Research News 2024

Research Division at Sveriges Riksbank

SVERIGES RIKSBANK

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This newsletter describes the research activities and output of the Research Division at Sveriges Riksbank in 2024.

Staff at the Research Division

Niklas Amberg, senior economist
Katja Artta, research assistant
Christoph Bertsch, senior economist
Roberto Billi, advisor
Marianna Blix Grimaldi, advisor
Daria Finocchiaro, advisor
Anna Grodecka-Messi, senior economist
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Kristian Jönsson, senior advisor
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Conny Olovsson, advisor
Anna Rogantini Picco, economist (on leave)
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Valentin Schubert, economist
Emanuel Skeppås, research assistant
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Lena Sundvall, assistant
Andreas Westermark, advisor
Xin Zhang, advisor

Reflections by the Head of Research

2024 was yet an eventful year at the Research Division. We organized two large research conferences during the year: one conference in May on the lessons from three decades of inflation targeting, and one conference in November commemorating the 150th anniversary of the first issuance of the Swedish krona. In both cases the aim was to learn from recent (or sometimes more distant) history and draw lessons for the future. We were very fortunate to attract a number of very distinguished speakers to both of these conferences. It's great to see that our conferences are seen as attractive fora for discussions among top researchers and policymakers. In addition we organized our annual workshop for PhD students in April, to interact with and learn from new talented researchers.

At the division we welcomed two new research assistants, Katja Artta and Emmanuel Skeppås, and we hosted a total of five PhD interns over the year, each spending three months at the bank.

Our track record of publishing papers in top economics and finance journals continued in 2024, one example being our featured article this year, "Central Bank Mandates and Monetary Policy Stances: Through the Lens of Federal Reserve Speeches" written by Christoph Bertsch and Xin Zhang together with Isaiah Hull and Robin L. Lumsdaine. This article is forthcoming in the Journal of Econometrics

During the year we also commissioned an external review of the Research Division. Similar reviews have been done regularly over the years, with reports published in 2008 and 2016. The review team this time consists of Elena Carletti, Bocconi University; Frank Smets, BIS; and Silvana Tenreyro, London School of Economics. The team visited the Riksbank for a few days in October, and they will publish their report in January 2025. We are looking forward to reading their review and recommendations, which will help us to improve further in our aim to conduct top-notch research and contribute to the policy analysis at the Riksbank.

With this, I wish you a good read of our Research News and a happy and productive 2025!

Ulf Söderström

Changes in the research staff

During 2024 both our research assistants, **Joakim Jigling** and **Klara Strömberg** left us, Joakim started the PhD program at Stockholm University and Klara started a traineeship at the European Banking Authority. Instead, **Katja Artta** and **Emanuel Skeppås** joined the group as our new RAs. **Cristina Cella** returned to the Financial Stability Department. **Mathias Klein** spent six months on sabbatical at the Collegio Carlo Alberto in Turin, and **Christoph Bertsch** spent four months on sabbatical at the University of Bonn. **Anna Rogantini Picco** is still on leave at the ECB.

Featured article

*The following is a summary of the article [Central Bank Mandates and Monetary Policy Stances: through the Lens of Federal Reserve Speeches] by **Christoph Bertsch** (Riksbank), **Isaiah Hull** (CogniFrame; Rethinc Labs), **Robin L. Lumsdaine** (American University; Erasmus University Rotterdam; NBER; Tinbergen Institute; Center for Financial Stability), and **Xin Zhang** (Riksbank). The article is forthcoming in the Journal of Econometrics.*

Many central banks have a mandate that outlines their objectives and responsibilities. The Federal Reserve (Fed) operates under a dual mandate requiring maximum sustainable employment and price stability. While these primary objectives are clear, debate exists over whether the Fed's authority extends to other goals like financial stability that fall outside its explicit mandate.

