actual loan loss provisioning behaviour. To address our main question, we estimate panel data models and bank-specific time-series models to provide evidence on banks' earnings management and risk management behaviour. The analysis has policy implications for the effective regulation of banks' loan loss provisioning, which should take into account the incentives for earnings management and risk management.

Top management dilemmas: how accountability influences a focus on collective goals

Melanie de Waal

In response to the financial crisis a behavioural and cultural change starting at the *top* of financial organisations (i.e. at the board-level) is desired, which concerns a shift from short-term individual goals towards a focus on collective goals that serve financial organisations in the long run. To realize this change a call for more regulation on the financial sector is heard and to subsequently decrease risk taking behaviour at the top of financial organisations. This research project aims to investigate which factors play a role in stimulating this focus on organizational goals. Important in this regard are the dilemmas that top managers in financial organisations encounter when they have to choose between divisional goals these board members represent and the collective goals of the organisation. In such social dilemma situations accountability is seen as a silver bullet that can stimulate employees and teams to focus on the achievement of long-term collective goals, rather than on short-term individual gains. It is assumed that this focus will also reduce risk-taking behaviour of organisations. In 2012 a first study was performed to investigate this influence of accountability and specifically the accountability audience in relation to a focus on organizational goals. In 2013 a follow-up study will be prepared and conducted to further study this topic.

Why do firms face credit restrictions? The importance of firm, country and bank-sector characteristics

Jasper de Winter

This paper analyses the effects of firm, country and bank-sector characteristics on loan application and approval rate. The analysis uses firm-level data from the bi-annual survey on the access to finance of SMEs carried out by the European Central Bank that will be combined with characteristics of the domestic bank-sector and the economy at the country level. The proposed statistical method – a factor augmented fixed effects probit model – allows for simultaneous estimation of the impact of a large number of firm, country and bank-sector characteristics on the loan approval rate.

Measuring the effects of supervision in the financial sector

Paul Hilbers, David Rijsbergen, Femke de Vries, Karina Raaijmakers

The global financial crisis has raised questions concerning the performance of financial supervisors. Did they undertake all the necessary steps to prevent the crisis or could financial supervisors have done more? As their work is being scrutinised, financial supervisors need to become better at demonstrating that their efforts and actions lead to results. Measuring the effects of supervision must consequently become an integral part of the supervisory process. Not only will this promote external accountability, but also – and equally important – it will show whether supervisory actions have contributed to the desired results. This information is important in order to improve the supervisory process and to ensure that the correct priorities are set. Measuring effectiveness is not straightforward in financial supervisory practice. This is mainly due to the difficulty of proving causality, but also relates to the legal question of whether financial supervisors are allowed to report even general results of their interventions. As a result of these challenges, the development of performance measurement in financial supervision has long been in its early stages. The aim of this paper is to analyse performance measurement in the context of financial supervision. For that, we not only examine the challenges, but also investigate the opportunities for measuring the effects of financial supervision. We examine possible performance indicators at a strategic (e.g. public confidence), tactical (e.g. migration between supervisory regimes) and operational level. The paper develops a concrete set of indicators and analyses their impact on the objectives of financial sector supervision.

Losing trust in financial institutions: what matters, and when?

David-Jan Jansen, Robert Mosch (IMF), Carin van der Cruisen

We use two surveys among, conducted in 2010 and 2012, to investigate when people lose trust in financial institutions. To this end, we asked CentERpanel members to rate how various hypothetical events, related to aspect of culture and behaviour in the financial sector, would harm their trust in banks or insurance companies. We are interested in explaining both variation over time and in the cross-section. In particular, we test to what extent there are differences in short-term versus long-term effects of negative experiences with banks during the financial crisis.

An integrated framework for human decision-making and its application in financial supervision

Ashraf Khan

This paper presents a simple framework for human decision-making. It is designed to give insight into how and when humans accept or reject rules, both in the social, legal and market realm of norms. As such, it offers a first step to a more integrated approach of different social sciences and their respective explanations of human behaviour. This integrated approach has the advantage of “making more sense” of human behaviour from a perspective of (financial) supervisors. Though this paper does not present any results of empirical research, it does offer a number of topics (gaps) where further research could be conducted. It also offers concrete suggestions for (financial) supervisors and regulators, and companies alike, to integrate ideas on behaviour and culture in their own (corporate) policies. For structuring this paper and defining its theoretical contribution, I have followed Dubin’s building blocks for theory development, as described by Whetten (1989). The paper’s approach is descriptive and does not include any empirical research.

The absorption of talent into finance: Evidence from U.S. banking deregulation

Christane Kneer

The U.S. banking sector has grown substantially since the 1970s and has become more skill-intensive over time. I exploit the variation in banking deregulation across U.S. states between 1997 and 2008 to test whether the banking sector absorbs talent at the expense of the real sectors in the economy. I find that the relaxation of interstate branching restrictions disproportionately reduces the labour productivity of skill-intensive manufacturing industries. This result also holds if changes in bank lending following deregulation are controlled for. My findings suggest that banking deregulation increases the demand for skilled labour of banks. The diversion of skilled individuals into banks and away from real sectors leads to labour productivity declines especially in those industries which rely heavily on skilled labour.

