DNB Research programme 2015

The DNB Research programme 2015 has five 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.
5. Modelling and forecasting.

The research projects for 2015 are listed below. Some fit into more than one theme.

1. Monetary strategy, business cycles and price stability

Fiscal multipliers at the extensive margin
Andrea Colciago, Vivien Lewis (University of Leuven), Lorenza Rossi (University of Pavia)

We provide VAR evidence concerning the joint effect of a Government Spending and a Dividend income tax shock on unemployment and firms' creation (the extensive margin of investment) in the U.S. We provide a DSGE model consistent with the facts we uncover.

Who creates jobs over the business cycle? (started in 2014)
Andrea Colciago, Antonella Trigari (Bocconi university)

Using U.S. and Dutch data, we study the contribution of different categories of firms to net job creation and job reallocation over the cycle. We then study the contribution of different classes of employers - say small, medium and large employers - to job reallocation, net job creation, job creation and job destruction. We study how much of cyclical job creation is due to expanding employers as opposed to newly-created employers and how much of job destruction is due to contracting employers versus exits. We also consider the role of firms' age and possibly other dimensions. We build a model with search in the labor market consistent with the facts we uncover.

Structural reforms in time of crisis
Andrea Colciago, Tiziano Ropele (Bank of Italy)

We evaluate the macroeconomic effects of structural reforms in both the labor and the Goods market. We consider a New Keynesian DSGE model with an endogenous number of producers and labor market frictions. Reforms are evaluated under alternative scenarios. In particular we consider the case of a binding zero lower bound on the nominal interest rate set by the central bank and the case of a highly indebted economy.

Survey on communication about unconventional monetary policy (started in 2014)
Jakob de Haan, David-Jan Jansen, Richhild Moessner

In the wake of the global financial crisis the ECB and other major central banks have engaged in unconventional monetary policy measures. This project provides a survey of the literature on the communication about unconventional monetary policy, notably forward guidance, and identifies questions for future research.

Lending shocks and macroeconomic stability
Emmanuel de Veirman

In a theoretical model calibrated to the US economy, I investigate the macroeconomic effects of changes in downpayment requirements on mortgage loans. A tightening in downpayment requirements weakens the collateral effect, and thereby dampens the macroeconomic effects of monetary policy and housing demand shocks. The lending shock itself is amplified to a lesser extent when downpayment requirements are tight, implying that a change in downpayment requirements induces less short-run volatility when downpayment requirements are tight at the outset.

Firm volatility and the Phillips curve (project started in 2014)
Emmanuel de Veirman

This paper empirically tests the theoretical prediction that the Phillips curve is steeper when the volatility of firm-specific shocks is high. In theory, a higher volatility of shocks causes firms to adjust prices more frequently, which implies that other shocks are translated into prices more quickly. Therefore, in theory macro shocks have stronger inflationary effects when firm volatility is high. I quantify the relationship between changes in firm volatility and the slope of the Phillips curve. This helps to understand to which extent the inflationary effects of monetary policy stimulus change depending on fluctuations in firm volatility.

Formation of inflation expectations - new insights from heterogeneity in a high-frequency survey (started in 2014)
Gabriele Galati, Richhild Moessner (BIS)

We analyze the mechanism through which inflation expectations are formed by evaluating results from a survey conducted from July 2010 through December 2014. Participants in this survey answered a weekly questionnaire about their expectations of euro area HICP inflation at one-, two- and ten-year horizons. Participants received common information sets with data relevant to euro area inflation. We examine alternative expectation formation rules and test for the role of the ECB's definition of price stability as a focal point. We also exploit information on questions on the entire of distribution of inflation expectations to examine whether individual uncertainty differs from cross-sectional dispersion and time series variability of expectations.

Inflation differentials in the euro area: the role fiscal policy in real time
Niels Gilbert, Jasper de Jong

Monetary policy in the euro area aims to preserve price stability at the level of the monetary union. Fiscal policy at the national level then should adjust so that individual euro area member states do not persistently exceed or undercut the area wide inflation target. We intend to determine to what extent fiscal policy indeed played this stabilizing role in real-time (ex ante). Moreover, we compare this to the actual (ex post) effect fiscal policy had on inflation differentials.

Wage dynamics after the crisis
Marco Hoeberichts

Using the results from the third wave of the Wage Dynamics Questionnaire, we will address a selection of issues regarding wage dynamics, possibly relating frictions in the labour market to financial frictions.

Household inflation expectations in a context of low inflation
David-Jan Jansen, Matthias Neuenkirch (University of Trier), Edith Neuenkirch (University of Marburg)

We use the DNB Household Survey to further understand household inflation expectations. In particular, we will address the role of inflation perceptions and media usage in a context of low inflation.

FDI and international business cycle synchronization: a structural analysis (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).

Cyclical and structural imbalances in the euro area
Mark Mink, Jakob de Haan, Jan Jacobs (University of Groningen)

At the start of 1999, several European member states formed an Economic and Monetary Union (EMU). During this process, much emphasis was placed on the need for convergence of national business cycles so that the common monetary policy would be appropriate for all member states. However, developments in 2010 and thereafter showed that EMU was not so much challenged by the cyclical imbalances complicating the implementation of a common monetary policy, but by structural imbalances complicating the implementation of a common currency. The distinction between both has received relatively little attention in the empirical literature. This paper uses the measurement approach proposed by Mink, Jacobs and De Haan (2012, OEP) to analyse cyclical and structural imbalances in the euro area within a single empirical framework. This framework allows us to analyse the developments in both types of imbalances over time as well as the interrelationships between the two.