Much of the academic literature has concluded that monetary policy cannot be used to achieve other goals without inhibiting the Fed's pursuit of its narrower mandate. This finding supports maintaining a narrower focus for the Fed. Other academics and central bankers see secondary objectives, such as financial stability, as an implicit part of the dual mandate and, thus, a necessary consideration when conducting monetary policy. For example, Eric Rosengren, former President of the Federal Reserve Bank of Boston, has stated on several occasions that financial stability does and should influence monetary policy. Other members of the Federal Open Market Committee (FOMC) have argued for the pursuit of financial stability more explicitly during their tenure. Former vice chair of the Federal Reserve Lael Brainard, in a 2014 speech, claimed that monetary policy should constitute a "second line of defense" against financial instability. While Brainard argued that dual mandate and financial stability concerns typically coincide, she also concedes that the two may conflict under certain circumstances.

We contribute to this debate by applying a collection of large language models (LLMs) to analyze the speeches of Fed officials, which we modify for improved performance on central bank texts. We build on pre-trained transformer models, such as the RoBERTa model (Liu et al., 2019), which have facilitated significant advances in natural language processing. For example, the artificial intelligence chatbot, ChatGPT, which has recently demonstrated considerable prowess at generating high-quality text in the context of a conversation, is based on the same underlying technology architecture. We use these technologies to extract hard-to-measure features from insights into the Fed's perception of its mandate.

Our analysis shows that financial stability features prominently in Fed communications beyond the dual mandate, especially during periods of high debt-to-GDP ratios. However, Fed officials consistently frame financial stability not as a separate objective, but as an intermediate factor critical to achieving their mandated goals of price stability and maximum employment.

Estimating an augmented Taylor rule reveals two key findings about financial stability discussions in Fed communications. First, an increase in speech content that is unrelated to the dual mandate, and typically focused on financial stability, is associated with more accommodative monetary policy. Second, speeches advocating the use of monetary policy as a tool for financial stability are associated with tighter monetary policy, suggesting support for a "leaning against the wind" view, rather than a "financial instability is caused by monetary tightening" view. Additionally, financial stability discussions have a negative impact on asset prices, even after accounting for macroeconomic factors, financial variables, and crisis-related communications.

In this paper, we demonstrated that AI models, such as LLMs, can provide us with a powerful tool to extract informative and interesting text measures from central bank communication. Our text measures can offer unique insights into the Fed's perception of its mandate. Going forward, we hope that a better understanding of the interpretation of central bank mandates over time and the implications for policy decisions and financial markets will help policymakers to communicate more effectively and make better-informed decisions.

Research projects pursued in 2024

CREDIT AND BANKING

Banking Without Branches

Niklas Amberg and Bo Becker

Banks' branch networks are contracting rapidly in many countries. We study the effects of these large-scale branch closures on firms' access to credit and real economic activity. Our empirical setting is Sweden, where two thirds of all bank branches have closed in the past two decades. Using a shift-share instrument and micro data comprising the near-universe of Swedish firms and bank branches, we document that corporate lending declines rapidly following branch closures, mainly via reduced lending to small, collateral-poor, and risky firms. The reduced credit supply has substantial real effects: local firms experience a decline in employment and sales and an increase in exit risk after branch closures. Our results thus demonstrate that the large-scale reduction of branch networks has far-reaching implications for the economy.

(Continuing project)

Trade Credit and Input Substitution

Niklas Amberg, Tore Ellingsen, Tor Jacobson and Erik von Schedvin

Why do financially weak firms owe so much money to their suppliers? The conventional explanation is that weak firms pay their bills later, either agreeing longer terms or making overdue payments. We develop a complementary explanation: Weak firms optimally relax their financial constraints by relying more on purchased inputs relative to labor and long-term assets. With the help of uniquely informative data from Sweden, we assess the relative importance of the two explanations in the cross-section. We finally consider the impact of bank branch closures on the input mix, thereby providing causal evidence that tighter financial constraints increase external sourcing.