Finance as a magnet for the best and brightest: Implications for the real economy
Christane Kneer

This paper examines how the absorption of talent into the financial sector affects the real sectors in the economy. Based on a sample of 13 countries observed over the period 1980-2005, I show that financial liberalization is associated with skill-upgrading in the financial sector. I exploit variation in financial liberalization across countries and time, and differences in the needs for skilled labour across manufacturing industries to identify the effect of the absorption of talent into finance on real sector outcomes. My evidence suggests that employment of skilled individuals grows disproportionately slower in skill-intensive relative to less skill-intensive industries following financial reform. I also show that financial liberalization decreases labour productivity, total factor productivity and value added growth disproportionately in industries which rely strongly on skilled labour. This is consistent with the idea that financial liberalization hurts non-financial sectors via a brain-drain effect. Among the different dimensions of financial liberalization, especially policies fostering the development of security markets account for this finding.

Determinants of bank stability throughout the 2007 – 2011 financial crisis (project started in 2012)
Mark Mink (FRB), Jakob de Haan

Demirgüç-Kunt et al. (2010) show that banks which entered the crisis with higher regulatory capital ratios turned out to be more stable and resilient to shocks, consistent with the objective of capital regulation. These regulatory capital ratios have remained remarkably stable throughout the crisis, and in many cases have even increased. This observation is at odds with market participants' perceptions of bank capital levels, which have worsened substantially as evidenced by the fact that bank stock prices have plummeted. As a result, the question arises to what extent market participants take into account banks' regulatory capital levels when evaluating their stability, and to what extent they attach value to other factors such as expectations of future profitability and the presence of (implicit) government safety nets. Our approach to analyse the determinants of bank stability is inspired by the regression framework by Stiroh (2006). In this framework, we can take into account variables reflecting regulatory capital ratios, the stance of the business cycle, and bank characteristics that are associated with the likelihood of receiving a bailout (such as size). By analysing the difference between the coefficients and the changes in coefficients over time, we can draw conclusions about the (potentially time-varying) importance of the various determinants of bank stability.

Suppliers to multinationals and local and global crises (project started in 2012)
Steven Poelhekke, Beata Javorcik (University of Oxford)

During the Asian financial crisis of the late 1990s, it was a good thing for a local firm to be (partially) foreign owned or an exporter, since global demand remained strong (especially after devaluation) and these firms were less dependent on the locally failing banking system. Also suppliers to multinationals tend to be less capital constrained. Export status or foreign owned status during a global crisis may, however, be less of a good thing due to weak global demand and (real and financial) contagion effects. How did suppliers to multinationals cope with the recent crisis? To what extent can (parent) MNEs substitute for banks?

Public trust in banks and their supervisor

Carin van der Crujssen, Jakob de Haan, David-Jan Jansen

Using a Dutch household panel survey, we research the development of public trust in banks and their supervisor. First, we show that trust has declined sharply during the recent crisis. Second, by using the outcomes of a detailed questionnaire, we shed more light why trust left on horseback. We expect that the decline in trust is relatively strong for those respondents that experienced that their own bank ran into problems, either by going bankrupt or by receiving government support.

The level effect of bank lending standards

Koen J.M. van der Veer, Marco Hoeberichts

This paper disentangles the impact of credit demand and supply factors on the growth rate of credit to businesses, using bank lending survey (BLS) data from Dutch banks. We find that tightening credit conditions have both a temporary and a permanent effect on credit growth. The permanent effect of tightened credit supply standards is a new element in the analysis of BLS data and has important consequences for bank lending (also in The Netherlands) after a prolonged period of tightening standards.

The role of a private trade credit insurer in the international transmission of shocks

Koen J.M. van der Veer

The role of trade finance, credit or insurance, in the decline of trade during crises has received much research attention since the global financial crisis and collapse of international trade in 2008-09. There is now convincing evidence that banks transmit financial shocks to exporters via a reduction in trade finance (Amiti and Weinstein, 2011). While banks are the principal suppliers of trade finance, a focus on banks exclusively could give an incomplete picture of trade finance constraints during a crisis. This paper assesses the role of private trade credit insurers during crises by being the first to examine empirically how a globally active private trade credit insurer reacts to loss shocks. I show that the private trade credit insurer transmits shocks across countries by reducing its supply of export credit insurance. This finding is particularly relevant for an export-oriented country such as The Netherlands. Moreover, DNB supervises Atradius; one of the "Big Three" private trade credit insurers with a combined share of 85% of the world market for private trade credit insurance.

