DNB Research Program 2023

DeNederlandscheBank

EUROSYSTEEM

DNB Research Program

De Nederlandsche Bank NV
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Theme 1. Conventional and unconventional monetary policy

New projects

1. Quantitative easing under de-anchored expectations
Alexandre Carrier (ECB, Bielefeld University) and Kostas Mavromatis (DNB, University of Amsterdam)

In this paper we analyze the effectiveness of asset purchase programs (or Quantitative Easing) in a model in which agents' expectations can become de-anchored. Using analytical and numerical methods, we examine the ability of these policies to keep inflation and output gap at their target when conventional monetary policy based on the adjustment of a short-term policy rate is unavailable. We find that, at the zero lower bound, quantitative easing can fully stabilize the output gap, regardless of the degree of de-anchoring. Nevertheless, the fall in inflation as a response to a demand shock is wider the bigger the fraction of de-anchored agents.

2. Quantitative easing in times of market stress: evidence from the euro area
Gavin Goy (DNB)

A growing literature has highlighted the intensification of financial frictions during (financial) crises, including the counter-cyclicality of risk premia, due to, for instance, the asymmetric information. Using a stylized New Keynesian model with real effects of Quantitative Easing (QE), I show that the effects of QE are larger whenever financial frictions are high. In a second step, I estimate a Bayesian proxy threshold VAR on monthly euro area data to confirm these model predictions and show that QE surprises have larger effects on macro-financial variables when market stress is high.

3. Quantitative tightening in a HANK model
Guido Ascari (DNB, University of Pavia), Timo Haber (DNB) and Kostas Mavromatis (DNB, University of Amsterdam)

Who bears the burden of quantitative tightening and how does it affect macroeconomic outcomes? In order to answer this question we build a model where households face uninsurable idiosyncratic income risk and can save in two assets; a short and a long government bond. The long government bond is subject to adjustment costs and modelled like a perpetuity that declines geometrically. We model QT (and QE) as a change in the relative aggregate supply of the long- versus the short bond. We then investigate the following questions through the model's perspective: How does a change in the maturity structure of outstanding debt affect aggregate variables? How does fiscal policy affect these conclusions? Are there any asymmetries?

4. Monetary policy transmission during sovereign stress
Tilman Bletzinger (European Central Bank) and Gavin Goy (DNB)

A key justification of several asset purchase programs of the European Central Bank (ECB) has been the safeguarding of the monetary transmission, i.e. the control of euro area interest rates and ultimately inflation. Using a Bayesian threshold model and daily data on key macro-financial variables, we provide evidence that the monetary policy transmission in the euro area may indeed break down at times of heightened sovereign stress. Our results thus provide an important empirical justification for instruments such as the Transmission Protection Instrument.

Continued projects

1. Efficient estimation of models with occasionally binding constraints

Paolo Bonomolo (DNB) and Sophocles Mavroeidis (University of Oxford)

We propose two methods to estimate models with occasionally binding constraints: a maximum likelihood strategy and a Bayesian approach. With respect to existing methods, we improve the efficiency of the estimators through the analytical derivations of the likelihood and of the posterior distributions of the parameters and latent processes. Our methods are simpler to implement and faster. We apply our estimation strategy to the CKSVAR model of Mavroeidis (2021) and use it to measure the contribution of conventional and unconventional monetary policies in the Euro Area and US.

2. Yield curve control

Sami Alpanda (University of Central Florida), Serdar Kabaca (Bank of Canada) and Kostas Mavromatis (DNB)

We consider a dynamic stochastic general equilibrium model with three types of agents (savers, borrowers and renters) and housing to analyze the efficacy of targeting the long-term interest rate along with the short-term interest rate (i.e., yield curve control) for implementing monetary policy in normal times. The long rate differs from the short rate due to portfolio costs, and affects aggregate demand directly through its partial pass-through to mortgage rates on borrowers. We first characterize optimal monetary policy in a simple version of the model, and show that the presence of heterogeneity (and exuberance shocks on house prices) generate a crucial role for targeting the long rate along with the short rate even in the absence of markup shocks or wage rigidities. We then estimate a full-blown version of the model to consider the quantitative importance of yield curve control for welfare and macroeconomic stabilization.

3. Detecting liquidity traps

Paolo Bonomolo (DNB), Yildiz Akkaya (Konjunkturinstitutet) and Ingvar Strid (Sveriges Riksbank)

Major economies experienced a period of low interest rates and low inflation. A possible explanation is that they fell in a liquidity trap. This is an equilibrium situation in which the policy rate is at the effective lower bound and inflation fluctuates around a negative or very low value. Ending in a liquidity trap is a big risk for the policy maker and we develop an econometric strategy to quantify this risk. We show that the methodology is able to recognize when the probability of converging to a liquidity trap is high before the interest rate approaches the lower bound.

4. Estimating DSGE models with finite horizons

Kostas Mavromatis (DNB), Joep Lustenhouwer (University of Heidelberg), Mike Tsionas (Lancaster University) and Giorgio Motta (Lancaster University)

We augment the Smets-Wouters (2007) model to account for households' and firms' bounded rationality. In particular, we assume that both form decisions up to a finite number of periods to the future. We estimate the model using a novel estimator. Our estimates show that the planning horizon of agents varies from 20 to 25 quarters ahead. Moreover, given the finite horizon in agents' decisions, we show that the responses of output, inflation and investment in the U.S. are more pronounced following fundamental shocks.

5. Assessing the impact of conventional monetary policy on the capital-labor ratio in Brazil

Guilherme Moura (Federal University of Santa Catarina) and Aishameriane Schmidt (DNB, Erasmus University Rotterdam, Tinbergen Institute)

To empirically investigate redistributive effects of conventional monetary policy shocks in Brazil, we use the series of the capital-labor ratio, as well as GDP, inflation rate, and interest rates in our proposed extension of Uhlig's (1997) Wishart BVAR to a time-varying parameter framework. The data used for posterior computations comprises the monthly observations between March 2000 to October 2018, which corresponds to the inflation targeting regime in the Brazilian economy. The results show a positive and significant response of the capital-labor ratio to contractionary monetary shocks, which lasts at least a semester, suggesting the existence of a non-negligible redistributive effect of monetary policy. Moreover, this response is not constant across periods, and changes in the impulse response functions across the sample were observed due to a time-varying behavior of some of the model parameters. In particular, the strength of the impact of monetary shocks on the capital-labor ratio has diminished in the last sample periods analyzed.