(Continuing project)

Have We Got News For You: Firm-Level Evidence on the Optimal Choice of Expected Capacity Utilization

Niklas Amberg, *Richard Friberg and Chad Syverson*

Commercial-paper backup lines account for a substantial share of undrawn loan commitments in the corporate sector, but have despite this received scant attention in the credit-line literature. In this paper, I study the liquidity-insurance properties of backup lines using a comprehensive loan- and security-level dataset and the sharp contraction of the Swedish commercial-paper market during the COVID-19 pandemic as an exogenous shock to the supply of market-provided liquidity. I find that backup lines provide commercial-paper issuers with reliable liquidity insurance and that banks' liquidity provision via commercial-paper backup lines in periods of distress does not crowd out lending to other firms.

(New project)

Financing Trade Credit

Niklas Amberg, Tor Jacobson and Yingjie Qi

Buyers and suppliers have diverging interests about trade-credit maturities: buyers desire long payment periods as a source of cheap funding, while suppliers prefer swift payments to avoid locking up scarce liquidity in idle assets. A fast-growing financial product innovation---supply-chain finance (SCF)---offers to resolve these diverging interests, but its net effect on suppliers is a priori unclear. We study the effects of SCF programs on suppliers using unique invoice-level data from a large Swedish bank. We find that SCF programs relax suppliers' liquidity constraints and thereby enable them to grow their sales, employment, and investments.

(Continuing project)

Dynamic Credit Constraints: Theory and Evidence from Credit Lines

Niklas Amberg, Tor Jacobson, Vincenzo Quadrini and Anna Rogantini Picco

We use a comprehensive Swedish credit register to document that firms across the size distribution have access to substantial borrowing capacity via credit lines. However, most firms choose not to use all available credit, even though interest rates are low compared to their return on equity. We explain the low utilization of credit with a theoretical framework in which the expected cost of unanticipated financial needs (uncertainty) increases with current borrowing. We test the model's predictions with the data and find that (i) utilization rates are negatively related to real and financial uncertainty, and (ii) firms borrow more in response to a credit limit increase, even if they have significant unused credit prior to the change in the limit. The second finding is based on firm-level measures of credit limit shocks that we derive from the structural estimation of the model.

(Continuing project)

The Effects of Extreme Weather on Collateral Provision

Cristina Cella, Valentin Schubert and Xin Zhang

Physical climate risks matter for collateral provisions. Using loan-level data covering all bank loans to firms in Sweden, we show that extreme weather events influence banks' requirements for collateral on new loan originations as well as the reappraisal of collateral securing existing loans: following an adverse weather event, new loans are more likely to be collateralized, and conditional on collateral, the collateralization is higher. However, banks are less likely to reappraise real estate collateral on existing loans following a weather shock. If they do, values are on average lowered. Moreover, we find that extreme weather events do not explain the one-year default probabilities calculated by banks.

(New project)

Is Flood Risk Priced in Bank Returns?

Valentin Schubert

I quantify the costs of realized flood disasters for banks and create a novel measure of bank-level flood risk exposure using expected flood risk estimates and mortgage lending data. I document that banks with large shares of mortgages in affected areas experience lower profits and capital ratios following flood disasters. In the cross-section of stock returns, small banks with high exposure to flood risk underperform other banks, on average, by up to 2.6% per year; this implies that exposure to flood is not fully priced. Underperformance persists when controlling for the negative effects of disasters on realized returns and adjusting for investors' climate change concerns. The findings support regulatory concerns that bank equity is exposed to physical risk from climate change.

(Continuing project)

Recovery Lending after Natural Disasters

Valentin Schubert

This paper examines how banks' incentives to internalize the negative spillovers from natural disasters affect their credit lending. Using data on small business loans and damage estimates from natural disasters, I find that banks with a large lending share in a local market provide more credit to small firms during the recovery periods than other banks. This finding implies that banks recognize the benefits of alleviating liquidity constraints for distressed borrowers, which lowers their default risk and preserves future business opportunities. Furthermore, I document that disaster-affected local areas with high-lending-share banks experience higher employment growth than other disaster-affected areas. The paper underscores the importance of bank lending in disaster recovery and resilience.