How bank business model drive interest margins: Evidence from U.S. bank-level data

Saskia van Ewijk, Ivo Arnold (EUR, Nyenrode Business University)

Interest margins in developed banking sectors have experienced a steady decline during the past two decades. In explanation of this phenomenon, the literature describes a causality that runs from increased competition in the retail segments to lower margins to new activities. A common argument runs as follows: heightened competition and disintermediation depressed interest margins in traditional retail markets, motivating banks in developed countries to diversify into new lines of business in order to increase their non-interest income. This paper seeks to qualify the chain of causality running from competition to lower margins to new activities. We propose an alternative explanation for the decline in interest margins, which, in our view, better fits the empirical and narrative evidence on bank behavior in the run-up to the credit crisis. Using a comprehensive dataset with bank-level data on over 16,000 FDIC-insured U.S. commercial banks for a period ranging from 1992 to 2010, this paper tests whether a bank's business model is empirically important in explaining the size of bank interest margins in the United States. In doing so, we provide a more detailed and accurate description of the chain of causality leading to lower interest margins in developed banking industries than the one that is available now.

Branching out: Foreign bank entry and access to small business finance

Neeltje van Horen, Thorsten Beck (Tilburg University), Hans Degryse (University of Leuven), Ralph De Haas (EBRD)

This paper studies how foreign bank entry affects the ability of local firms, in particular small and medium-sized ones (SMEs), to access external finance. To do so we collected new data on the exact

geographical location of foreign and domestic banks' branch networks in 22 Eastern and Central European countries. Moreover, we measure how these branch networks develop over time through openings and closures, as well as mergers and acquisitions. This gives us a very detailed and rich picture of the dynamics of bank branch networks for domestic and foreign banks across and, importantly, within countries. We merge these data with information on firms' access to finance in 2005 and 2008, taken from the Business Environment and Enterprise Performance (BEEPS) survey. Using this unique micro-level database, we first examine whether the presence of a foreign bank branch in a firm's vicinity affects access to finance. Next we investigate which types of firms benefit more and whether country characteristics, like the availability of a credit registry, matter. Finally, we examine whether the mode of foreign bank entry (greenfield or M&A), the amount of time a bank branch has been present, and the functional distance within the bank matter for access to credit.

Contextual determinants of banks' liquid buffers (project started in 2010)
Iman van Lelyveld, Robert Zymek (BOE, Pompeu Fabra)

Banks' role in maturity transformation combined with a first-come, first serve constraint imply that banks are susceptible to bank runs and thus can suffer from – temporary – illiquidity. The supervisory community has realised this and is working hard in coming to a joint framework for liquidity regulation and supervision (see WGL (2009) for an overview of the state of play in the literature). Objections to such a common framework have been raised as 'contextual factors' would make it impossible to achieve a level playing field; The depth of the financial market, the quality of regulation and competition have for instance been mentioned as such factors (BCBS, 2008). This paper will examine the economic importance of many of the factors mentioned in the debate. We will provide the first formal analysis of the determinants of banks' liquid asset holdings across countries. Using balance-sheet data for nearly 7,000 banks from 30 OECD countries over a ten-year period, we will assess the relevance of a number of country-specific institutional and policy variables in explaining the size of banks liquid asset buffers. Our setup will be similar to Aspachs, Nier and Tiesset (2009) but we will use a worldwide dataset. Using several measures of bank's liquidity as dependent, we intend to explain these by firm specific controls, macro economic controls, and variables that measure contextual factors as mentioned in the literature.

Regulatory capture: A social identity perspective on supervisors' monitoring financial institutions (project started in 2012)
Dennis Veltrop, Jakob de Haan,

Regulatory capture is a topic widely debated in the academic literature. We propose that an important but up to now unaddressed determinant for regulatory capture is that supervisors can identify with the institutions they are monitoring. In this research project we examine the determinants of effective supervision from a social identity perspective. In particular, social identity theory holds that part of an individual's self-concept is derived from his or membership of social groups. In this vein, organizations can be considered as social groups. A great deal of research on organizational identification has demonstrated the pervasive effects of individuals identifying with organizations. Accordingly, we maintain that supervisors identifying with the institutions they are monitoring may affect their effectiveness in monitoring these institutions.

Board functioning: A multilevel perspective on the determinants of effective board behaviour in financial institutions (project started in 2012)
Dennis Veltrop, Jakob de Haan, Gerben van der Vegt (University of Groningen)

Boards of directors are critical for good governance of financial institutions. Although a great deal of research has been conducted on formal structural board arrangements, like any social entity boards of directors are first and foremost social groups. Governance scholars know very little about the determinants of effective board behaviour, however. This research project teases out the determinants of effective board behaviour at multiple levels of analysis. We study board behaviour at the group level of analysis, at the individual level of analysis, and at the dyadic level of analysis. Thereby,

facilitating a fine-grained analysis fostering a profound understanding of boards from a behavioural perspective.