Theme 2. Inflation

New projects

1. Global supply chain pressures, inflation and implications for monetary policy
Dennis Bonam (DNB, VU University) and Andra Smadu (DNB, University of Groningen)

How should policymakers respond to the recent surge in inflation? This paper quantifies empirically how much global supply chain pressures contribute to euro area inflation, and examines theoretically what they imply for monetary policy. We first document that global supply chain pressures contribute positively and significantly to inflation in the euro area, based on a Phillips curve analysis. We then show that shocks to global supply chain pressures play an important role in the recent surge in euro area inflation, using a Bayesian structural vector autoregressive model. These shocks are found to have a highly persistent effect on inflation. Finally, we study what these shocks imply for optimal monetary policy using a New Keynesian model with trade in intermediate goods.

2. Nonlinear Phillips curve and inflation risk
Hanno Kase (University of Minnesota), Sebastian Rast (DNB) and Matthias Rottner (Deutsche Bundesbank)

How does a nonlinear Phillips curve affect inflation risk? Using a strategic surveys approach and micro price data, we establish that the price setting behaviour of firms depends nonlinearly on the inflation environment. In a high inflation environment, the share of firms that adjust their prices in response to expected inflation increases. We rationalize these dynamics using a quantitative macroeconomic model with a nonlinear Phillips curve. The model features a tractable heterogeneous firm setup with endogenous varying degrees of price flexibility. Solving the model with a machine learning approach, we demonstrate that firms price setting decision implies a substantial inflation and growth risk on the upside. Contractionary monetary policy becomes less effective in a high inflation environment, which provides a new motive to act pre-emptively for monetary policy once inflation risk increases.

3. Inflation trends and cycles
Marco Hoeberichts (DNB)

We investigate trends and cycles for inflation using trend-cycle decomposition based on a Beveridge-Nelson filter. We also the relationship between cyclical inflation and a business cycle indicator. By applying this approach to data from the euro area and from the Netherlands, we investigate whether the results help in understanding the inflation process and whether the trends as analyzed in Hindrayanto, Samarina and Stanga (2019) still apply. We also intend to use the result for forecasting inflation in real time.

4. Estimating the slope of the Phillips curve
Emmanuel De Veirman (DNB) and Anton Nakov (European Central Bank).

This paper examines the performance of different ways of estimating the Phillips curve. We do so by running Phillips curve regressions on simulated data from a New Keynesian model in which we know the true Phillips curve parameters. We check which estimation method yields estimates that are closest to the truth. We check how this depends on the mix of demand and supply shocks that hit the economy.

5. **Inflation and commercial real estate: a happy marriage?**
Dorinth van Dijk (DNB), Simon Camillo Buechler (MIT) and Alex van de Minne (UCONN)

Real estate is usually seen as a relatively good inflation hedge compared to stocks or bonds. The main reason is that rents tend to be indexed. At the same time, real estate pricing is relatively sensitive to interest rate swings. In this study we examine the effect of several inflation shocks on commercial real estate returns at a regional level. We include cities from multiple countries in our sample. We will allow for nonlinear effects to distinguish between periods of low and (unexpected) high inflation.

6. **Inflation nowcasting in persistently high inflation environments**
Richard Schnorrenberger (Kiel University), Guilherme Moura (Federal University of Santa Catarina) and Aishameriane Schmidt (DNB, Erasmus University Rotterdam, Tinbergen Institute)

Recent episodes in global markets have shown that inflationary waves can unfold extremely fast while leading to considerable macroeconomic uncertainty as spiraling inflation expectations become a real threat. In this scenario, real-time forecasts of inflation are of utmost importance for central banking, policy analyses and investment strategies. At the same time, there is a rapidly increasing availability of high-frequency datasets and a growing body of literature on mixed-frequency models. Building on these trends, we investigate the predictive content of high-frequency economic and financial indicators for the CPI inflation rate in an environment characterized by persistently high inflation rates, namely the Brazilian macroeconomy of the past decades. We also exploit appealing nonlinearities in the data using machine learning methods and incorporate stochastic volatility features that have proven to improve density forecasts in turbulent times with sudden inflationary trends.

Continued projects

1. The relation between idiosyncratic volatility and price setting
Emmanuel De Veirman (DNB) and Raphael Schoenle (Brandeis University)

Firm-specific shocks play a crucial role in price setting models. For instance, they are in line with the fact that one observes a substantial share of price declines even with positive inflation. In this paper, we test the implication from price-setting models that firm-specific volatility relates positively to the frequency of price adjustment. This relation is important for monetary policy given that theoretically, more frequent price adjustment implies a steeper Phillips curve.

2. Consumers' inflation expectations: insights from a monthly survey
Richhild Moessner (BIS), Gabriele Galati (DNB) and Maarten van Rooij (DNB)

There is an increasing interest among policy makers and academics in the formation of inflation expectations of consumers. This project aims to better understand inflation expectations using results from an ongoing consumer survey. Topics include the level and probability of inflation expectations, anchoring of long-term inflation expectations, developments during a period of regime changes and increasing inflation realizations, and the role of information provision.

3. Forecasting Dutch inflation using machine-learning methods
Robert-Paul Berben (DNB) and Jasper de Winter (DNB)

Despite the benefits of forecasting inflation accurately, improving simple models has proved challenging. This research explores advances in machine learning (ML) methods to forecast Dutch inflation. We investigate whether ML models with a large number of covariates are systematically more accurate than simple benchmark models, such as AR

and RW. Amongst other we will investigate (polynomial) shrinkage methods, (targeted/boosted) factor models, ensemble methods, random forests and neural networks.

4. Bounded rationality, noisy signals and monetary policy assessment
Kostas Mavromatis (DNB), Tolga Ozden (Bank of Canada) and Joep Lustenhower (University of Heidelberg)

We introduce household bounded rationality in a closed economy where firms have noise signals as regards the demand for their products. We assume that households use simple heuristics to forecast inflation, output, consumption and the future monetary policy stance. Firms operate in a monopolistically competitive environment and set the price of their goods infrequently. Firms are uncertain about the demand conditions in their sector. In particular, we assume that when setting the price, firms observe the demand for their product with some noise. This channel introduces an additional layer of uncertainty in our model. We assess the performance of simple monetary policy rules, namely inflation targeting, average inflation targeting and price level targeting. Subsequently, we compare our results to those from the rational expectations benchmark where households and firms share the same information set.