(Continuing project)

Market Competition, Credit Standards, and Bank Performance

Valentin Schubert and Martin Waibel

Bank profits are closely tied to a bank's local mortgage market share. We find that this link shifts over time and across business cycle. During crises, when house prices decline, and delinquencies rise, banks with higher market shares report higher profitability compared to their peers. Conversely, during expansion periods, characterized by rising house prices and lower delinquencies, this relationship is reversed. We provide evidence that a key driver is the incentive for high-market-share banks to internalize spillovers from fire sales, which have significant real effects: high-market-share banks originate higher loan volumes at more favorable terms and indirectly affect the performance of banks active in the same region. Further evidence confirms that this channel is different from alternative explanations based on market power, relationship effects, diversification, or informational benefits.

(Continuing project)

ECONOMETRICS

Joint Extreme Value-at-Risk and Expected Shortfall Dynamics with a Single Integrated Tail Shape Parameter

Enzo D'Innocenzo, Bernd Schwaab, André Lucas and Xin Zhang

We propose a robust semi-parametric framework for persistent time-varying extreme tail behavior, including extreme Value-at-Risk (VaR) and Expected Shortfall (ES). The framework builds on Extreme Value Theory and uses a conditional version of the Generalized Pareto Distribution (GPD) for peaks-over-threshold (POT) dynamics. Unlike earlier approaches, our model (i) has unit root-like, i.e., integrated autoregressive dynamics for the GPD tail shape, and (ii) re-scales POTs by their thresholds to obtain a more parsimonious model with only one time-varying parameter to describe the entire tail. We establish parameter regions for stationarity, ergodicity, and invertibility for the integrated time-varying parameter model and its filter, and formulate conditions for consistency and asymptotic normality of the maximum likelihood estimator. Using four exchange rate series, we illustrate how the new model captures the dynamics of extreme VaR and ES.

(New project)

Quantitative Easing, Bond Risk Premia and the Exchange Rate in a Small Open Economy

Jens Christensen and Xin Zhang

We assess the impact of large-scale asset purchases, commonly known as quantitative easing (QE), conducted by Sveriges Riksbank and the European Central Bank (ECB) on bond risk premia in the Swedish government bond market. Using a novel arbitrage-free dynamic term structure model of nominal and real bond prices that accounts for bond-specific safety premia, we find that Sveriges Riksbank's bond purchases raised inflation and short-rate expectations, lowered nominal and real term premia and inflation risk premia, and increased nominal bond safety premia, suggestive of signaling, portfolio rebalance, and safe asset scarcity effects. Furthermore, we document spillover effects of ECB's QE programs on Swedish bond markets that are similar to the Swedish QE effects only after controlling for exchange rate fluctuations, highlighting the importance of exchange rate dynamics in the transmission of QE spillover effects.

(Continuing project)

FINANCIAL THEORY

Bank Fragility and the Incentives to Manage Risk

Toni Ahnert, Christoph Bertsch, Agnese Leonello and Robert Marquez

Shocks to banks' ability to raise liquidity at short notice can lead to depositor panics, as evidenced by recent bank failures. Why don't banks take a more active role in managing these risks? In a standard bank-run model, we show that risk management failures are most prevalent when exposures are more severe and managing risk would be particularly valuable. Bank capital and deposit insurance coverage act as substitutes for risk management on the intensive margin but as complements on its extensive margin, encouraging the adoption of risk management operations. We provide insights for the appropriate regulation of bank risk-management operations.