Is there a home bias in Dutch insurance companies' asset allocations? (project started in 2012)

Robert Vermeulen, Melle Bijlsma

Previous research pays little attention to the international diversification of insurers' assets. In general, researchers take home bias as a given for insurance companies. There are, in principle, no barriers to foreign investments for Dutch insurance companies. Moreover, the euro zone provides a large market to hold assets the same currency. Since knowledge about insurance companies' investments is scarce, we first document Dutch insurers' geographical asset mix. We use confidential DNB data at the firm level, which contains the investment positions and transactions for each Dutch insurance company during 2006-2011 at the quarterly frequency. A first glance at the data suggests that most funds are invested in euro denominated assets, mostly bonds. We formally study the extent of home bias in the portfolio with an empirical gravity model. In particular, we study whether gravity matters differently for the type of asset and how it changes from pre-crisis, during the financial crisis and during the current sovereign debt crisis. We aim to document the extent to which insurers decrease their exposure to periphery government debt and where they shift their portfolios to. In particular, whether the sovereign debt crisis creates a flight to domestic assets and increases the home bias.

Loan loss reserve announcements: Investor responses during the financial crisis

Robert Vermeulen, Theoharry Grammatikos (LSF)

Since the outbreak of the sub-prime mortgage crisis banks had to write off large amounts of bad debts. Banks first make an estimate of the amount of loan that will likely not be repaid. This is the allowance for bad debts. Loan loss reserve (LLR) additions precede writedowns. These LLR additions are an important part of every quarterly earnings announcement, because they contain important information about the management's view on future credit losses. However, it is ex ante not clear how investors should react to LLR additions. Theoretically, many different channels are at work. LLR additions signal that loans will not be repaid, which is a value loss. But LLR additions can also signal that banks are not willing to refinance non-creditworthy customers. Also, when loans are written off, this induces tax savings for banks. This paper investigates if LLR announcements trigger an abnormal stock price reaction during the 2006-2011 period. If they do, in which direction?

Corporate governance of financial institutions: A survey

Razvan Vlahu, Jakob de Haan

We argue that financial firms are different from non-financial firms. Their business is more complex, their failure more severe and they face different incentives due to regulation. From that perspective it should not come as a surprise that 'optimal corporate governance' of financial firms differs from that of non-financial firms. At the same time, there is clearly no consensus in the literature on these issues. Our review highlights the conflicting results from the empirical literature on the role played by different corporate governance mechanisms such as (a) the role of board characteristics (i.e., composition, size, independence) in financial vs. non-financial firms, (b) the role of outside and inside ownership, as well as on (c) relation between managerial compensation and banks' risk-taking. There are several potential explanations for this. One important reason suggested by several studies surveyed here is the time period covered, notably whether or not the crisis period is included or not. If banks from different countries are included, differences in national governance systems may play a role as well. Another potential explanation for this divergence is that documented risk-taking behaviour is the result of interaction between regulation and corporate governance mechanisms (i.e., ownership structure), feature not taken into account by most of the studies.

4. Financial literacy and behaviour of households and companies

Modelling the share of cash payments in the economy

Carlos Arango (Bank of Canada), Yassine Bouhdaoui (Telecom ParisTech), David Bounie (Telecom ParisTech), Martina Eschelbach (Deutsche Bundesbank), Lola Hernandez

Modelling the demand for cash and deposits is a primary concern for central banks. Within a wide range of theoretical contributions, payment choice models based on transaction sizes (TS models) have been promoted. However, TS models induce strong predictions about the use of payment instruments. In particular, all equalized transactions are supposed to be paid with the same payment instrument: cash for transactions below a given threshold (small-value purchases) and alternative payment instruments for transactions sizes above the same threshold (large-value purchases). In contrast, we propose a simple alternative model based on cash holdings and uncertainty about the timing of arrival of different transactions sizes (CH model). The CH model allows equal-sized transactions to be paid for in cash or with other payment instruments. Using micro-level payment diaries about cash holdings, cash withdrawals and cash payment choices from Canada, France, Germany and the Netherlands, we test how well each model replicates the observed shares of cash payments in these economies for each transaction size, while controlling for various individuals' demographics.

Consumer Cash Usage and Management: A Cross-Country Comparison with Diary Survey Data

John Bagnall (RBA), David Bounie (Telecom Paris Tech), Kim P. Huynh (BoC), Anneke Kosse, Tobias Schmidt (Buba), Scott Schuh (Fed Boston), Helmut Stix (OENB)

The motivation for this project is that payment behaviour and use of payment instruments vary substantially across countries. These differences are not well understood. Part of this due to lack of comparable data about use of payment instruments at the point-of-sale (POS). Our research question is which factors drive differences in payment behaviour across Western countries. The focus of the paper will be on cash usage, cash holdings and cash management. We will make cross country comparisons using harmonized data for Australia, Austria, Canada, France, Germany, the Netherlands and the U.S from payment diaries and additional survey information. This research will make an important contribution to understanding differences in payment behaviour and cash usage in particular in Western countries. It may provide useful information about the development of the use of cash in different parts of the Western world, which may help DNB in assessing the future usage of cash and electronic payment instruments.