Theme 3. Monetary policy, financial markets and credit

New projects

1. Identifying financial fragmentation: do sovereign spreads in the EMU reflect differences in fundamentals?
Jan Kakes (DNB) and Jan Willem van den End (DNB, Vrije Universiteit)

We present a metric for financial fragmentation in the EMU, based on the distribution of sovereign spreads relative to macro-financial variables. We apply two-stage-least-squares (2SLS) regressions to allow for time variation in this relationship while controlling for market sentiment. The unexplained part of the moments of the spread distribution is identified as (unwarranted) fragmentation. The metric provides a single, area-wide measure of fragmentation in the EMU.

2. Pass-through of banks' lending and deposit rates in a changing interest rate environment
Jan Kakes (DNB) and Andra Smadu (DNB, University of Groningen)

We study the pass-through of monetary policy rates – and market interest rates more generally – to banks' deposit and lending rates in the euro area. Particularly for retail deposits, this pass-through was limited in the negative interest rate environment because of the zero lower bound (ZLB). We aim to identify and date changes in banks' rate setting policies, using panel threshold and time-varying regressions. In addition, we investigate to what extent banks have passed on the costs of the ZLB for deposits by boosting their lending rates. Finally, a relevant question is to examine if banks reversed their rate setting behavior when policy interest rates moved back into positive territory in 2022.

3. Macroeconomic implications of price and liability dollarization
Daniela Hauser (Bank of Canada) and Kostas Mavromatis (DNB, University of Amsterdam)

Dollarization is a key feature of many emerging market economies, affecting their vulnerability to currency fluctuations as well as to foreign shocks. This paper develops a small open economy with endogenous dollarization in goods and financial markets. Domestic firms can price their goods in both the domestic currency as well as in dollars. At the same time, local governments can issue debt in both currencies. Our model suggests that dollarization affects the economy's dynamics to relevant shocks and gives rise to an additional trade-off between stabilization and the degree of dollarization.

4. Local supply effects and the impact of QE: the Eurosystem's corporate sector purchase programme
Casper de Haes (University of Amsterdam), Tom Hudepohl (ECB) and Jan Kakes (DNB)

We study the impact of the corporate sector purchase programme (CSPP) on market prices through the lens of a preferred habitat investor. Using individual bond data, we investigate the presence of a so-called local supply effect, which means that yields of bonds that are eligible under the CSPP, or have characteristics that are similar to eligible bonds, respond more to the Eurosystem's asset purchases than other securities. Establishing a local supply effect helps to understand how asset purchase programmes affect financial markets. Moreover, the presence of a local supply effect provides insight into the scope for tilting asset purchases towards issuers with specific characteristics, such as green (climate-friendly) relative to brown firms.

5. Cross-country evidence of the natural yield curve
Gavin Goy (DNB) and Yuto Iwasaki (Bank of Japan)

The asset pricing literature usually describes yield curve dynamics by a small set of factors. Using data for the Euro area, Japan, the United Kingdom and the United States we provide country-level analysis evidence for treating the first two factors, namely level and slope, as non-stationary factors, thus supporting the existence of a time-varying natural yield curve. We then estimate the natural yield curves of these models by modelling the global component using a VAR with common trends.

6. Public money as a store of value, heterogeneous beliefs, and banks: implications of CBDC
Manuel Munoz (European Central Bank) and Oscar Soons (DNB)

The bulk of euro-denominated cash is held for store of value purposes, with such holdings sharply increasing in times of high economic uncertainty. We develop a model with public money as a store of value and heterogeneous prior beliefs about the probability of a bank run that accounts for this evidence. The issuance of a central bank digital currency (CBDC) as a store of value that is technologically superior to cash introduces a trade-off. On the one hand, the efficiency of holding public money increases and those consumers who were already holding public money benefit by fully replacing cash with CBDC. On the other hand, CBDC leads to bank disintermediation as it lowers the subjective probability of a bank run above which consumers prefer to hold public money rather than bank deposits. While CBDC partially replaces deposits, long-term lending decreases less than proportionally to deposits as remaining depositors are, on average, more optimistic about bank stability and banks re-balance their portfolio accordingly. The central bank can determine the magnitude of these effects by calibrating CBDC design features such as remuneration and quantity limits ex ante.

7. Financial factors, firm size and firm potential
Miguel Ferreira (Queen Mary University of London), Timo Haber (DNB) and Christian Rörig (QuantCo)

Using a unique dataset covering the universe of Portuguese firms and their credit situation we show that financially constrained firms (1) are found across the entire firm size distribution, (2) account for a sizeable asset share, and (3) exhibit a higher sensitivity to shocks, conditional on size. Incorporating a richer productivity process, for which we find empirical support for, into an otherwise standard model allows us to match the distribution of constrained firms conditional on size. In contrast to models that do not account for the distribution of constrained firms, the presence of large, constrained firms, together with the fact that constrained firms present a higher capital elasticity, can generate sizable recessions even for relatively minor shocks to the financial sector.

8. Financial investment sorting: the interaction of real and financial frictions
Miguel Ferreira (Queen Mary University of London), Timo Haber (DNB) and Hanbaek Lee (University of Tokyo)

A simple model predicts that financial intermediaries restrict financing to firms with a greater fixed investment adjustment cost. We show that the model prediction is consistent with the observed sorting patterns between the real and financial frictions using the universe of Portuguese firms. Then, we incorporate the different cost structures and financial frictions into a heterogeneous-firm general equilibrium model to capture the observed sorting pattern. Using the model, we analyze how the recently strengthened sorting pattern affects capital misallocation and aggregate shock sensitivity.

Continued projects

1. Heterogeneous access to loans across sectors: evidence from AnaCredit and the Bank Lending Survey
Stephen Kho (DNB, University of Amsterdam)

One explanation for the low post-GFC credit growth in the Netherlands is that Dutch firms are more service-based, have little collateral to offer and thus may not as easily obtain loans from banks. The lack-of-collateral argument would imply that service firms suffer more from shocks to credit supply, as they are all else equal riskier. Using the Dutch edition of the quarterly Bank Lending Survey, in which banks report their expectations and observations with regards to credit supply, and AnaCredit, a credit registry for non-financial corporate bank loans, we assess whether a shock to credit supply indeed disproportionally reduces access to bank loans for service firms. In an extension, we could assess whether this effect is mitigated by banks that take part in TLTRO.