(Continuing project)

Stablecoins: Adoption and Fragility

Christoph Bertsch

This paper analyzes the factors influencing the adoption of stablecoins and their susceptibility to runs, offering insights for risk assessment and appropriate regulation, as well as new testable implications. When payment preferences are heterogeneous, a wider adoption of stablecoins is associated with a destabilizing composition effect. Positive network effects mitigate the destabilizing composition effect, but may undermine the role of bank deposits in payments. Since the marginal adopter of stablecoins does not internalize these effects, the regulatory concern about excessive adoption is justified. The introduction of a portfolio choice by the stablecoin issuer and moral hazard provide additional lessons for reserve management and disclosure. Factors that increase the issuer's income from fees and seigniorage promote stability, as do congestion effects. A stablecoin lending market promotes both stability and adoption, if it is not undermined by speculation.

(Continuing project)

Optimal Bank Leverage and Recapitalization in Crowded Markets

Christoph Bertsch and Mike Mariathasan

We study optimal bank leverage and recapitalization in general equilibrium when the supply of specialized investment capital is imperfectly elastic. Assuming incomplete insurance against capital shortfalls and segmented financial markets, ex-ante leverage is inefficiently high, leading to excessive insolvencies during systemic capital shortfall events. Recapitalizations by equity issuance are individually and socially optimal. Additional frictions can turn asset sales individually but not necessarily socially optimal. Our results hold for different bankruptcy protocols and we offer testable predictions for banks' capital structure management. Our model provides a rationale for macroprudential capital regulation that does not require moral hazard or informational asymmetries.

(Continuing project)

FISCAL POLICY

Inflation, Fiscal Rules and Cognitive Discounting

Roberto Billi and Carl Walsh

Using a stylized, calibrated New Keynesian model, we provide a welfare ranking of passive monetary and active fiscal (PM/AF) rules when contractionary aggregate-demand shocks occasionally drive the nominal interest rate to the ELB. When the shocks are calibrated to match the U.S. frequency of ELB episodes under a traditional active monetary, passive fiscal (AM/PF) regime, a PM/AF regime in which debt increases trigger increases in government purchases and/or cuts in taxes — what we call super-active fiscal policies — can so reduce the frequency of the ELB that they outperform an AM/PF regime if expectations are formed rationally. This last condition is critical. Welfare ranking of policy regimes depends critically on the way private sector agents form expectations; when agents display cognitive discounting, PM/AF regimes perform significantly worse. This result is robust to the government's long-run debt target and the presence of long-term debt. We also analyze fiscal rules calibrated to the U.S. response during the Great Recession and the COVID recession. Our paper is the first to analyze super-active fiscal policies and to evaluate the implications of cognitive discounting for the relative performance of AM/PF and PM/AF policy regimes.

(Continuing project)

Inflation Targeting or Fiscal Activism?

Roberto Billi

I study the welfare performance of a policy regime of fiscal activism in which fiscal policy acts as an automatic stabilizer and controls inflation, while monetary policy pegs the nominal interest rate. When evaluated through the lens of a standard New Keynesian model, accounting for price and wage rigidities and for a zero lower bound (ZLB) on the nominal interest rate, fiscal activism can substantially outperform inflation targeting in the face of both demand shocks and technology shocks. Fiscal activism can also eliminate the occurrence of ZLB episodes.

(Continuing project)

The Fiscal Channel of Monetary Policy

Max Breitenlechner, Martin Geiger and Mathias Klein

This paper empirically quantifies the importance of fiscal policy in shaping the monetary policy transmission mechanism and derives implications for monetary-fiscal interactions. First, we document that a contractionary monetary policy shock, besides lowering output and prices, leads to a pronounced adjustment in fiscal measures and a significant increase in the fiscal deficit. We then construct different structural counterfactuals, in which we shut down the endogenous responses of fiscal measures following a monetary policy shock. The impact of a monetary policy shock on output is more than halved by the endogenous adjustment in tax revenues, whereas the public transfer system significantly reduces the impact on prices. Thus, the tax system considerably improves the trade-off between price and output stabilization the central bank faces, whereas the transfer system worsens it. Finally, we show that changes in the fiscal framework can enhance monetary policy effectiveness.