Competition in bank-provided payment services

Wilko Bolt, Dave Humphrey (FSU Tallahassee)

Banks supply payment services that underpin the smooth operation of the economy. To ensure an efficient payment system, it is important to maintain competition among payment service providers but data available to gauge the degree of competition are quite limited. We propose and implement a frontier-based method to assess relative competition in bank-provided payment services. Special interest goes out to the most and least competitive banks and their characteristics. How do they differ regarding size, return on assets, net income, and productivity? We will also compare our competitive efficiency index to the standard indicators of competition, such as HHI, Lerner index and H-statistic.

Impact of the Tourist Test on payment pricing in the Netherlands

Wilko Bolt, Nicole Jonker, Mirjam Plooij

Banks' payment pricing has attracted a lot of antitrust controversy recently. To curb excessive pricing of payment cards by banks the European Commission has put forward the Tourist Test methodology, based on indifference between accepting cash and cards for the retailer at the point of sale. However, scale effects over time may yield 'perverse' outcomes in the sense that this specific type of regulation may allow banks to set even higher card fees. We want to look at this phenomenon using Dutch payment data, as well as provide a theoretic underpinning and possibly describe alternative price regulation schemes that avoid these perverse effects. This project is a follow up on a first exploration by Jonker and Plooij for the Netherlands (in 2012). At the same time the theoretic framework borrows

from Rochet and Tirole's work on payment choice and two-sided markets (2003, 2004) as well as Bolt and Chakravorti (2008) and other theoretical contributions.

Macroeconomic effects of mortgage interest deduction

Cenkhan Sahin

How does a fall in the mortgage interest deduction influence the rate of mortgage default? In this paper I present two business cycle models where households invest in mortgages featuring tax-deductible mortgage interest. I analyse how shocks affect the rate of default on mortgages and the subsequent transmission to the rest of the economy. An economy with a higher mortgage interest deduction is characterised by (i) higher house prices, (ii) more levered households, and (iii) a higher rate of mortgage default.

Cash versus debit card: the role of budget control (project started in 2012)

Lola Hernandez, Nicole Jonker, Anneke Kosse

Since the start of the financial crisis in 2008, the financial situation of households in many European countries has worsened. This is also the case for many Dutch households. In order to cope with their lower purchasing power, many households examine their expenses more closely and cut their expenditures when necessary. Traditionally, Dutch households that need to cut down expenses were advised to record all of their payments, in order to gain insight into how much they spend and in what expenses they could possibly save. They were also advised to withdraw a fixed amount of cash for their daily expenditures, just to make sure that they were not able to spend more than they can afford. Nowadays, with the widespread use of payment cards, as well as the almost universal access of the Dutch to internet banking, and the introduction of mobile banking apps that people can use to check their balances real-time, consumers can also use their payment cards or mobile phones instead of cash to examine their expenditures and to make sure that they do not spend more than they can afford. Given the current financial crisis and the new opportunities offered by the different means of payment for controlling expenditures, the question arises to what extent consumers' desire or need to control budget affects consumers' payment choice. Many studies have been conducted to gain an insight into the drivers and barriers underlying consumers' payment choices. However, until now, the literature has paid little attention to the role of budget control in consumers' payment choice: what value do consumers attach to controlling their budget and spending? To what extent do the different means of payment fulfill these demands? And how does this affect consumers' payment choice? Therefore, the aim of this paper is to study consumers' needs for controlling their expenses and budget in relation to their choices between payment instruments at the point-of-sale (POS). Based on some first information obtained from a payment survey held in 2011 on the general budgeting behaviour of Dutch consumers, we drew up and distributed a second questionnaire among more than 1,700 Dutch consumers in 2012 to collect detailed information about their needs for and views on monitoring and controlling budgets and expenses. In addition, we collected data on the characteristics of the respondents using another survey that was distributed amongst the same consumers in the same year. This rich dataset allows us to assess differences across individuals.

Development of social costs POS payments in the Netherlands 2002-2009

Nicole Jonker

Cash is the mostly used payment instrument for point-of-sale (POS) payments, followed at a distance by the debit card. However, from a cost perspective the debit card has become more attractive for banks and retailers compared to cash. Technological advances in IT have taken place, lowering the costs of telecommunication and the processing of payment transactions. Based on recent and previous studies on the costs of POS payment instruments for banks and retailers, this study quantifies the development of the social cost of the POS payment system in the Netherlands between 2002 and 2009. Furthermore, I will pay special attention to the private costs and returns of debit card payments compared to cash payments for merchants. This information is relevant as the European Commission has made agreements with card companies about the level of interchange fees for debit card payments based on the net costs associated with debit card payments compared to cash payments for merchants

(MIFs based on the merchant indifference tests). This study is essential when assessing the cost efficiency of the POS payment system and it will provide useful information on how to optimise the cost efficiency of the Dutch POS payment system. DNB examines the cost efficiency of the POS payment in his role as guardian of the efficiency, security and continuity of the Dutch payments. The outcomes of the study will be used in the ECB study on the social costs of retail payments instruments and in the national Forum on the Payment System.