2. Banks' usage of TLTRO funds
Tomas Carrera de Souza (DNB)

The recalibration of the parameters of TLTRO as a response to the pandemic led to a large participation by banks, who had an incentive to frontload their take-up regardless of their liquidity needs. In this paper I analyse to what extent TLTRO funds were used for the purchase of government bonds with "carry-suitable" characteristics. Two characteristics of TLTRO.III make it unique as compared to earlier refinancing operations. First, banks' take-up was mostly driven by their borrowing allowances, which allows to treat TLTRO.III as an exogenous shock. Second, many banks had already beat their lending benchmarks by the time of their participation, which ensured access to the special interest rate without the need to further increase credit supply.

3. Macroeconomic implications of price and liability dollarization
Daniela Hauser (Bank of Canada) and Kostas Mavromatis (DNB)

Latin American emerging market economies have traditionally been subject to dollarization. The latter may refer to either goods being priced in dollars, or to local governments issuing dollarized bonds. Importantly, the share of dollarized sovereign debt has been increasing over the past years. We build a small open economy (SOE) DSGE model accounting for those facts in order to explore the effects of US monetary policy on dollarized economies. We show that the exchange rate effects of changes in US monetary policy have non-negligible effects on those economies. The local currency depreciation due to the imminent increases in the Federal Funds Rate not only raises the domestic currency value of dollar denominated debt but also leads to an increase in the risk premia attached to it. Hence, local governments can be subject to pressures to consolidate, deepening thus the induced recession. We derive the endogenous degrees of price and liability dollarization and argue that local governments can appropriately target them in order to minimize the risks of exchange rate fluctuations.

4. Integration of funding and market liquidity in real estate
Dorinth van Dijk (DNB), Yumei Wang (University of Amsterdam) and Marc Francke (University of Amsterdam)

In commercial real estate markets, market liquidity tends to commove stronger than returns. As trading requires capital, we hypothesize that part of the strong co-movements in market liquidity are determined by changes in capital markets, i.e. funding liquidity. Because capital markets, as opposed to space markets, are mostly nationally or even internationally integrated, this provides a reasonable explanation why commercial real estate market liquidity is so strongly integrated across markets. By using and constructing several measures for funding liquidity, we provide robust evidence that changes in funding liquidity drive common changes in market liquidity.

Theme 4. Financial stability and financial regulation

New projects

1. Finding the right balance with the digital euro: banks' liquidity risk and central bank reliance
Barbara Meller (ECB) and Oscar Soons (DNB)

How many digital euros can the banking system accommodate? And how severely would a digital euro change the way banks are funded? To answer these questions, we use granular euro area bank-level data in a constraint optimisation model which simulates the impact of a digital euro on individual banks' balance sheets simultaneously. The severity of the simulated impact on each bank crucially depends on i) investors' and supervisors' liquidity risk preferences, ii) the available liquidity in the banking system, iii) the bank's business model and iv) whether the digital euro is introduced orderly.

2. Cross-border banking, intragroup exposures, and bank risk-taking
Eric Cuijpers (DNB, University of Amsterdam) and Razvan Vlahu (DNB)

European banking groups face significant restrictions when moving funds across borders, most notably in intragroup exposure limits that impair the ability to transfer funds from entities in one jurisdiction to those in another. Regulators intend to loosen (or abolish entirely) restrictions on the cross-border flow of funds within banking groups. We study banking groups' risk-taking behavior under alternative intragroup exposure limits. Specifically, we focus on the behavior of banking groups with a large parent in the home country and a small(er) subsidiary in the host country when the banking group falls under supranational supervision but complies with national regulations of intragroup exposures. We show that banks have incentives to onshore risky investments to the home country due to the structure of intragroup support required under supranational supervision. This effect is more pronounced when foreign subsidiaries are larger.

3. Borrower runs and the lender of last resort
Razvan Vlahu (DNB)

This paper studies a global game model of "borrower runs" on a bank and the role of a lender of last resort in the presence of strategic debtor behaviour. As a result of collective strategic default, a financially sound borrower may claim the inability to repay if she expects a sufficient number of other borrowers to do so, thus reducing bank enforcement capacity. Such opportunistic behaviour of borrowers happens in a framework in which, on the one hand, the bank understands that its asset choice will affect the central bank's intervention policy. On the other hand, the central bank (acting as a lender of last resort) recognizes the opportunity cost of forgone intermediation if the bank is closed.

4. Shared equity mortgages, momentum for utilizing housing wealth. Interesting option for pension funds.
Casper van Ewijk (University of Amsterdam), Arjen Gielen (Stimuleringsfonds Volkhuisvesting Nederlandse Gemeenten), Marike Knoef (University of Leiden, University of Tilburg), Mauro Mastrogiacomo (DNB, Vrije Universiteit Amsterdam) and Alfred Slager (University of Tilburg)

Dutch households have a home equity of approximately 1,200 billion euros. Yet the utilization of this equity is not thriving, which, among other things, inhibits improving the sustainability of homes. In this paper, we investigate whether the introduction of shared equity mortgages may give new momentum to the utilization of home equity in the Netherlands and the role that pension funds could play in this regard. Shared equity mortgages are a - for the Netherlands - new form of mortgage in which the value of the loan (upon repayment) comoves with the market value of the home. This reduces the housing price risk for homeowners. As with reverse mortgages, the annual charges are

rolled over to the end of the term (before or after death) which provides extra liquidity to households, thus strengthening their financial resilience. Through these mortgages, pension funds can take on some of the housing market risk from households (and banks) and thus contribute to greater financial stability.

5. Residual mortgage debt, insurance and defaults in the Netherlands
Madi Mangan (DNB, Vrije Universiteit Amsterdam), Mauro Mastrogiacomo *(DNB, Vrije Universiteit Amsterdam) and Hans Bloemen (Vrije Universiteit Amsterdam),*

Fluctuations in house prices can result in negative home equity and an increase in mortgage defaults. To rationalize an increase in defaults in the presence of lower house prices, some authors refer to strategic defaults, i.e. the defaulting of those who could actually afford the payment of mortgage premiums, but prefer to discharge debt. We focus on the onset of negative home equity and the presence of a (semi-public) insurance accessible for a specific segment of the housing market, whose size has exogenously changed over time. Do defaults also occur more often because of the insurance? We also complement the quasi-experimental setting with a more structural approach, with the estimation of an optimal stopping model.