Loan default risk in the banking sector and macroeconomic stability
Sebastiaan Pool

This paper examines the strength of financial frictions amplifying and prolonging business cycle fluctuations. I build upon the mainstream macroeconomic paradigm by estimating a canonical DSGE model for the Euro Area including a banking sector and financial frictions to analyze real-financial interaction. The model is a hybrid model of the financial accelerator model of Bernanke et al. (1999) and the banking DSGE model of Gerali et al. (2010). The (preliminary) results suggest that financial frictions cause strong amplification and prolonging of business cycle fluctuations. Not accounting for these frictions in canonical DSGE models results in a sever underestimation of business cycle fluctuations.

The role of monetary authorities in (de)stabilizing the financial sector
Sebastiaan Pool

The aim of this paper is to examine the role of monetary authorities in (de)stabilizing the financial sector. I scrutinize the consequences of (un)conventional monetary policy in a credit based economy.

How does the market respond to a government announcement? (started in 2014)
Ayako Saiki, Jeffrey Frankel (Harvard University)

In this research, we explore market reactions to government announcements about growth, inflation, change in payroll employment, etc. For example, YoY growth vs. QoQ growth; YoY inflation and monthly inflation, etc. Our conjecture is that QoQ/MoM, as opposed to YoY, will contain more “noise,” thus is likely to invite overshooting, or more simply put, higher volatility in the market.

The impact of income equality and business cycle
Ayako Saiki

This paper analyzes how income inequality will affect the amplitude and duration of business cycles, with a specific focus on recessions. The aim or our research is to see how income equality affects the amplitude and duration of business cycles of OECD countries, using data from 1960Q1 to 2007Q1. After controlling for many other effects, (monetary and fiscal policy, exchange rate, demographic factors, etc.) we do a panel analysis to see how equality, in two definitions (Solt, 2014), impacts amplitude and duration of business cycles.

Comparison of the income distribution effect of unconventional monetary policy – UK, US, Germany, and Japan
Ayako Saiki

Following Saiki and Frost (2014), we use a similar technique to compare the impact of unconventional monetary policy taken by the US, UK, and Eurozone and its impact on income distribution. To the extent that the Eurozone's UMP differs from other economies' QEs, it may be an interesting experiment to see if different kinds of UMP will have (significantly) different impact on income distribution. Also, how it is different among different Eurozone countries after controlling for other factors and looking at the interactive effects of UMPs with economic fundamentals may be an interesting avenue to pursue.

The formation of European inflation expectations: One learning rule does not fit all
Christina Strobach (WHU - Otto Beisheim School of Management), Carin van der Cruijsen

We empirically investigate how well different learning rules manage to explain the formation of household inflation expectations in six key member countries of the euro area. Our findings reveal a pronounced heterogeneity in the learning rules employed on the country level. While the expectation formation process in some countries can be best explained by rules that incorporate forward-looking elements, households in other countries employ information on energy prices or form their expectations by means of more traditional learning rules. Moreover, our findings suggest that least square based algorithms significantly outperform their stochastic gradient counterparts, not only in replicating inflation expectation data but also in forecasting actual inflation rates.

Effectiveness of central bank balance sheet as monetary policy tool
Jan Willem van den End, Christiaan Pattipeilohy

We estimate the effect of credit easing versus quantitative easing on inflation expectations and exchange rates. Both monetary policy strategies are summarised in measures for composition and size of the central bank balance sheet and included in a VAR model.

2. Financial stability and macro-prudential supervision

The liquidity of financial instruments
Clemens Bonner, Iman van Lelyveld

Liquidity has come to fore, receiving attention from both academics and regulators alike. The latter have implemented both a Liquidity Coverage Ratio (LCR) and a Net Stable Funding Ratio (NSFR) to reduce liquidity risks. The key underlying notion is that to cover (potential) outflows, a firm should have sufficient liquid assets. The aim of this paper is to investigate how banks' funding profiles have evolved in recent years in response to an almost complete collapse of unsecured funding markets and the transition to the new regulatory framework. One primary data source of this paper are the MiFID transaction reports obtained from the Netherlands Authority for the Financial Markets (AFM). As such, the MiFID database is the most comprehensive dataset on market transactions in the EU. Along with many other data fields, each transaction in the dataset includes the international securities identification number (ISIN) of the traded security, the two trading counterparts, volume, time to maturity, the exact time as well as whether the reporting institution acted as a buyer or a seller. The MiFID data will be augmented with other data available at DNB, e.g. covering the unsecured interbank market.

Following the herd or leading it? Portfolio allocation of Dutch occupational pension funds
Dirk Broeders, Peter Minderhoud, Willem Schudel

During the recent financial crisis, pension funds in the Netherlands suffered considerable decreases in their funding ratios. What was striking about the crisis was that pension funds were hit in very similar ways. Indeed, pension funds' coverage ratios (as defined by the ratio of total assets over technical provisions) have moved largely in line with one another. These developments give rise to the question if asset allocation decisions of pension funds are independent. In fact, the Office of Financial Research in the United States identified so-called herding behaviour of asset managers as one of the main vulnerabilities of this sector which could turn into a risk to financial stability. This paper seeks to shed light on the issue of herding between pension funds in The Netherlands. We aim to theoretically and empirically examine the extent to which these pension funds follow one another in terms of their (strategic and actual) asset allocation. In doing so, this study will develop testable hypotheses on herding behaviour in this sector of the Dutch financial services industry. This study will use a detailed dataset from the supervisory database at De Nederlandsche Bank, which includes information on pension funds' asset allocation, asset sales and purchases as well as the market value of investments in different asset classes. The econometric methodology will follow a spatial two stage least squares approach, which is a novelty in the pension economics literature.