(New project)

Who is Afraid of Eurobonds?

Francesco Bianchi, Leonardo Melosi and Anna Rogantini Picco

The current Euro Area policy framework exposes its members to the opposite risks of deflation and high inflation because it does not separate the need for short-run macroeconomic stabilization from the issue of long-run fiscal sustainability. We study a new policy framework that addresses this deficiency. A centralized Treasury issues Eurobonds to finance stabilization policies, while national governments remain responsible for the country-level long-term spending programs. The centralized Treasury can run larger primary deficits during recessions, followed by primary surpluses during expansions. However, following an exceptionally large contractionary shock, the centralized Treasury can coordinate with the monetary authority to reflate the economy and avoid the zero lower bound. The policy acts as an automatic stabilizer and removes the risk of deflation. At the same time, the proposed policy framework removes the risk of high inflation and fiscal stagflation because it does not require suspending the fiscal rules designed to preserve long-run fiscal sustainability.

(Continuing project)

The Signaling Effects of Fiscal Announcements

Leonardo Melosi, Hiroshi Morita, Anna Rogantini Picco and Francesco Zanetti

Fiscal announcements may transfer information about the government's view of the macroeconomic outlook to the private sector, diminishing the effectiveness of fiscal policy as a stabilization tool. We develop a simple model that transparently outlines conditions and key properties of the signaling effect and guides our empirical tests, and we show that results hold in a standard microfounded model. We construct a novel dataset that combines daily data on Japanese stock prices with narrative records from press releases about a set of extraordinary fiscal packages introduced by the Japanese government from 2011-2020. We show that these fiscal stimuli were often interpreted as negative news by the stock market whereas exogenous fiscal interventions that do not convey any information about the business cycle (e.g., the successful bids to host the Olympics on September 8, 2013) fostered bullish reactions. In addition, these negative effects on stock prices arose more commonly when fiscal stimuli were announced against a backdrop of heightened macroeconomic uncertainty. Our empirical findings support the theory of signaling effects.

(Continuing project)

HOUSEHOLD FINANCE AND SAVINGS

Mortgage Shortfall and Financial Constraints: Borrowers' Response under Full Recourse

Anna Grodecka-Messi

In this paper, the causal effect of news about mortgage shortfall under full recourse is evaluated. Around the turn of the 21st century, a large part of U.K. mortgagors holding a specific alternative mortgage product called an endowment mortgage found out that their mortgage will be underwater in the future. I compare their subsequent behaviour to that of unaffected borrowers with repayment mortgages and show that in response to the shock, endowment mortgagors increased their labor supply and reduced alternative investments in an attempt to avoid the realization of the negative equity scenario.

(Continuing project)

Riding the Housing Wave: Home Equity Withdrawal and Consumer Debt Composition

Anna Grodecka-Messi, Jieying Li and Xin Zhang

Using a monthly panel dataset of individuals' debt, we show that house price changes can explain a significant fraction of personal debt composition dynamics. We exploit the variation in local house price growth as shocks to homeowners' housing wealth to study the consequential adjustment of debt portfolio. We present direct evidence that homeowners re-optimize their debt structure by using withdrawn home equity to pay down comparatively expensive short-term non-mortgage debt during a housing boom. The effect is strongest for homeowners with high debt-to-income ratios and in municipalities with high literacy levels.

(Continuing project)

Business Education and Portfolio Returns

Adam Altmejd, Thomas Jansson and Yigitcan Karabulut

Using university admission cutoffs that generate exogenous variation in college-major choices, we provide causal evidence that enrollment in a business or economics program leads individuals to invest significantly more in the stock market, earn higher portfolio returns, and ultimately accumulate higher levels of wealth. Underlying these effects, beyond differences in risk taking, innate ability, labor market outcomes, or scale effects, is the improved ability of business-educated individuals to acquire and process economic information and make informed investment decisions. Early investments in financial literacy thus play an important role in generating higher returns that significantly alter individuals' life-cycle wealth profiles.