Continued projects

1. The preferential treatment of sovereign debt
Eric Cuijpers (DNB), Maurice Bun (DNB, University of Amsterdam) and Massimo Giuliodori (University of Amsterdam)

Large holdings of (home) sovereign debt by banks have negative effects on real output and financial stability. The literature has found risk shifting, carry trade behavior and moral suasion as causes of these large (home) holdings. This paper contributes by investigating to what extent the preferential regulatory treatment, i.e. zero risk weight, is a contributing factor in the emergence of large (home) sovereign portfolios. Using a novel dataset of EU bank's sovereign portfolios broken down by member state and regulatory approach (SA versus IRB), we identify to what extent the zero risk weight facilitates the mechanisms identified by the literature. If zero risk weights facilitate banks' large holdings of (home) sovereign debt, the policy implication is that risk shifting, moral suasion and carry trade behavior can be eliminated by adjusting the preferential treatment of sovereign debt.

2. Central bank digital currencies and financial stability: Market discipline in the era of digital money
Razvan Vlahu (DNB)

Central Bank Digital Currency (CBDC) is a highly debated topic. Various central banks are currently considering whether and how to introduce this new type of fiat money. The introduction of a CBDC raises questions relating to, among others, the optimal design and potential consequences for financial stability. Some argue that under stress conditions, the presence of CBDC can increase the likelihood of bank runs. Concerns about a bank's health might encourage depositors to convert their money into CBDCs (since this digital money is backed up by sovereign credibility and thus risk-free). The financial stability implications of a CBDC would depend on depositors' behavior, which also depends on the specific attributes of the CBDC. This research project's main goal is to gain insights into the implications of the adoption of CBDC on financial stability. We answer the following questions: (1) How does the presence of CBDCs alter the nature of bank runs?, and (2) To what extent does the impact on bank deposits depend on the design features of a CBDC (such as interest rates and limits on convertibility)?

3. Collateral scarcity and reuse in the European repo market
Justus Inhoffen (DNB) and Iman van Lelyveld (DNB)

We study the effects of collateral scarcity on re-use in the European repo market. Using transaction data of the 53 largest dealer banks in the Eurozone, we estimate the daily bank- and security-specific reuse rate. We find that about 10% of the collateral obtained through reverse repo transactions is sold onwards. Regression results indicate that re-use increases as collateral becomes scarce through the ECB's asset purchasing programs.

Theme 5. Trust

New projects

1. The impact of high inflation on trust in national politics and central banks
Carin van de Cruijsen (DNB), Jakob de Haan (University of Groningen) and Maarten van Rooij (DNB)

The reopening of the economy after the COVID-19 pandemic and the war in Ukraine that was accompanied by a surge in energy and food prices, boosted inflation in 2022 to unprecedented levels. As a result, central banks worldwide started tightening monetary policy and national governments designed large support packages to relieve the drain in purchasing power of households. In this study we explore whether the increase in inflation has led to changes in public trust in national politics and monetary authorities (DNB and ECB).

2. Groups at risk and their trust in the payment system
Marie-Claire Broekhoff (DNB), Carin van der Cruijsen (DNB) and Jakob de Haan (University of Groningen)

Accessibility of the payment system is a topical issue. Some groups in the Dutch population are at risk of not being able to independently take part in the payment system, which is partly caused by the digitalisation of banking. We examine the level of trust in the payment system among these groups at risk. We expect trust to be relatively low among these groups, as they find the digitalisation of banking services more challenging and are more prone to be a victim of fraud. Through an extensive daily payment diary data set, we study around fifteen groups including people with functional impairments and low digital skills. Both consumers' trust in the payment system and trust in their own banks' payment services are considered.

3. The effect of online news articles on trust in the payment system
Marie-Claire Broekhoff (DNB)

While there is a growing literature on the effect of news articles in finance, research on the effect of news articles on trust in payment systems is yet to develop. Digitalisation increases people's access to information and news. Therefore we examine the effects of online news articles on consumers' trust in the payment system in the Netherlands. The articles can entail numerous topics related to, for example, (central) banks or political news, that could have either a positive or negative effect on trust. We use a machine-learning based text mining technique and a sentiment indicator and combine this with a daily payment diary data set, that includes data on trust. This could create new insights into what affects consumers' trust in the payment system.

4. Trust in pension funds financial performance, its' public perception, and their effect on voluntary pension savings participation
Floor Goedkoop (Vrije Universiteit Amsterdam), Madi Mangan (DNB, Vrije Universiteit Amsterdam), Mauro Mastrogiacomo (DNB, Vrije Universiteit Amsterdam) and Stefan Hochguertel (Vrije Universiteit Amsterdam)

We investigate the determinants of trust in one's pension fund and the effect of trust on having additional pension savings. Our identification is based on using exogenous shocks due to pension cuts and indexation, and how these are perceived. These instruments allow identifying the effect of trust in pension funds on participation in voluntary pension savings. We disentangle the effect of age, birth cohort and time in the determination of trust, and contradict previous findings of a positive age gradient with trust. This implies that in the future the general level of trust in pension funds will decline. This study also

finds a positive effect of trust on additional pension savings. Hence, the positive correlation found in previous studies can be interpreted as unbiased.

Continued project

1. Trust in financial institutions and central banks
Anna Samarina (DNB, European Central Bank) and Carin van der Cruijsen (DNB)

Trust in financial institutions is key because low trust may undermine financial stability and damage the financial services industry, which is detrimental for the well-functioning of the economy. Trust in central banks is also important. High trust comes with better-anchored consumer inflation expectations around the central bank's price stability objective, which makes it easier to reach this objective. We discuss trust in financial institutions and trust in central banks and summarize research on their drivers and impact.

Theme 6. Sustainability

New projects

1. Green bond standards, issuance and holdings: empirical research questions
Martijn Boermans (DNB)

European companies and governments are increasingly raising capital by issuing green bonds. Capital raised through green bonds may only be used for initiatives and projects aimed at making the economy more sustainable. When issuing these financial instruments, a company explicitly commits itself to working towards climate goals. There are various standards for green bonds and bodies that certify them, for example the Climate Bond Initiative and the ICMA. The European Union is working on a Green Bond Standard in line with the previously ratified EU taxonomy. In this paper we analyze green bond standards and the relationship with firm and government issuance program of these green bonds. We contribute by integrating this with holdings of green bonds to understand the drivers of investors to buy these climate-related bonds.

2. Sustainable investing at Dutch pension funds: awareness, implementation and the impact of sustainable investment initiatives
Annick van Ool (DNB, Maastricht University)

There is increasing societal and political pressure on pension funds to invest their assets in a sustainable way. Yet, little is known on how pension funds actually implement sustainable investing. In this paper I analyze how Dutch pension funds, who had over 1.8 trillion euros under management at the end of 2021, write about their sustainable investment policy over time. I introduce a novel textual analysis approach using state-of-the-art natural language processing (NLP) techniques to measure the awareness about and implementation of sustainable investing at pension funds using the annual reports of Dutch pension funds from 2016 to 2021.