A theory of bazookas, or "how to design large-scale official support" (started in 2013)
Jon Frost

This paper aims to develop a theoretical model for "big bazookas", a term coined by US Treasury Secretary Hank Paulson in the immediate pre-Lehman period for official support funds. 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 they 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. This paper constructs a simple theoretical model of a deep-pocketed official creditor and distressed borrower. With a number of simple parameters, the model is an attempt to formalize the conditions under which a "bazooka" will be credible enough to have the desired market effects. Among other things, the paper examines 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 are compared with a number of case studies of actual support programs during and after the recent crisis.

Financial crises and macroeconomic performance (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.

Sovereign-bank interdependencies: an empirical exploration (started in 2013)
Krzysztof Muzalewski, Remco van der Molen, Jon Frost

Sovereign-bank feedback loops have been at the heart of the euro area crisis and many previous debt crises. This study sketches the direct and indirect channels of bank-to-sovereign and sovereign-to-bank stress, including through (expectations of) public sector support, bank holdings of sovereign debt, credit ratings and through the real economy. We measure the degree of interdependency using the correlation of sovereign and domestic bank CDS series for 24 countries over the 2006-2013 period. This measure is regressed on various indicators of interlinkages to empirically test which channels have been most important. We find evidence that especially direct sovereign debt holdings of banks have a significant impact, that the impact is larger when fundamental measures of sovereign and bank risk are higher, and that the importance of direct channels has increased since 2008. Similarly, we find that bank (sovereign) risk determinants perform better in explaining sovereign (bank) CDS levels when the correlations are high. From these results, we draw policy conclusions for banking regulation across the sample and for the design of the European Banking Union.

Measuring systemic risk in OTC-derivatives markets
Anouk Levels

The OTC-derivatives reforms aim to reduce systemic risk by increasing transparency and mandating central clearing for some types of derivatives. However, while central clearing of derivatives reduces counterparty credit risk amongst market participants, new risk will emerge. These include liquidity risk as a result of increased collateral demand and concentration of risk exposures with the central clearing houses (CCPs) and general clearing members. The aim of the research project is to develop a formal framework that can be used to analyse risks in the derivatives market for Dutch financial institutions. A first goal is to obtain the network for Dutch financial institutions and to analyse how shocks in the underlying of derivatives spread through the system. The basis framework can later be extended to study questions such as: (i) Do alternative CCP requirements (policy measures) alter contagion in the network? (ii) Do pension funds need access to central bank liquidity in the light of central clearing? (iii) Do alternative network structures alter contagion in the network?

Financial sector development and external shocks in small open economies (started in 2012)
Steven Poelhekke, Thorsten Beck (Cass Business School)

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.

Inherent instability in the financial sector
Sebastiaan Pool

In this paper I build a model placing the financial sector at the heart of the economic framework, i.e. the model is built around the concept of credit. The critical component of the model is the endogenous build-up of systematic risk as proclaimed by Minsky (1986). While the increase in leverage dwindles down margins in the financial sector, credit for mortgages rather than productive capital increases the dependence of the financial sector on a low inflation rate, low policy rates, and steady growth rate. In the model I will show that an episode of tranquility results in an unstable financial sector, which collapses when the realized state deviates (slightly) from past expectations.

Demand and supply of mortgage credit
Alex van de Minne (UvA), Federica Teppa, Johan Verbruggen

In the Netherlands, household mortgage leverage has increased considerably in the course of the last two decades. Apart from demand factors, like income and the effective interest rate, supply factors play an important role as well. In DNB Working paper 447, a so-called Credit Condition Index (CCI) was determined to proxy these supply factors. In this follow-up project, we will try to disentangle demand and supply factors behind the growth of mortgage credit and their impact on house prices. First of all, it is tried to explain the CCI on a macro level. Because it will be difficult to analyze the impact of some key factors, like the development of new mortgage products, the analysis will be expanded on a micro level, using DNB's Loan Level Database (LLD).

Identifying the determinants of competitiveness: A value added trade share perspective (started in 2013)
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 OECD-WTO Trade in Value Added database to estimate the value added a country gains by trading for around 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? We explicitly document the policy implications that the results imply for the Netherlands.

Transmission of shock in capital flows and competiveness in selected European economies (started in 2014)
Robert Vermeulen, Karsten Staehr (Eesti Pank)

The project aims to obtain insight into the economic links between capital flows, unit labour cost developments and the trade balance/current account. We are in particular interested in the time dimension and how a shock to one variable affects the other variables. The outcomes of this research project contribute to the debate on the competitiveness of peripheral euro area economies. In particular, we aim to obtain quantitative evidence on whether current account surpluses lead to a significant loss in competitiveness or competitiveness losses lead to current account deficits.

Price-based measures of systemic importance (started in 2014)
Nikola Tarashev (BIS), Chen Zhou

We use tools of extreme value theory to extract information about rare events from market prices. We find that such information contributes materially to measures of banks' systemic importance. We investigate the relation between these measures with simple characteristics of banks' balance sheets and income statements. In addition, we show the time variation on whether systemic important financial institutions are perceived as having low default risks.