The impact of public campaigns on debit card usage in the Netherlands (project started in 2012)
Nicole Jonker, Mirjam Plooij

The number of debit card payments has increased steadily since the introduction of the debit card at the end of the 80s. However, in 2007 Currence, the scheme owner of the Dutch debit scheme PIN, launched a long term public campaign stimulating consumers to use their debit card even more, also to settle small transaction amounts at the point-of-sale. The campaign has aimed subsequently at specific branches, starting with supermarkets in the summer of 2007. Sectors that followed include drugstores, DIY, wine & liquor stores, garden centres and the catering industry. In addition, the public campaign also includes regional campaigns and nation wide campaigns ‘Week van het Pinnen’, ‘PIN & Win’ which focus on overall card usage. This paper aims at assessing the overall effectiveness of the campaign on card usage, as well as the effectiveness of the different kind of campaigns. In 2012 we will collect monthly/weekly branch specific debit card figures as well as information on the intensity of the different kind of campaigns (measured e.g. as the number of tv-commercials, radio commercials, adds in national or regional papers, promotion material in shops, ec.). We will use time-series/panel data techniques to analyse whether the campaign has had effect on card usage, while controlling for other factors which influence card usage such as supply side factors (e.g. availability of payment terminals per branch, availability of ATMs), demand side factors (demographics, macro-economic environment) and seasonal effects.

Household wealth, indebtedness and consumption behaviour in the Netherlands: Empirical evidence from survey data
Federica Teppa

The paper investigates the dynamics of household wealth and indebtedness over the recent years in the Netherlands. The empirical analysis is based on survey data from the DNB Household Survey (DHS), and from the Household Finance and Consumption Survey (HFCS). The longitudinal component of the DHS allows to study whether the recent financial crisis has had a significantly negative impact on the level of household indebtedness in a country (the Netherlands) that suffered relatively less from labour market shocks than other European countries during the crisis period. The use of the HFCS, a new harmonized dataset collecting detailed information on wealth holdings, consumption and income in the 15 Euro countries, allows to adopt an international perspective and to compare the indebtedness level of Dutch households with that of other European countries. Preliminary results already show that Dutch households are the most indebted ones in Europe, mainly as a consequence of the very developed mortgage market and of the fiscal incentives related to that. The analysis focuses on how the level of household wealth and debt vary with background characteristics, occupational status and income distribution, and on how the propensity to consume vary across the wealth distribution. Ultimately the paper will detect vulnerable segments of the population whose high level of indebtedness makes them particularly exposed to unexpected idiosyncratic risks in the economy.

Distributional aspects of household savings, saving motives and liquidity constraints
Federica Teppa, Alessandro Porpiglia (BdL), Michael Ziegelmeier (BdL), Julia Le Blanc (Bundesbank), Jose Maria Casado (BdE), Junyi Zhu (Bundesbank), Elena Pavlova (ECB)

We study the role of individual motives for saving and that of perceived liquidity constraints on household finances in the 15 Euro-area countries. The empirical analysis is based on the Household Finance and Consumption Survey (HFCS), a new harmonized dataset collecting detailed information on wealth holdings, consumption and income. We find evidence of heterogeneity across countries with respect to saving preferences and the relative importance of alternative motives for saving. In addition

we find a more homogeneous impact of credit constraints that are perceived to be binding for specific groups of respondents. These findings have relevant policy implications if interpreted in light of the recent financial crisis, the country-specific institutional settings, and the different degree of development of formal lending channels.

The rose-colored glasses of homeowners

Carin van der Crujsen, Maarten van Rooij, David-Jan Jansen

Based on a yearly survey among Dutch households we show that homeowners have a too rosy picture of the value of their own home, in particular when general house prices are falling. This causes a mismatch between home buyers and sellers and explains slow price adjustments and low transaction volumes on the housing market. There are several explanations for this phenomenon. Homeowners are likely to suffer from *loss aversion* and the *endowment effect*. The few earlier studies that show that homeowners are too optimistic about the value of their home do this by comparing survey data to official price statistics. A disadvantage is that there can be other reasons for a discrepancy between the two figures than unrealistic judgments by home owners. In contrast to these previous studies we are able to show the too rosy picture by contrasting two survey questions. These questions measure both homeowners' expectations of the future (1) general house price developments, and (2) the price development of their own home. Homeowners are more optimistic about the future price development of their own house than about general price developments. While differences in price developments do occur for individual cases, it is not feasible for the group as a whole. We relate the optimism of homeowners to socio-economic factors, psychological factors and tenure.