3. Corporate climate related disclosures and green bond home bias
Anouk Levels (DNB) and Claudia Lambert (European Central Bank)

The benefits of international portfolio diversification have been widely recognized in finance theory. Yet, compared to what is deemed optimal, investors tend to allocate a disproportionally large share of their wealth to domestic financial assets. This empirical phenomenon, called home bias, has been extensively researched but remains an important empirical puzzle in financial markets to date. A steadily growing literature has proposed several partly competing and partly complementary explanations for investors' home bias, including information asymmetries. Interestingly, the integration of the nascent but fast growing European green bond market and its drivers remain largely unexplored, despite its potential relevance for financing the EU's transition to a green economy. We exploit the nascent state of the euro area green bond market to assess how euro area companies' climate related disclosures affect the level of home bias of the green bonds that they issue. Our findings may inform EU policy development geared towards green capital market integration.

4. Climate risk disclosure quality and costs of debt
Anouk Levels (DNB) and Rex Wang Renjie (VU Amsterdam, Tinbergen Institute)

In response to the increasing demand for climate-related financial disclosures, many countries start to mandate listed or large firms to explicitly report their climate risks and initiatives. Yet, despite some evidence in the equity markets, there is little evidence on how climate risk disclosure quality affects firms' cost of debt. Our study aims to fill this gap by studying the credit market effects of EU firms' climate disclosures. Specifically, we test whether high-quality climate disclosure reduce firms' financing costs for both green

and conventional bonds. We further study whether the change in costs of debt is driven by reduced home-bias.

5. Carbon taxation, reallocation and productivity
Boris Chafwehe (European Commission), Andrea Colciago (DNB, University of Milano Bicocca) and Romanos Prifitis (European Central Bank)

We develop a New Keynesian, multisector, industry dynamics model. Electricity is produced with both a fossil resource and a renewable. Goods and services are produced with technologies characterized by different labor intensity. In the latter two sectors firms are heterogeneous in terms of productivity and there are endogenous entry and exit dynamics. Nominal wages are sticky, such that monetary policy has real effects. We use carbon taxation to model a transition aimed at meeting the emission targets set by the European commission, and evaluate productivity and reallocation effects.

6. Corporate taxes, productivity and business dynamism
Andrea Colciago (DNB, University of Milano Bicocca), Vivien Lewis (Bundesbank) and Branka Matyska (CERGE-EI)

We identify the effects of corporate income tax shocks on key US macroeconomic aggregates, including productivity and firm entry and exit. Our key findings are that in response to an unexpected corporate tax rate reduction: (i) labor productivity increases; (ii) entry increases with delay; (iii) exit increases; (iv) expansionary uses of labor increase by more than production labor. To rationalize these empirical findings, we build an Industry dynamics New Keynesian model where firms have heterogeneous idiosyncratic productivity. Our model features productivity gains due to selection along both the entry and exit margins in response to the shock. Models with homogeneous firms do not feature selection, and, for this reason, deliver counterfactual dynamics.

7. Entry, exit, and employment concentration: the role of entry cost shocks
Andrea Colciago (DNB, University of Milano Bicocca) and Marco Membretti (University of Pavia)

We identify the effects of entry cost shocks on key US macroeconomic aggregates, including firm entry and exit, unemployment and employment concentration. Our key findings are that in response to an unexpected increase in entry costs: (i) exit of small firms increases, while entry decreases; (ii) the average size of new entrants increases (iii) unemployment decreases, (iv) employment becomes more concentrated at large firms. To rationalize these empirical findings we build a model with search frictions in the labor market and endogenous entry and exit of firms with heterogeneous productivity. Entry costs shocks increase barriers to entry and limit competition. The resulting higher profitability by incumbents leads to job creation and to a higher real wage that pushes small firms out of the market. Thus, the fraction of workers employed by large firms increases.

8. Shocks to occupational pensions and household savings
Francesco Caloia (DNB, Vrije Universiteit Amsterdam), Mauro Mastrogiacomo (DNB, Vrije Universiteit Amsterdam) and Irene Simonetti (University of Amsterdam)

This paper studies the saving response of households to shocks to the capital position of pension funds. Using survey panel data matched to supervisory data of occupational pension funds in the Netherlands, for a period covering three major economic crises, we provide evidence of the increase in savings driven by a deterioration in the financial position of pension funds. The identification strategy exploits cross-sectional and time variation in the funding ratios of pension funds, which are exogenous shocks to the pension wealth of pension fund members as they result from asset price corrections and asset allocations over which members have no direct control. We show significant saving responses to general changes in the funding ratios, as well as to direct shocks to pension

funds such as in the event of a funding deficit, a stop to conditional indexation, and a pension curtailment. The change in savings is concentrated among workers of pension funds with historically lower returns.

9. Modelling macroeconomic time series with multivariate Bayesian forests
Aishameriane Schmidt (DNB, Erasmus University Rotterdam, Tinbergen Institute), Andreas Pick (Erasmus University Rotterdam, Tinbergen Institute) and Andrea Naghi (Erasmus University Rotterdam, Tinbergen Institute)

We develop a new non-parametric model that accommodates non-linearities that can be present in the joint dynamics of macroeconomic time series. Specifically, we propose a multivariate heteroskedastic Bayesian regression tree (BART) model. Our new model is flexible and scalable as the traditional BART model without the restriction of a constant parametric variance specification. Moreover, the multivariate framework allows to capture correlations among the time series as well as dependencies in the error structure.

10. HANK models and the labor share
Guido Ascari (DNB, University of Pavia), Andrea Colciago (DNB, University of Milano Bicocca) and Timo Haber (DNB)

We identify the effects of monetary policy shocks on US aggregates, including profits, and income inequality. We propose a HANK model where the distribution of profit income among households is endogenous. Thanks to this mechanism the model displays dynamics consistent with the evidence, unlike standard New Keynesian models.