3. Micro-prudential supervision and conduct of financial institutions

X-efficiency of Dutch pension providers
Gosse Alserda (EUR), Jaap Bikker, Fieke van der Lecq (EUR)

The Dutch collective pension market mainly consists of two kinds of pension providers: for-profit pension insurers and non-profit pension funds. Although hundreds of pension funds exist, competition among them is limited because most plans are mandatory. Employees have to participate in the pension scheme their employer offers, while many employers are obliged to offer their respective industry-wide scheme. Pension providers have different business models, sizes, and types of pension plans. Previous research has shown that, apart from unused scale inefficiency, also huge X-inefficiency exists, possibly caused by insufficient competitive pressure. Moreover, X-inefficiency is detrimental to pension benefits and would contribute to a plea for further consolidation. To the best of our knowledge, X efficiency analysis of pension funds have so far not yet been provided. This paper will study differences in X-efficiency for the two main types of pension providers in the Netherlands: pension funds and life insurers, for the latter distinguishing between collective pension plans and individual pension policies. Although these two types of institution may offer products which diverge, they still compete (indirectly) in the same markets. X-efficiency will be measured using two approaches which complement each other: the Data Envelopment Analysis and the Stochastic Cost Function Approach. Further, we investigate the drivers behind X-inefficiency. We will use quarterly data from supervisory reports to DNB.

Developing secondary legislation: the Achilles heel of the EU's framework on financial services?
Niels van der Bijl

The Commission's Delegated Regulations supplementing Solvency II (SII) and the Liquidity Coverage Ratio (LCR) mark important milestones in the development of the EU's new regulatory frameworks for insurers and banks. Based on Article 290 of the Treaty on the Functioning of the European Union, both Regulations are subject to a legislative procedure in which the European Parliament and the Council can either adopt or reject the text in full. This procedure was introduced by the Treaty of Lisbon (2009) to enhance the legitimacy of secondary legislation in the EU. Recently doubts have risen about the unintended effects of the legislative veto. Stack (2014) for example argues that instead of augmenting legitimacy the veto increases the capacity of interest groups to shape the content of the Commission's secondary legislation, stimulates Parliamentary *rapporteurs* to negotiate with the Commission for concessions bilaterally, and supplants Member State's gatekeeping role in the process for developing legislation. This paper examines to what extent this claim holds true for the Delegated Regulations LCR and Solvency II. The methodology used to analyse the two case studies is a combination of discourse analysis and process tracing. By comparing the proposals in various stages of their conception (resp. EBA/EIOPA advice, Commission consultation version for the Expert Group, and the adopted version) I establish which changes were introduced in which stage of the process. I will combe these results with interviews with the Commission officials that wrote the proposals and the European Parliament's *rapporteurs* (MEP Bukhard Balz for SII and MEP Otmar Karas) for the LLR, I shed light on the functioning of Article 290 in the case of secondary legislation in the field of financial services.

Dynamic adjustment of stock prices to the fundamental value: An error correction approach (started in 2014)
Jaap Bikker, Laura Spierdijk (University of Groningen)

In the public discussion on the future of the Dutch pension system, people suggest that the current funding shortages will disappear as stock prices are expected to recover. Pension funds' investment policies in the Netherlands (including rebalancing strategies) are explicitly based on (long-run) mean reversion of stock prices. The existence or absence of mean reversion has great implications for the FTK continuity test and, the required buffers of pension funds. Theoretically, one may expect a strong link between the financial stock price and real-economic developments. Employing such kind of a long-run relationship is expected to result in a more informative mean reversion model. We will collect data series for several countries over very long periods. Furthermore, we will use bootstrap and simulation methods to determine reliable standard errors in models that employ overlapping samples. Finally, we will investigate the consequences of our results for the FTK continuity test.

Competition in the non-life insurance industry: a cross-country comparison (started in 2014)
Jaap Bikker, Thomas Maas (University of Utrecht)

Competition in the non-life insurance markets is beneficial as long as the markets remain in equilibrium and the solvency of insurers is not impaired. Where many papers address insurer (in)efficiency, this paper contributes to the limited non-life insurance competition literature. Both the SCP paradigm and ES hypothesis use market concentration as a proxy for competition. This paper assesses competitive conduct in many countries by applying the Panzar-Rosse (P-R) model, adjusted for insurance markets. This approach is rare in the insurer industry and the P-R model is in most cases wrongly specified. Where existing papers on non-life insurance competition investigate a single country, we apply the ISIS data set of insurers' balance sheets across 36 countries. The sample covers around 35 thousand insurance-year observations on 3,500 individual insurers during the 1992-2012 period, allowing for a large cross country comparison.

Early warning and forecasting performance of HAMs in housing markets
Wilko Bolt, Maria Demertzis, (DNB/European Commission), Cees Diks (CeNDEF, UvA Amsterdam), Cars Hommes (CeNDEF, UvA Amsterdam), Marco van der Leij (CeNDEF, UvA Amsterdam)

Based on DNB WP 2014 2014-450, we apply a nonlinear endogenous switching model of heterogeneous expectations to housing price data, where agents switch between a mean-reverting fundamental view and a trend-extrapolating forecasting rule, based upon their relative profitability. We would like to evaluate this so-called HAM (i.e. heterogeneous agent model) in terms of forecasting performance (HAMs versus linear models) and, based on these results and robustness, assess how the model can be used for early warning purposes. In addition, we would like to extend the model accounting for a number of other variables, including interest rate costs (mortgage costs) as well institutional aspects that dominate the differences between countries.

