June 2023
DNB Research Newsletter

DeNederlandscheBank
EUROSYSTEEM

Research highlights

1. Behavioral learning equilibria in New Keynesian models

In a forthcoming article in Quantitative Economics, Cars Hommes, Kostas Mavromatis, Tolga Ozden and Mei Zhu incorporate simple but optimal autoregressive forecasting rules, known as behavioral learning equilibria, in the Smets and Wouters (2007) model. Their estimations on the US data show that these simple rules outperform rational expectations. Read more

2. Business dynamism, sectoral reallocation and productivity in a pandemic

In a recently published paper in the European Economic Review, Guido Ascari, Andrea Colciago and Riccardo Silvestrini identify three facts that characterized the initial phase of the pandemic in the USA: (1) sectors where market activity involved exposure to the virus experienced a much sharper downturn, relative to trend, than the overall economy; (2) in sectors characterized by high exposure to the virus, that they define as social sectors, there was a substantial drop, with respect to trend, in new business applications, followed by a rebound in the third quarter of 2020; and (3) aggregate productivity increased up to summer/fall of 2020, to drop sharply afterwards, and to start growing again at the beginning of 2021. Read more

3. Preferred habitat investors in the green bond market

Green bond markets have grown significantly in recent years, expanding to over EUR 2 trillion in market size by the end of 2022. Using granular bond-level data from SHS-S we find that European investors invest 3.7% of their bond portfolio in green bonds, while green bonds represent only 1.5% of the total bonds' outstanding value. In particular, we show that mutual funds and pension funds invest disproportionally in green bonds and that their holdings are very price insensitive, which fits into our proposed theoretical framework of "green bond preferred habitat". By contrast and surprisingly, European insurance corporations and households shun green bonds. These results highlight the divergence in investor demand as an important factor for green bond issuers because firms and governments issue green bonds to cater certain investors willing to sacrifice returns.
Read more

4. Financial constraints and firm size: Micro-evidence and aggregate implications

A question that is of fundamental interest to both policymakers and macroeconomic researchers is which firms are most directly affected by monetary policy and financial tightening. One central piece of that puzzle relates to which firms are financially constrained, i.e. cannot obtain credit at the risk-free rates or the desired quantities. In a seminal work on this topic, Gertler and Gilchrist (1994) propose firm size as a good proxy for financial constraints. Small firms are arguably in a weaker financial position, have more idiosyncratic risk, and relymore on external financing. In simple terms: small firms face financial constraints whereas large ones do not. Many macroeconomic models used in the literature to assess the effects of financial shocks on the supply side reflect this strong correlation between size and financial constraints. Read more

5. PhD defense Oscar Soons

On January 11 Oscar Soons defended his PhD dissertation titled 'The Past, Present and Future of the Euro Area'. Oscar currently works as a policy economist and researcher at the Monetary Policy Department of DNB. Read more

Publications (since March 2023)

Working Papers

780 - Corporate taxes, productivity, and business dynamism
Andrea Colciago, Vivien Lewis and Branka Matyska

779 - The price of flexible jobs: wage differentials between permanent and flexible jobs in the Netherlands
Cindy Biesenbeek, Maikel Volkerink

778 - Identifying financial fragmentation: do sovereign spreads in the EMU reflect differences in fundamentals?
Jan Kakes, Jan Willem van den End

777 - Financial constraints and firm size: micro evidence and aggregate implications
Miguel Ferreira, Timo Haber, Christian Rorig

776 - Credit ratings and investments
Anna Bayona, Oana Peia, Razvan Vlahu

775 - Shocks to occupational pensions and household savings
Francesco Caloia, Mauro Mastrogiacomo, Irene Simonetti

774 - Misallocation and productivity growth: a meta-analysis
Maurice Bun, Theoplasti Kolaiti, Tolga Özden

773 - Preferred habitat investors in the green bond market
Martijn Boermans

Occasional Studies

Kwetsbaarheid en veerkracht van Nederlandse huishoudens: een analyse vanuit een breed welvaartsperspectief
Frank van Hoenselaar, Gerard Eijsink, Nikki Rupert

Published journal articles

Pricing of climate transition risks across different financial markets
Dirk Broeders, Bernd Schouten, Isabelle Tiems and Niek Verhoeven
Journal of Risk Management in Financial Institutions, 2023, 16(2), 102–115.

Outlier detection with reinforcement learning for costly to verify data
Michiel Nijhuis and Iman van Lelyveld
Entropy, 2023, 25(6), 842.