A psychological view on payment behaviour

Frank van der Horst

We learned from a virtual reality study and a neuro-scientific study that DNB initiated in 2011 that the most important factor in choosing to pay with cash or with debit card is habit. This makes it difficult to manipulate this payment behaviour, as habits aren't easily changed. Since the neuro-scientific study was small-scaled and more or less a finger exercise, we intend to harden the conclusions from this study, and examine new questions, in a new neuro-scientific experiment. We will examine three questions: can we measure the neural networks that form the habit to pay with cash or debit card? What are the differences between young and old people in neural activity when paying and are these differences caused by an age-effect or a generation effect? Does the possession of cash evoke positive or negative emotions which go together with consumer behaviour (in other words is it 'scary' not to have cash on you or does it spoil the fun?)?

Non-financial determinants of the individual retirement age (project started in 2012)

Niels Vermeer (CPB/UvT), Daniel van Vuuren (CPB), Maarten van Rooij

It can be loosely stated that about half of the observed retirement behaviour is related to financial incentives and half to non-financial determinants. The impact of financial incentives has been investigated widely. But few scholars have focused on other determinants, while these might be critically important for the effect of the policy changes ahead of us on actual retirement choices. We will set up a special module for the DNB Household Survey to shed light on the impact of non-financial determinants on retirement behaviour. In particular, we are interested in social norms with respect to the retirement age, the effect of the presentation of choice options and the role of financial literacy. This research will provide important insights on the retirement behaviour of individuals and the impact of a higher pension age on the labour participation rate.

Remittance payment channel preferences of migrant' in the Netherlands: Evidence from survey data (project started in 2012)

Robert Vermeulen, Anneke Kosse

Globally migrants send over US\$ 300 billion to their families in their countries of origin and many studies provide results on the positive effect of remittances on the local economy of the recipient countries, both at a micro and macro level. So far, however, little attention has been paid to remittance

channel choices made by migrants. Each channel has its own pros and cons for the payer and the payee, e.g. in terms of transparency, costs, accessibility, safety, speed and reliability. This research will contribute to the existing literature by exploring the determinants of migrants' remittance channel choice. We base our research on an extensive consumer survey conducted in 2009 among more than 1,600 Dutch migrants. First, we describe the remittance channels used by migrants in the Netherlands. Next, we dig deeper in the underlying reasons for choosing a specific channel. In particular, we investigate how remittance channel choice is affected by the country of destination, the amount remitted, socio-economic characteristics of the payer, personal stated motivations, cost perceptions, as well as migrants' perceptions and experiences regarding the safety, speed, costs and user friendliness of other payment instruments and payment channels in general, such as internet banking and cash usage. The relevance of this work is to shed light on the role of formal and informal remittance channels, the possible barriers perceived by migrants for particular channels, and to provide policy suggestions on how to increase the usage of formal remittance channels and more generally on how to further stimulate the safety, efficiency and integrity of international remittance transfers.

5. Modelling and forecasting

DELFI's long-run properties (project started in 2012)

Robert-Paul Berben

Many of DELFI's behavioural equations are modelled using the co-integration framework, in which the long-run relationships are derived from economic theory. This implies that – in isolation – these variables move back smoothly towards their equilibrium paths. Much less attention has been paid to the stability of the entire model. Is it possible to construct long-term projections with DELFI? Does the model return to equilibrium after a temporary shock? And if so, is the adjustment path smooth or does it feature strong oscillations? Studying the long-run properties of DELFI will hopefully give answers to these questions. But furthermore, we may be able to uncover weaknesses in the model, i.e. equations or coefficients that lead to instability. The impact on the long-run properties of the model can then explicitly be used as a criterion for equation selection.

Forecasting macro-economic time series using economic indicators (dynamic factor model approach) (project started in 2012)

Jasper de Winter, Siem Jan Koopman (VU), Irma Hindrayanto

In dynamic factor models (DFM), a small number of (unobserved) common dynamic factor drive the observed movements of a large number of economic time series. The technique has been proven a powerful tool for short-run forecasting and policy analysis. The appropriate dimension in DFM specifications is still a topic of ongoing research. Empirical forecast performance of small scale DFM appears quite competitive with larger models. However, large DFMs may still be attractive when there are few theoretical grounds to eliminate possible explanatory variables a priori. As a compromise, we propose to employ a large scale DFM framework with a clearly defined categorical structure. Assuming we have four categories in economy (real, finance, prices, survey indicators), we may choose for instance up to three principal components (PC) from, say 20 time series in each group, resulting in no more than twelve PCs. These PCs are then used as the unobserved common factors in our DFM. After the DFM structure is selected, we apply this model to forecast two key macro-economic variables: output growth and inflation. Empirical details will follow later on. In a next stage, we plan to investigate the forecast performance of our model for different Euro-countries.

Relation between employment and production: Lessons from the credit crisis (project started in 2012)

Irma Hindrayanto, Johan Verbruggen

Labour market behaviour during the credit crisis was different to normal and also different from forecasts. Although the economy faced an unprecedented sharp fall in production in 2009, the number of unemployed persons increased by far less than DNB and others had predicted. This was primarily because enterprises hoarded substantially more employees than expected. With the benefit of hindsight, this is understandable given that the labour market was rather tight for quite some time

when the credit crisis hit. Employers evidently attached great importance to keeping their newly recruited employees on the payroll. Moreover, enterprises were generally in good financial shape during the credit crisis, as a result of which employers could afford hoarding labour. We will analyse whether these mechanisms have worked before in the Dutch economy or elsewhere. If so, we will try to incorporate these findings in the employment equation of DELFI.