Regular equivalence in interbank markets (started in 2012)
Wilko Bolt, Rod Garratt (University of California Santa Barbara), 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 regard 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 portioning of banks generated by regular equivalence to that obtained 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.

Strategic defaults: An empirical identification
Margherita Bottero (BoI), Steven Poelhekke, Razvan Vlahu

This empirical study shed light on the borrowers incentives for strategic default. Using detailed information on borrowers outstanding debt and historical repayment behavior, we find that uncertainty about lenders fundamentals is an important driver for borrowers' repayment incentives. We focus on our study on solvent borrowers which maintain multiple-bank relationships. (A borrower is considered as being solvent if it has multiple-bank relationships and it repays all the loans but one.)

A return analysis of pension fund investment portfolios
Dirk Broeders, Arco van Oord, David Rijsbergen

The investment performance of pension funds influences general welfare, as they are responsible for maintaining the standard-of-living of beneficiaries after retirement. Poor investment returns can significantly impact the wealth and consumption of beneficiaries. From the academic literature, several points of interest regarding pension fund performance stand out. For one, there appears to be a strong focus on equity investments. This can largely be attributed to the absence of sufficient data on investment performance for other asset classes. A second point of interest is that the academic literature tends to focus on the performance of U.S. pension funds. Again, this appears related to the availability of data. As a result, remarkably little is known about the investment performance of European pension funds. The main contribution of this paper is to employ an exclusive pension fund database to provide a comprehensive overview of the investment performance of Dutch pension funds for 2012 and 2013. Using a unique dataset, we provide a comprehensive and detailed examination of the investment performance of Dutch pension funds. Our dataset is free from self-reporting biases, and contains detailed information on pension fund-specific returns and benchmarks for a distinct set of asset classes. The database covers unique data for approximately 200 pension funds and is highly detailed. For one, the database provides the returns per pension fund for 6 different asset classes (i.e. equity, fixed income, real estate, commodities, private equity and hedge funds).

The role of foreign banks in trade
Stijn Claessens (IMF), Omar Hassib (Maastricht University), Neeltje van Horen

Financially developed countries tend to export relatively more in financially vulnerable sectors, suggesting access to finance to be important for promoting trade. Combining detailed data on bilateral, sectoral trade with bilateral data on foreign bank presence for 95 exporting countries, we show that exports are even higher with greater foreign bank presence. Results are robust to including various control variables and controlling for possible reverse causality. Studying the role of foreign banks by exporters' level of financial development and contracting and information environments suggests that foreign banks, especially those from the importing country, besides providing additional external financing, help overcome information problems.

The robustness of risk measures in market risk regulation
Jon Danielsson (LSE), Chen Zhou

Risk managers of financial institutions, as well as the regulators, are increasingly dependent on risk measures. Risk measures are usually forecasted using sophisticated statistical methods and back-tested by observations collected afterwards. Surprisingly, little robustness analysis exists in financial risk forecasting. Here robustness refers to whether the calculated risk measure is sensitive to variations in the methodological setup. Regulations based on non-robust risk measures will not be reliable since minor variations in the setup will lead to a totally different regulatory measure. On the contrary, risk managers may prefer such a measure in risk disclosure: risk might be underreported by exploiting the room of the variation. This research investigates the robustness properties in forecasting risk measures, in particular, the Value-at-Risk (VaR) and the Expected Shortfall (ES).

Recovery measures of underfunded pension funds: contribution increase, no indexation, or pension cut? (started in 2014)
Leo de Haan

Using recovery plan and progress report data of underfunded Dutch pension funds, discrete choice models are estimated describing pension funds' choices between three recovery measures: contribution increase, no indexation, and pension cuts, respectively. First, a multinomial logit model is estimated to examine the fund characteristics that determine the choice among these three recovery measures. Next, probit models are estimated to determine whether there is a preference hierarchy among these three recovery measures.

Spoilt for choice? Firm-bank matching in local credit markets
Ralph de Haas (EBRD), Neeltje van Horen

For a large group of countries, we combine data on firm-bank relationships with data on the local banking landscape. From each firm we know its geographical location as well as the bank branches present in the same locality. We also know the bank the firm borrows from. This allows us to analyze how firms choose a bank from a set of potential creditors. First, we analyze whether firms tend to borrow from banks in their own locality. Second, we analyze how the composition and competition in the local credit market determines whether a firm borrows or self-selects out of the credit market. Finally, conditional on borrowing, we examine which type of firms match with which type of banks. The paper provides insights in whether more diverse banking systems are more inclusive or not.

Internal asset transfers and risk taking in financial conglomerates
Natalya Martynova

This paper studies the effect of securitization in financial conglomerates on their risk choice, and compares it with the choice of standalone banks. Loan sales in conglomerates avoid information asymmetry, which enables conglomerate banks to shift worse loan risk to the deposit insurance by selling their best loans to the affiliates. However, such a value transfer induces a better asset monitoring by conglomerates enhancing their asset value. Under low capital requirements, conglomerate banks may be safer than standalone banks due to higher monitoring incentives. The model speaks to Vicker's proposal of the UK structural reform showing that higher bank capital requirements alone may not offset conglomerate banks' risk shifting incentives.

Convertible bonds and bank risk taking
Natalya Martynova, Enrico Perotti (UvA)

We study the effect of going-concern contingent capital on bank risk choice. Optimal conversion ahead of default forces deleveraging in highly levered states, when risk incentives are worse. The equity infusion reduces endogenous risk shifting by diluting returns in high states. Interestingly, contingent capital may be less risky in equilibrium than traditional debt, as its lower priority is compensated by reduced endogenous risk. Its effectiveness in risk reduction depends critically on the informativeness of the trigger.