The shadow costs of illiquidity
Kristy Jansen and Bas Werker
Journal of Financial and Quantitative Analysis, 2022, 57(7), 2693-2723

Excess liquidity and the usefulness of the money multiplier
Jan Marc Berk and Jan Willem van den End
Credit and Capital Markets, 2022, 55(4), 457–488

DNB Analyses

Klimaatveranderingsrisico's en de markt voor energie en emissierechten
Merel Vrolijk, Ellen van der Woerd, Elisabeth de Vogel

The European equity lending market: exclusive security lending agreements
Iman van Lelyveld, Ellen van der Woerd, Natalie Kessler

Macroeconomic effects of the Inflation Reduction Act
Jonathan Rusch, Mario Carceller del Arco, Edi Vording, Bas Heerma van Voss, Kostas Mavromatis

Financieringsruimte en huizenprijzen
Gerard Eijsink, Dorinth van Dijk

De bijdrage van winsten en lonen aan de Nederlandse inflatie
Bahar Öztürk, Gerbert Hebbink

Forthcoming journal articles

How quantitative easing changes the nature of sovereign risk
Dirk Broeders, Leo de Haan and Jan Willem van den End
Journal of International Money and Finance

Inattentive search for currency fundamentals
Agnieszka Markiewicz, Ralph Verhoeks, Willem Verschoor and Remco Zwinkels
IMF Economic Review

[Monetary-fiscal interactions under price level targeting]
Guido Ascari, Anna Florio and Alessandro Gobbi
Journal of International Money and Finance

[Endogenous uncertainty and the macroeconomic impact of shocks to inflation expectations]
Guido Ascari, Stefano Fasani, Jakob Grazzini and Lorenza Rossi
Journal of Monetary Economics

[Accelerating inflation expectations of households in the euro area: sources and macroeconomic spending consequences]
Ad Stokman
Applied Economics Letters

[Business dynamism, sectoral reallocation and productivity in a pandemic]
Guido Ascari, Andrea Colciago and Riccardo Silvestrini
European Economic Review

[Behavioral learning equilibria in New Keynesian models]
Cars Hommes, Kostas Mavromatis, Tolga Ozden and Mei Zhu
Quantitative Economics

[Staggered wages, unanticipated shocks and firms' adjustments]
Francesco Caloia, Jante Parlevliet and Mauro Mastrogiacomo
Journal of Macroeconomics

Other publications

[Misallocation and productivity growth: a meta-analysis]
SUERF Policy Brief 618
Maurice Bun, Theoplasti Kolaiti, Tolga Ozden

[The market view: what the prices on credit default swaps imply about macroprudential bank buffers in Europe]
VoxEU Column, June 19, 2023
Daniel Dimitrov, Sweder van Wijnbergen

[Aandacht voor duurzaam pensioenbeleggen groeit sneller dan implementatie]
Economisch Statistische Berichten, June 16, 2023
Rob Bauer, Dirk Broeders, Annick van Ool

[Stijgende beleidsrente werkt meer door in hypotheek- dan spaarrente]
Economisch Statistische Berichten, May 10, 2023
Martin Admiraal, Tomar Dahan, Jan Willem van den End, Minke van der Heijden

[Regulators as risk managers: macroprudential policy through a risk management lens]
SUERF Policy Brief 563
Daniel Dimitrov, Sweder van Wijnbergen

Vijf aanbevelingen om klimaat- en inkomensbeleid samen te laten gaan
Economisch Statistische Berichten, April 13, 2023
Frank van Hoenselaar, Bas Heerma van Voss

Nederlandse beleggers desinvesteren uit wapens, ondanks hoge rendementen
Economisch Statistische Berichten, March 29, 2023
Martijn Boermans

For a complete list of publications see our website.

Events

Research seminars

Past

4 April 2023: Brexit and the trade elasticity
John Lewis (Bank of England)

11 April 2023: Firm heterogeneity, capital misallocation and optimal Monetary Policy
Galo Nuno (Bank of Spain)

18 April 2023: Dynamic Programming on a Quantum Annealer: Solving the RBC Model
Isaiah Hull (Norwegian Business School)

25 April 2023: The macroeconomic effects of cash transfers: Evidence from Brazil
Thuy Lan Nguyen (Federal Reserve Bank San Francisco)

2 May 2023: The Macroeconomic Effects of Extreme Shock
Francisco Ruge-Murcia (McGill University)

4 May 2023: Changing credit conditions and transmission to firms
Sarah Holton (ECB)

9 May 2023: Downside and Upside Uncertainty Shocks
Luca Sala (Bocconi University)

16 May 2023: Heterogeneous beliefs and the Phillips curve
Francesca Monti (Université Catholique de Louvain)

30 May 2023: The Fed's Response to High Inflation
Bill English (Yale School of Management)

6 June 2023: Coming Down to Earth: How to Tackle Soaring Public Debt
Tamon Asonuma (International Monetary Fund)

20 June 2023: Market Power and Sectoral Heterogeneity: Unveiling the Role of Intermediary Platforms
Riccardo Silvestrini (Erasmus School of Economics)