Interaction of trend-season-cycle components

Irma Hindrayanto, Jan Jacobs (University of Groningen), Denise Osborne (University of Manchester)

State space models that allow for trend, cycle and seasonal typically assume that an observed series can be decomposed into a trend, a cycle, and a seasonal component where the three unobserved components are assumed uncorrelated. We propose an alternative specification by allowing for correlated shocks in the state equation. In the specific context of seasonal-cycle interaction, we assume that cycle shocks may have an impact on the season, or the other way round that seasonal shocks have an effect on the cycle. The modeling of seasonal-cycle interactions has direct implications for seasonal adjustment of a series, and thus the understanding of the business cycle situation in real time.

Forecasting and nowcasting real GDP: Comparing statistical models and subjective forecasts

Jos Jansen, Xiaowen Jin (Ludwig Maximilians Universität), Jasper de Winter

We conduct a systematic comparison of the short-term forecasting abilities of eleven statistical models and professional analysts in a pseudo-real time setting, using a large set of monthly indicators. Our analysis covers the euro area and its five largest countries over the years 1996-2011. We find that summarizing the available monthly information in a few factors is a more promising forecasting strategy than averaging a large number of indicator-based forecasts. The dynamic and static factor models outperform other models, especially during the crisis period. Judgmental forecasts by professional analysts often embody valuable information that could be used to enhance forecasts derived from purely mechanical procedures.

Improving short-run predictions of GDP by statistical methods by subjective information

Jos Jansen, Jasper de Winter

This project investigates how short-run forecasts of real GDP derived from statistical procedures may be improved by subjective forecasts by financial analysts in real time. A reliable assessment of the current state of the economy and its prospects in the short run is of great importance to both policy makers and private agents, especially in volatile times. The project builds upon the results of a pseudo-real time analysis by Jansen, Jin and de Winter (2012) who found that predictions by financial analysts are rather poor forecasting devices in themselves, but do seem to contain valuable information that statistical models fail to pick up. We will use a dynamic factor model as a purely mechanical forecasting device to extract the predictive information from a large dataset of monthly indicators, such as industrial production and consumer and producer confidence. We then try to enhance model-based forecasts by forecasts by financial analysts, which are partly determined by 'judgment'. We follow a strictly real time setup, using only available information, including preliminary figures and revisions on GDP and industrial production data. The analysis will cover six European countries, the euro area and the US.

Optimal forecasts in the presence of structural breaks for nonlinear forecasting problems

Andreas Pick

In this research project we will extend the optimal weights that Pesaran, Pick and Pranovich (2012) derived for the linear regression model under structural breaks to a range of nonlinear forecasting problems. Pesaran, Pick and Pranovich (2012) consider the linear regression model in the presence of one or more discrete structural breaks or in the presence of continuous breaks, for example, when the parameters in the model follow a random walk. They find that optimal weights for observations can be derived that minimise the mean square forecast error. These weights are specific to the type of model and the break process. In this research project, we aim at generalizing the weights to other models and to forecasting problems other than point forecasts. The underlying methodology will remain the same:

each observation is weighted in the forecasting procedure, where the weights have no restriction other than summing to one over the sample. A loss function is specified, for example the mean square forecast error but others will be considered, too, and the weights are found by minimizing the loss function. Given the generality of this approach, the resulting forecast will be optimal under a wide range of assumptions. For example, forecasts that use only observations after a structural break and other weighting approaches such as exponential smoothing are special cases of our general forecasting procedure.

6. Other projects

Firms' dynamics, endogenous mark-ups and the dynamics of the labour share of income
Andrea Colciago, Lorenza Rossi (University of Pavia)

Recent U.S. evidence suggests that the response of the labour share to a productivity shock is characterized by countercyclicality and overshooting. These findings cannot be easily reconciled with existing business cycle models. We provide a labour search model with endogenous market structures which, through countercyclical mark-ups, explains the countercyclicality and overshooting of the labour share in response to a technology shocks observed in the U.S. Extending the model to account for wage rigidity further improves its ability to replicate the facts described above.

Optimal taxation in a dynamic general equilibrium model with firms: Dynamics and strategic interactions.
Andrea Colciago

I study optimal fiscal policy in the sense of Ramsey in a model with endogenous firm entry and oligopolistic competition between firms. Most existing studies consider the case of monopolistic competition. For this reason they can be looked at as to special cases of this analysis. Also I consider alternative forms of the sunk entry cost, and show that this affects optimal taxation. I show analytically that optimal long run dividend income taxation is not confiscatory, but depends on the degree of concentration in the final good market.