What drives the markets' view on bank capitalization?
Mark Mink (DNB), Jakob de Haan (DNB), Eric van Loon (Ministry of Finance)

Inadequate banking system capitalisation is widely considered to be one of the main causes behind the 2007 global financial crisis. While regulatory reforms importantly focused on raising bank capital requirements, the crisis also illustrated regulatory capital ratios' poor performance in measuring bank solvency to begin with. For instance, on September 15th 2008, at a time when its regulatory capital ratio was higher than ever before, Lehman Brothers' financiers lost confidence in the bank's solvency, and through a run on the bank forced it to file for Chapter 11 bankruptcy protection. Inspired by this sudden loss of confidence in the accuracy of regulatory capital ratios, this paper develops a measure of bank capitalisation as perceived by financial market participants. We use this measure to analyse how various bank characteristics and market developments cause the markets' view on bank capitalisation to change over time.

To increase or not to increase? The determinants of banks' sovereign exposure
Steven Ongena (Zurich University), Alex Popov (ECB), Neeltje van Horen

This paper attempts to better understand the reasons why some banks substantially increased their holdings of domestic sovereign debt during the sovereign debt crisis and its aftermath. Using confidential MFI data, we compare the changes in holdings of domestic sovereign debt by 200+

domestic and foreign banks active in the euro zone. We exploit a difference-in-difference-in differences strategy in which we compare the holdings of domestic vs. foreign banks in GIIPS vs. non-GIIPS and before and after the start of the sovereign debt crisis. Comparing behaviour of domestic and foreign banks allows us to examine to what extent moral suasion played a role in a bank's decision to increase its sovereign debt holdings. Importantly, we exploit the impact of the introduction of the LTRO to examine the role of unconventional monetary policy in banks' lending decisions.

Do banks lend to countries with overvalued currencies? (started in 2014)
Ayako Saiki, Dennis Quinn (Georgetown University)

Using a proprietary BIS bank lending survey, we examine whether or not advanced economies' bank lending tend to go to EMEs where currencies are overvalued vis-à-vis the lending country (as undervalued countries typically do not have to borrow), which can eventually lead to a financial crisis of the recipient country. We also examine if/how banks' borrowing behaviour changed after crisis episodes.

Securitization and insolvency risk (started in 2014)
Maarten van Oordt

Does the removal of credit risk from banks' balance sheets through securitization transactions reduce the insolvency risk of financial institutions? This is an important question in the context of current plans to implement regulation on credit risk retention and the development of plans to set up a Dutch mortgage institute (NHI). The purpose of this project is to study this issue in the setting of a theoretical framework.

Board functioning: A multilevel perspective on the determinants of effective board behaviour in financial institutions (started in 2012)
Dennis Veltrop, Jakob de Haan

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.

Understanding the effects of qualitative supervision policies (started in 2012)
Aloys Wijngaards, David-Jan Jansen

It is becoming increasingly important to understand the effects of financial supervision (Hilbers et al. 2013). Measuring the effects of financial supervision helps supervisors in understanding which interventions provide the best results and enables them to give an account of their supervisory activities. This holds for all dimensions of supervision, but it is especially relevant for relatively new developments that have a strong qualitative component. This project focuses on supervisory policies with a strong qualitative component, such as, for instance fit-and-proper testing and remuneration.

4. Financial literacy and behaviour of households and companies

Using point-of-sale payment data for estimating household consumption
Wilko Bolt, Carin van der Cruijsen, Nicole Jonker

Collecting statistical information on consumers' expenditures is expensive and time-consuming. As an alternative, in this study we will examine the usefulness of retail payments data for estimating household consumption patterns and identifying leading indicators for business cycles. Usage of payment data sources seem to be very promising: they provide detailed information with respect to the timing of consumption and the nature of consumption and in case of diary data consumption can be linked to demographic characteristics of respondents. We will use two payment data sources. The first data source that we use is payment diary information. Consumers report detailed information on all individual payments made during the day at all points-of-sale in the Netherlands. DNB and the Dutch Payments Association collect these data from September 2013 onwards among the members of the GfK consumer panel. This dataset includes information on domestic demand for expenditures in 14 different POS sectors. These data may provide preliminary estimates of household consumption on daily needs. The second data source is monthly information on the number and value of debit card payments, distinguishing between 21 sectors and available from January 1995 onwards. We study whether potential leading indicators to forecast swings in overall consumption can be identified.

Mode effects on self-reported household financial data
Wändi Bruine de Bruin (Leeds University Business School), Wilbert van der Klauw (Federal Reserve Bank of New York), Maarten van Rooij, Federica Teppa, Klaas de Vos (CentERdata)

We conduct an experiment in which participants are randomly assigned to survey modes to examine the effect of internet survey vs. face-to-face interview mode on reported financial information. We aim to measure the accuracy of responses to asset, debt, income and expense questions and the variation across different modes. We investigate the effect of the interview mode on the willingness of individuals to report financial information and on the accuracy of their answers. For the latter, we use objective financial records that respondents have sent in to the survey agency after having participated in the survey.