27 June 2023: Expectations and Credit Slumps
Jasmine Xiao (University of Notre Dam)

Forthcoming

3 Oct 2023: TBA
Lianne Hans (Kadaster)

10 Oct 2023: TBD
Benjamin Born (Frankfurt School of Finance & Management)

17 Oct 2023: TBA

Giovanni Ricco (École Polytechnique and Univ. Of Warwick)

24 Oct 2023: TBA

Margherita Bottero (Bank of Italy)

Workshops and conferences

Forthcoming

30 -31 August 2023: Annual Macroprudential conference

Sveriges Riksbank will host the 7th Annual Macroprudential Conference in cooperation with De Nederlandsche Bank and the Deutsche Bundesbank on 30-31 August 2023. The subjects to be discussed at this year's conference include: crypto assets, stablecoins, the economics of sanctions, the Irish financial crisis, macro shocks and housing markets and the home bias of insurance investments among others.

2 – 3 November 2023: DNB annual research conference

Challenges for monetary policy during normalization

This year's conference will focus on main challenges for the design and implementation of monetary policy in the context of the post-pandemic central bank balance sheet normalisation and rate hikes, taking into account the ongoing evolution of central banks' operational frameworks. In addition, the conference will cover financial stability considerations related to the monetary tightening cycle and possible central bank responses.

Keynote speakers are Klaas Knot (President of DNB), Annette Vissing-Jorgensen (Federal Reserve Board) and Stephen Cecchetti (Brandeis International Business School). We aim to provide a platform for researchers from academia, central banks, and other policy institutions to present and discuss their findings related to these issues.

Call for papers

Other news

Raymond Chaudron defended his Ph.D. thesis at the University of Groningen on April 3. The title of his thesis is "Income from maturity transformation, interest rate risk and hedging by Dutch banks".

Yasmine van der Straten recently won the best paper award at the European Sustainable Finance PhD Workshop. The title of her paper is "Flooded house or underwater mortgage? The implications of rising climate risk and adaptation on housing, income, and wealth".

Research highlights, details

1. Behavioral learning equilibria in New Keynesian models

From rational expectations to behavioral learning equilibria

Recently, major central banks in advanced economies underwent a review of their strategy. Departures from the rational expectations (RE) benchmark in core macroeconomic models were among the priorities. Driven by these facts, we incorporate the Behavioral Learning Equilibria (BLE) notion in the Smets and Wouters (2007) model. In BLE, agents are assumed to use simple AR(1) forecasting rules to form expectations about forward-looking variables, which in the spirit of Smets and Wouters (2007) refer to future price and wage inflation, output and investment. These simple forecasting rules are optimal in the sense that households correctly infer the sample mean and the first-order autocorrelation of the forecasted variable without fully understanding the complete structure of the economy (i.e., boundedly rational). Under BLE, thus, the parameters in the forecasting rules are fixed at their optimal (i.e., correct) values.

Horse race between alternative models

We bring the model to the data and estimate it for the US by developing an estimation methodology. A horse race between RE, BLE and constant gain learning models shows that the BLE model outperforms the RE benchmark and is competitive with constant gain learning models regarding in- and out-of-sample fitness. Using short-term survey inflation data, we show that sample autocorrelation learning of optimal AR(1) beliefs provides the best fit. Finally, by designing optimal monetary policy, we show that when the private sector forms expectations using AR(1) rules, the Taylor rule inherits history dependence making interest rate smoothing unnecessary as opposed to the RE benchmark.

Read more?
See the publication Behavioral learning equilibria in New Keynesian models *in Quantitative Economics* by Cars Hommes, Kostas Mavromatis, Tolga Ozden and Mei Zhu.
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2. Business dynamism, sectoral reallocation and productivity in a pandemic

To capture these facts, a two-sector general equilibrium model is proposed. The key features of the model are: (i) endogenous firms dynamics, (ii) firms heterogeneity, and (iii) an epidemiological block. Contagion occurs when individuals consume the social good, engage in work-related activities, or come across each other by change encounters. In response to the outburst of the crisis, households' expenditure shifted towards the non-social sector due to the fear of contagion. As a result, consistently with the first empirical fact, the output of the social sector declines more severely than aggregate output. Such a decline results in cleansing in the social sector, together with a reallocation of entry opportunities to the temporarily more profitable non-social sector. The reallocation process featured in our frameworks allows us to successfully reproduce the pattern of business dynamism that we described above. The analysis suggests that one distinctive feature of the Covid-19 crisis is that the cleansing effect on business dynamism that typically characterizes recessions is sector-specific. Cleansing in the social sector, together with reallocation across sectors, are the key dimensions to consider in order to explain the empirical dynamics of aggregate labor productivity during the pandemic.