Continued projects

1. Households' interest rate expectations and behavior
Evangelos Charalambakis (Bank of Greece), Federica Teppa (DNB, Netspar) and Athanasios Tsiortas (European Central Bank)

The focus of this project is the analysis of interest rate expectations by the household sector in the Netherlands. The empirical analysis is based on novel survey data collected since April 2020 at a monthly frequency in the new ECB's Consumer Expectations Survey. The data allows to study how the consumers expect interest rates on savings as well as interest rates on mortgages to move in the next 12 months. The data also collects information on what the optimal interest rate movement would be for the economy as well as for the respondent's own finances. The data collected in the Netherlands will also be compared to those collected in the other EU countries also included in the survey. The study will investigate whether these expectations affect the household behavior in terms of consumption and saving.

2. The effect of labour market participation and education in credit access and approval during the covid-19 pandemic in Europe
Evangelos Charalambakis (Bank of Greece), Federica Teppa (DNB, Netspar) and Athanasios Tsiortas (European Central Bank)

We adopt the decomposition methodology à la Oaxaca (1973) and Blinder (1973) to identify and estimate the separate contributions of differences in parameters of (and in) individual demographic characteristics when accounting for mean differences in access to credit markets and credit approval between the employed and the unemployed, as well as between the high educated and the low educated. The empirical analysis is based on novel microdata from the new ECB's Consumer Expectations Survey, a fully harmonized online survey measuring consumer expectations and behavior, covering the period April 2020 to December 2021.

3. Misallocation and productivity growth: a meta-analysis
Maurice Bun (DNB, University of Amsterdam), Tetie Kolaiti (DNB) and Tolga Ozden (Bank of Canada)

In the last decades many countries experienced a slowdown in aggregate productivity growth. An important factor behind these declining productivity growth rates is misallocation of production factors. Recent studies have shown that empirical measures of misallocation based on the dispersion in marginal revenue products have increased over time within many countries. There are different sources of this observed misallocation, however, and there is in the literature no consensus about their relative impact on productivity growth. In this study we therefore conduct a meta-analysis of the extensive theoretical and empirical literature quantifying the productivity impact of the various origins of misallocation.

4. Pricing the carbon factor for Europe's equity market
Kristy Jansen (DNB, Tilburg University), Rianne Luijendijk (DNB), Philippe Loyson (DNB) and Sweder van Wijnbergen (DNB)

This paper uses firm specific CO2 emission data to augment the standard Fama-French three-factor model with a fourth "carbon factor". By constructing portfolios based on CO2 emissions we examine whether there is a systemic return from investing in a CO2 efficient European equity portfolio. In this way the paper will assess whether investors demand a carbon-specific risk premium as compensation for exposure to carbon risk. If there is no difference in pricing between CO2 intensive firms and low CO2 emitting firms, investors apparently do not value or possibly underestimate climate risk. If investors do price in a significant carbon factor this would have extensive consequences for the efficient allocation of investments and the cost of hedging carbon risk.

5. Financial literacy and pension expectations
Maarten van Rooij (DNB), Rob Alessie (University of Groningen) and Remko Struik (DNB)

A side-effect of low interest rates is that many pension funds are underfunded, have not been able to index the pensions for a number of years and may have to cut pensions when shortfalls do not recover. We investigate whether employees have updated their expectations regarding retirement age and replacement rate (both in terms of levels and uncertainty), also in view of the major policy changes since 2013 (gradual increase in statutory retirement age and reduced accrual rates). Moreover, we analyse whether the updating of pension expectations is related to financial literacy or other personal characteristics.

6. The effect of unemployment on interregional migration in the Netherlands
Cindy Biesenbeek (DNB, University of Groningen)

Using administrative data between 2006 and 2020, I analyze interregional migration in the Netherlands. In theory, individuals move out of regions with high unemployment rates, but most empirical research does not strongly support this prediction. Likewise, I only find a small effect of regional unemployment on interregional migration. Furthermore, I find that the unemployed are more mobile during the first three months of unemployment. In addition, my results suggest that renters in the private sector are much more mobile than homeowners or renters in the social housing sector. Finally, I find that commuters are much more likely to migrate, despite good infrastructure and relative short distances in The Netherlands.

7. The price of flexible work
Cindy Biesenbeek (DNB, University of Groningen) and Maikel Volkerink (DNB)

Employees with a flexible contract, i.e., those with either a temporary contract, temporary agency workers, or those on a contract with flexible hours, face more job and income insecurity than employees with a permanent contract. In competitive labor markets, they should be compensated for this uncertainty. In most countries, however, wages of flexible

jobs are lower than those of permanent jobs. We examine whether this is also the case in the Netherlands. We estimate the wage differential between permanent and flexible jobs wages between 2006 and 2019.

Theme 7. Payments and market infrastructures

New projects

1. Distinguishing cash user groups by clustering payment transaction data
Jelmer Reijerink (DNB)

Dutch consumers are increasingly moving away from using cash as a payment method at the point-of-sale. Despite the broad adoption of other payment methods, there remains a group of consumers who use cash as a payment method. It is important to shed light on who these people are. Using the Survey of Consumers' Payments (SCP) data from De Nederlandsche Bank and the Dutch Payments Association, we perform a clustering analysis in order to distinguish different types of cash users. We look at the role of payment transaction details, but also at individuals' personal characteristics. Additionally, we intend to explore data from the ECB SPACE II study to see whether similar results can be found in other Euro area countries.

2. A liquidity 'black hole' in a large value payment system: what is the impact of a failing participant on its environment and does time matter?
Ronald Heijmans (DNB) and Ellen van der Woerd (DNB)

This paper identifies the impact of a failing participant in a large value payment system (TARGET2). First, we determine, at individual bank level, the time interval between two payments to be considered exceptionally long (an outage or an outlier). To capture the intraday pattern we identify this interval at each hour during the daylight opening hours of TARGET2. Second, we measure the impact over time of this potential outage to other participants in terms of the number of participants hit and the amount of payments not send in line with Heijmans and Wendt (2019). In order to assess the impact we link the liquidity impact of participants to a measure of the size of the bank (e.g. the reserve requirement).

3. Paper or polymer? A fungal examination on banknotes
Katja Coeleveld (DNB), Wieske Ebben (DNB), Michel Justus (DNB), Simon Mastbergen (UMC Utrecht) and Schimmel onderzoekslaboratorium (UMC Utrecht).

Banknotes are exchanged by people in almost all communities on a daily basis, due to a variety in a person's health and hygienic standards microorganisms can spread on the surfaces of banknotes. The spread of microorganisms can also occur in the storage of banknotes under varying environmental conditions. One of the microorganisms are Fungi. Not only are fungi capable of destroying the paper currency they are also a threat to human health. In this study we are going to examine the transmission, survival and toxicity of fungi on banknotes. We are also going to look into if there is a difference in the transmission, survival and toxicity of fungi on paper or polymer based banknotes.