Uncertainty about future consumption and precautionary saving
Dimitris Christelis (CSEF), Dimitris Georgarakos (Goethe University Frankfurt), Tullio Jappelli (University of Naples), Maarten van Rooij

Life-cycle models of consumption behavior typically imply that increased income uncertainty will increase precautionary saving and consumption growth by lowering current consumption. We will study this relationship for the Netherlands using data from the CentERpanel (whose members also participate in the annual DNB Household Survey). First, we construct measures of expected consumption growth and expected income and consumption risk and correlate them to household characteristics (as to test whether these relations comply with economic intuition, e.g. the young and the self-employed expecting a higher consumption risk). Second we use new instrument variable techniques to estimate the Euler equation and study the relation between precautionary saving and income/consumption risk.

Housing price shocks and trust in financial advice (started in 2014)
Dimitris Georgorakos (Goethe University Frankfurt), Roman Inderst (Goethe University Frankfurt), Maarten van Rooij

In the last decade, housing prices have fluctuated significantly in the Netherlands. In particular, housing prices increased dramatically between the early 2000s and mid 2008, while they have subsequently dropped by 20% on average. At the same time, almost one out of three Dutch households has taken out a mortgage loan in the period 2000-2008, the vast majority of whom after receiving financial advice. Part of the households report that they were advised to take up particular mortgage products (such as interest only mortgages) or to borrow higher than planned amounts. Against this background, our aim is to examine the extent to which the likely losses that households have experienced on a difficult-to-trade asset have influenced the trust they put in advice and in financial institutions and banks more generally.

Intraday payment choices: mainstream vs. payments innovations (previously: Cash management and intraday cash balances), started in 2014
Lola Hernandez, Nicole Jonker

Payment instruments play a key role in channelling consumers' money into the economic pipeline. Increasing the efficiency of the payment system is then a crucial task of central banks. To better understand what determines the role of payment instruments, it is fundamental to study what determines their use at different moments. This paper aims at better understanding this by shedding light on consumers' cash management as well as their use of new forms of payments as contactless cards. This study uses detailed transaction information using cash, debit cards and new forms of payments as well as cash withdrawals. The focus of this paper will be on cash management and tracking people's payments, using detailed information on their cash balances and transaction characteristics, such as their order and size. In order to do this, it will use shopping diary data collected in an extensive payment survey in 2013 among more than 8,000 Dutch consumers.

How wide is the Dutch border: assessing the effects of increases in excise duties on cross-border trade filling stations
David-Jan Jansen, Nicole Jonker

Excise duties on petrol were increased in 2014. Petrol stations have incorporated the change in excessive duties in their consumer prices for petrol, leading to an increase in fuel prices for consumers and businesses. According to petrol shops located close to the Belgian and German borders, consumers have chosen to travel across the borders so as not to be affected by the increased excises. However, others have argued that there is no clear evidence of a change in fuel demand. This study attempts to estimate to what extent demand has shifted in response to recent higher excise duties. In addition, we want to examine whether there are any differences in changes in demand between car owners who live in the border regions and those who don't. The project uses data from the payment diary research. From September 2013 onwards members of the GfK consumer panel were asked to report all their daily payments at all point-of-sale in the Netherlands. As such, this dataset includes information on domestic demand for fuel prior to the change in excessive duties and after the change. In addition, we can distinguish between people living near the border and living further away of it.

Inflation expectations and household behaviour
Federica Teppa (DNB)

We analyse whether Dutch households perceive deflation as a concrete risk in the years to come and we investigate whether this risk affects their economic behaviour. The empirical analysis is based on the DNB Household Survey.

Friends, family and framing: An international comparison of longevity expectations formation
Hazel Bateman (University of New South Wales); Federica Teppa; Susan Thorp (University of Sydney)

We will design and implement a two-country online choice experiment to investigate the formulation of subjective survival expectations, and to evaluate the relation between subjective survival expectations and individuals' attitudes to regulatory changes to pension plans. By comparing survey outcomes from the Netherlands and Australia, we can show whether the results are likely to generalise to other settings. The value of the comparison is highlighted by differences between retirement savings systems in the Netherlands and Australia.

In love with the debit card but still married to cash
Carin van der Cruijsen, Lola Hernandez, Nicole Jonker

Using shopping diary survey data we show that changing payment patterns is a challenging task; even when consumers have fallen in love with the debit card they find it hard to divorce from cash. While seven out of ten Dutch consumers report to prefer using the debit card, only seven out of twenty actually mostly pay by debit card. The likelihood that reported preferences and actual behaviour do not match increases with income, education and age. Consumers with payments in cash-intensive sectors, where the wide acceptance of the debit card is a relatively recent phenomenon, are more likely to overestimate debit card usage than other consumers. The likelihood of a gap also increases with the amount of cash that consumers carry with them and decreases with the average transaction size. Our findings indicate that persistent habits are an important explanation why the substitution of cash by debit cards took place at a slower pace than was expected.

Flat or flexible pension? Consumers' expenditures before and after retirement
Carin van der Cruijsen, Nicole Jonker

Some pension funds allow their participants to choose between flat pension profiles and more flexible pension profiles in which monthly pension receipts may vary according to a prearranged agreement. People may choose to receive relatively much pension income during the first years of their retirement, and less afterwards (high-low construction), but low-high constructions are also feasible. We examine what kind of pension arrangements correspond best with the preferences and needs of (future) pensioners. We use the DNB households survey to collect data on consumers' actual expectations and preferences regarding their pension profile and we use data from consumer payment diaries to estimate realized expenditure profiles after retirement. The DNB/DPA payment survey includes extremely rich and detailed information on consumers' expenditures in 14 different sectors during 2014.