Monetary policy is a powerful tool in this asymmetric two-sector framework. A lower interest rate promotes intertemporal substitution. Fear of contagion, rather than limiting the substitution between future and current consumption, as it would happen in a one-sector model, channels the additional demand to the non-social sector, where the likelihood of contagion is lower. As a result, an accommodating monetary policy promotes reallocation across sectors and leads to a faster recovery.

Read more?
See the publication Business dynamism, sectoral reallocation and productivity in a pandemic in *European Economic Review* by Guido Ascari, Andrea Colciago and Riccardo Silvestrini.
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3. Preferred habitat investors in the green bond market

The market for green bonds, which facilitates long-term environmental-friendly projects, has received great attention among investors in recent years. We use detailed portfolio holdings based on sample of 2,693 green bonds and 12,474,824 observations over the period 2016-Q4 to 2022-Q4 and show that the high demand for green bonds by European investors displays a strong market segmentation, with only mutual funds and pension funds seeking greater investment in green bonds compared to other European investors. This excess demand for green bonds is less responsive to price. Mutual funds and pension funds generally have relative long investment horizons and ostensibly care to combat climate change. These findings fit within a preferred habitat framework where only certain investors invest more in green bonds for non-financial motives and display highly inelastic demand.

We also show that insurance corporations have a negative tendency to hold green bonds in ways similar to households. These institutions are very responsive to price changes: when prices increase by one percent insurance corporations reduce their green bond holdings by about 0.8 percent to 1.38 percent.

Finally, our results show no relationship between banks and green bond investments. Banks tend to avoid investing in green bonds due to the perceived risk and penalties associated with non-government issuers. However, the regulatory landscape is rapidly evolving, with the European Central Bank conducting a climate stress test among banks in May 2022 and proposing to incentivize climate-related investments to ensure long-term financial stability.

Read more? See DNB Working Paper 773 Preferred habitat investors in the green bond market by Martijn Boermans.
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4. Financial constraints and firm size: Micro-evidence and aggregate implications

Breaking up the correlation

Using data from the Portuguese credit registry between 2006 and 2017, we show that financially constrained firms exist across the entire size distribution. As we have access to data on individual firms' credit lines, overdue credit and maturing credit, we can construct several different proxies for financial constraints. One empirical fact remains intact across all of our measures - financially constrained firms are found in every decile of the size distribution.

Large constrained firms and financial shocks

Motivated by this empirical analysis, we then ask how the presence of these large constrained firms affects macroeconomic outcomes. We resort to a heterogeneous firms model with financial frictions where firms can have permanent productivity differences – creating both small and large financially constrained firms. We find that these differential effects can be quite large with respect to financial shocks, i.e. contractions in credit supply. For example, after a financial shock, credit-constrained firms larger than the 90th size percentile account for approximately 60 percent of the overall output response.

Our work has clear policy implications. It is not sufficient to simply look at small firms and assess their access to credit. It is equally important for the policymaker to assess whether larger, especially productive, firms require additional access to credit as a contraction to their external finance supply may significantly affect the macroeconomy.

Read more? See DNB Working Paper 777 Financial Constraints and Firm Size: Micro-Evidence and Aggregate Implications by Miguel Ferreira, Timo Haber and Christian Rorig

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5. PhD defense Oscar Soons

Congratulations with achieving this milestone! What is the topic of your PhD thesis?

Thank you! The title of my thesis is "The Past, Present, and Future of the Euro Area". I started my research by trying to understand why the economies of some euro area member states had performed much better compared to others. In the first chapter of my thesis I study the implications of a single common exchange rate when countries have persistent structural differences. The second chapter considers certain benefits and costs of further fiscal integration. The third chapter looks ahead and considers the implications of central bank digital currencies for the banking sector.

What are the main findings?

To summarize a lot, the most important three take-aways from my thesis are: i) structural differences between member states can validate occasional fiscal rebalancing in a monetary union; ii) common fiscal policy with common debt issuance could benefit all member states; iii) central bank digital currency as an alternative store of value could improve welfare despite leading to some bank disintermediation.

How does your research square with DNB policy work?
At DNB we are part of the debate on how to improve the euro area's institutional structure and how to make our common currency more resilient. The world is much more complicated than the theoretical models I worked on during my PhD. However, such models can provide useful guidance for our discussions with the various stakeholders. In my policy work I often use insights from my own research and other academic work.

What's next? Do you aim to continue doing research?
Last September I started working in the monetary policy team at EBO. I split my time between policy work and research, which has been a welcome change from only doing research during my PhD. I recently published my first DNB working paper on CBDC and the banking sector and hopefully we will soon be able to share our analysis on how the euro has impacted trade flows.

Read more? See Oscar's personal website
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