4. Attitudes and preferences of merchants with respect to CBDC
Nicole Jonker (DNB) and Ria Roerink (DNB)

Cash usage is declining and policymakers are discussing the introduction of a digital alternative: Central Bank Digital Currency (CBDC). They want to know the factors that will contribute to the adoption of CBDC and how CBDC can be designed best to meet the preferences and needs of consumers and merchants. Thus far, little attention has been paid to merchants and businesses. Goal of this research is to fill this gap, and to learn about merchant attitudes towards CBDC, and the factors influencing potential adoption. The study will gain deeper insights into the perceived and possible consequences of design

features for different types of businesses, depending on their size (small, large), their scope (national, international) and type (online, physical).

5. Cross-selling bank products via the payment account
Wilko Bolt (DNB, VU Amsterdam) and Nicole Jonker (DNB)

Dutch banks were not able to cover the cost of offering retail payment services in the Netherlands in 2021. It used to be the case that other bank segments cross-subsidized payments, because of the cross-selling possibilities. However due to increased competition in the market for bank products, cross-selling may gave become harder for banks. In this study, we will examine the importance of the payment account as a cross-selling channel for banks over time, and the factors affecting it. We will pay special attention to the impact of the interest rate on consumers' balances on payment accounts and savings accounts and trust in the providers of financial services. Among others, we will use information from DNB Household Survey (DHS). Our study will contribute to the understanding of the role of a payments account for banks for cross-selling other bank products.

6. Payment behaviour and preferences of 'groups at risk'
Carin van der Cruijsen (DNB) and Jelmer Reijerink (DNB)

There is a large body of research available on consumer payment behaviour. Many of these studies examine the way payment behaviour is related to standard personal characteristics, such as age and income. To date, however, little is known about how payment choices and preferences differ for those who find the digitalization of payments very challenging. These 'groups at risk' include, for example, consumers with a low digital literacy, consumers with a physical disability (such as deafness or blindness), ethnic minorities, or economically disadvantaged consumers. Using data from the Dutch Survey of Consumers' Payments (SCP), we gain insight into the payment behaviour and payment preferences for these groups of consumers.

7. Competition between private and public payment platforms
Vera Lubbersen (DNB)

One of the key issues in balancing public and private interests in money and payments concerns competition between payment service providers. Two-sided market structures, network effects, consumer habits and economies of scale and scope may lead to 'winner-takes-most' type of dynamics. The decline in cash usage poses the question what happens to payment pricing and social welfare when there is no longer a public alternative. This paper analyses welfare effects that arise when a public payment platform competes with a private payment platform compared to a monopolistic market structure. Specifically, under what conditions would it be more efficient to offer a public platform? Under these conditions, what role is left for private parties and what type of optimal fee structure will be implemented?

8. The Bank of Amsterdam and the limits of fiat money
Wilko Bolt (DNB, VU Amsterdam), Jon Frost (BIS), Hyun Song Shin (BIS), Peter Wierts (DNB, VU Amsterdam)

Central banks can operate with negative equity, and many have done so in history without undermining trust in fiat money. However, there are limits. How negative can central bank equity be before fiat money loses credibility? We address this question using a global games approach motivated by the fall of the Bank of Amsterdam (1609–1820). We solve for the unique break point where negative equity and asset illiquidity renders fiat money worthless. We draw lessons on the role of fiscal support and central bank capital in sustaining trust in fiat money.

Continued projects

1. Privacy in payments
Wilko Bolt (DNB, VU Amsterdam) and Maarten van Oordt (VU Amsterdam)

The issue of privacy is attracting more and more attention in payments. Preserving one's privacy in payments is increasingly difficult in a rapidly digitalizing world. Privacy in payments is a feature inherent to the use of cash, but transactional usage of cash is in decline. Garratt and Van Oordt (2021) provide a theoretic model unveiling the potential adverse economic consequences of foregoing privacy in payments. Their analysis stresses a public good aspect of privacy: my own information and own choices may also reveal something about the behaviour of other individuals. Others have highlighted the role of personal privacy attitudes (Kahn, 2018). The idea of this paper is to test empirically the role of privacy attitudes for payment behavior by combining recent survey datasets.

2. Characteristics of Dutch cryptocurrency owners
Nils Brouwer (DNB) and Jakob de Haan (University of Groningen)

Using a Dutch household survey we want to get more insight into which individuals own crypto currencies and for which reason. We will look at various demographic characteristics (e.g. gender, age, education level), level of trust in the financial sector and central banks and their level of knowledge about cryptocurrencies. For this latter we look at the self-assed level of knowledge, knowledge about technical aspects of crypto currencies and knowledge about which crypto currencies were traded most. Next, we will try to gain more insights into why individuals (intend to) purchase crypto's: are individuals buying crypto's as an investment or as an alternative for fiat money? For this, we ask participants to rate which statements about reasons for (not) buying crypto's align most with their own motive.

3. Data sharing and the privacy paradox
Nicole Jonker (DNB) and Hans Brits (DNB)

We observe that, on the one hand, consumers indicate that they consider the privacy of their (financial) data to be very important and, on the other, that they share their personal data with third parties fairly easily. This is known as the privacy paradox. There appears to be a discrepancy between intentions and actual behavior, especially in online environments. The literature indicates several reasons for this phenomenon, such as little or no risk assessment and biased risk assessment. With PSD2 and open finance approaching, there is a danger that account holders will also share excessive financial data with third parties, and cannot foresee the risks for themselves and for society. The aim of this study is to examine to what extent Dutch households share financial data with third parties, whether their data sharing activities are in line with their intentions to share data, and which factors may explain discrepancies between intentions and actual behaviour, such as lack of risk assessments or biased risk assessments.

4. Bank digitalisation and household payment behavior
Justus Meyer (European Central Bank) and Federica Teppa (DNB, Netspar)

This paper focuses on the impact that the increasing digitalization in the banking sector has on households payment behavior and preferences. The empirical analysis, based on questions asked in the new ECB Consumer Expectations Survey, will shed light on the most preferred and most used transaction means, on the use of bank apps and on the availability of cashless and electronic payments for purchases purposes. The study will show how the Netherlands compares to the rest of the largest Euro area countries and will contribute to better understand whether the scarce use of digital forms of payment in certain countries or for certain subgroups of the population is driven to demand side

factors (preferences, low technological skills, and alike) or to supply side factors (lack of digital payment instruments offered by the financial institutions).

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