Changing payment patterns at point-of-sale: their drivers
Carin van der Cruijsen, Mirjam Plooij

Based on household surveys from 2004 and 2014 we show how payment patterns in the Netherlands have changed. This data is unique because it covers a long time span and includes detailed information on payment behaviour per point-of-sale (POS). We find that the usage of the debit card has increased sharply. Perceived characteristics of payment instruments have affected both their adoption and the intensity by which they are used. Of these, user-friendliness and safety are the most important drivers of the adoption of electronic payment instruments. Socio-economic determinants of payment instrument adoption are quite robust over time. However, we find that the relevance of payment characteristics and socio-economic characteristics for the intensity of use of payment instruments varies over time and POS. Overall, user-friendliness is still the most important aspect and safety and speed remained relevant aspects, whereas costs are the least important aspect for the intensity by which payment instruments are used.

On the value of virtual currencies
Maarten van Rooij, Wilko Bolt

Virtual currencies such as Bitcoin represent both the emergence of a new form of currency and a new payment technology to purchase goods and services. This research project tries to assess the value of virtual currencies. The paper develops an economic framework that analyses the main drivers that determine this value. Value refers to the rate at which the virtual currency can be exchanged against an existing currency. Two components seem crucial: merchant acceptance and investor speculation.

Economic and institutional determinants of mortgage default
Razvan Vlahu, Jakob de Haan

This paper studies the potential causes of cross-country variation in mortgage defaults. We find that in addition to the macroeconomic risks and mortgage market characteristics, the peculiar features of countries' institutional and legal environment matter, which suggest that institutional arrangements governing the credit markets are important determinants for the performance of mortgage market.

5. Modelling and forecasting

Modelling spending under conditions of low inflation/deflation
Robert-Paul Berben, Ad Stokman

Many OECD countries have experienced episodes of low inflation or deflation in the recent three decades. In most cases such episodes had been short lived, but in some cases like Japan deflationary pressures had been structural with long lasting downward effects for economic growth. After the outbreak of the recent financial crisis, in many countries (both in Europe and outside) inflation and nominal interest rates dropped sharply. Particularly in Europe, inflation levels tended to remain low in the aftermath of the Great Recession posing problems for the real economy and for policy. In this paper, we investigate the consumer spending consequences of low inflation/deflation.

A labour market indicator for the Netherlands
Wilko Bolt, Johan Verbruggen

In recent years, it has proven difficult to forecast the developments of employment and unemployment in the Netherlands using traditional macro models. In this research project we attempt to find some specific leading indicators for the Dutch labour market, which are not incorporated in traditional macro models. Promising indicators are hours worked for temporary employment agencies, open vacancies and the number of applied dismissal orders. Applying an error-correction approach, we want to estimate labour demand and unemployment rate using these indicators as regressors and gauge its forecast performance.

Modelling the business and financial cycle in a multivariate time series model for the G7 and the euro area (started in 2014)
Irma Hindrayanto, Jasper de Winter, Siem Jan Koopman (VU University)

Azevedo, Koopman and Rua (AKR, 2006, JBES) proposed a multivariate bandpass-filter based on the trend-cycle decomposition model for the Euro-area. The underlying multivariate dynamic factor model with a moderate database (of nine time series) relies on m trend and cycle components and produces smooth business cycle indicators with bandpass filter properties. In this project, we plan to apply the AKR method by including relevant financial variables (financial-macro relation) and distinguish two instead of one business cycle. The goal of this project is to determine a long and short-term business cycle and determine the drivers of these cycles distinguishing real-economic indicators (GDP, industrial production, yield-curve, producer confidence, unemployment) and financial indicators (housing prices, credit variables, stock market indices) for the G7 and the euro area. What are the main drivers of the short- and long-term cycles and do we see international transmission between the short-term and long-term cycles?

Improving short-run predictions of GDP by statistical methods by subjective information (started in 2013)
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 the G7 countries.

Natural resource dependence of the Dutch economy
Jante Parlevliet, Robert Vermeulen

For both sustainability and resilience to supply shocks it is important to know how scarce natural resources are handled throughout production processes. This research project sheds new light on the resource dependence of the Dutch economy at a sectoral level from a global value chains perspective by using the World Input-Output Database during 1995-2011. We compare sectoral energy dependence in an international context and investigate the resource use of individual sectors both direct and indirect via intermediate goods that are needed for the production process. We can also identify the crucial direct and indirect energy suppliers.

Forecasting with large panel data sets
Andreas Pick

This research project investigates methods for forecasting with large panel data sets. An application is that of Bernoth and Pick (2011, JBF), who investigate forecasts of banking and insurance vulnerabilities. The current project aims to further the understanding of forecasting in such data sets, to develop new forecasts, and compare those forecasts to existing forecasting methods.

Trade financing practices before, during and after the Great Recession
Ad Stokman

Worldwide 40 to 80% of exports are financed by means of open accounting, which is the most flexible (and risky) form of trade financing; banks finance 10 to 40% of international trade transactions. In a time series framework from the early 1970s to the early 1990s, Stokman (1995) showed that German, Belgian and Dutch foreign trade financing practices are actively being used to (partly) offset tighter bank credit conditions. Data availability for The Netherlands from 1995 onwards (CBS) and for Germany for a much longer episode (Bundesbank, starting in 1949) puts us in a position to re-investigate inter company trade credit behaviour and establish whether trade financing played a similar or different role during the recent financial crisis. We explicitly take account of the possibility that causality between trade and trade financing may run in both directions.