(Continuing project)

Wealth Inequality: Opportunity for Me or for Others?

Michael Haliassos, Thomas Jansson and Yigitcan Karabulut

This paper presents evidence for a new propagation mechanism of wealth inequality. Motivated by cross-country survey evidence, it uses unique administrative microdata and a quasi-field experiment of exogenous assignment to test the hypothesis that, in the presence of significant opportunities for wealth mobility, the more educated respond to greater wealth inequality at the start of economic life by taking more financial, real, and self-employment risks and achieving higher wealth, thereby propagating wealth inequality. We find no evidence for alternative channels of propagation through labor income, unemployment risk, or human capital investment, nor for inspiration, imitation, or learning from the rich.

(Continuing project)

Individual Investor Behavior and Sustainability

Thomas Jansson and Vicke Norén

This paper investigates whether a change in a company's sustainability performance affects the propensity to hold stocks of the company. Using an administrative panel of individual investors in Sweden allows us to control for a rich set of socioeconomic and portfolio characteristics. We find that the average investor is more likely to offload stocks of companies that have worsened sustainability performance, especially if environmental issues are managed poorly. Investor reaction is particularly strong among less wealthy investors with a lower level of education, as well as for large firms and popular stocks. The findings are robust to plausible alternative hypotheses.

(Continuing project)

LABOR MARKETS

Dynamic Macroeconomic Implications of Migration

Conny Olovsson, Karl Walentin and Andreas Westermark

International migration flows are large, volatile and have increased in the recent period. As one of the first papers, we study the dynamic effects of immigration shocks on the economy within a search and matching framework. Since many of the macroeconomic effects of immigration are largest in the short run, a steady state analysis would be insufficient. To construct a quantitatively relevant general equilibrium framework, extensive Swedish microdata is used. We then study the effect of a large migration shock on various macroeconomic aggregates. The effect on GDP per capita and the employment rate is substantial on impact, and then decreases over time.

(Continuing project)

Skill Loss, Job Mismatch and Slow Recovery from Large Recessions

Karl Walentin and Andreas Westermark

In this paper we ask to what degree i) human capital dynamics induced by skill loss during unemployment and ii) decrease in match quality contributed to the slow recovery from large recessions, in particular the low post-2009 growth in GDP, employment, labor productivity and real wages following the Great Recession. Match quality has decreased because of the sullying effect of the recession that follows from reduced hiring activity and the resulting collapse of the job ladder. We find that the increase in unemployment during the initial phase of the Great Recession had long-lasting effects through the skill loss it induced, mainly in terms of increased unemployment and reduced GDP.

We also find that persistence is important for the results. An equally sized shock that is less persistent has substantially smaller effects on GDP and employment.

(Continuing project)

Trade, Specialization and Inflation

Andreas Westermark

The project studies how optimal inflation, from an optimal taxation perspective, depends on the level of trade and interacts with the degree of specialization. When specialization is fixed, an increase in trade leads to an increase in inflation. If the specialization choice is endogenous, increases in inflation leads to a decrease in the quantity of goods traded and, in turn, leads to less specialization. In equilibrium, the policymaker then reduces inflation in response to an increase in trade, since this increases the tax base and hence tax revenues. From a historical perspective, low inflation currencies tended to be associated with a high level of trade. An empirical analysis of the mechanism is also undertaken.

(New project)

MACROECONOMICS

Measuring the Impact of Taxes and Public Services on Property Values: A Double Machine Learning Approach

Anna Grodecka-Messi and Isaiah Hull

How do property prices respond to changes in local taxes and local public services? Attempts to measure this, starting with Oates (1969), have suffered from a lack of local public service controls. Recent work attempts to overcome such data limitations through the use of quasi-experimental methods. We revisit this fundamental problem with a novel dataset of 947 time-varying local characteristic and public service controls for all municipalities in Sweden over the 2010-2016 period. We use two different approaches to deal with the high dimensionality of the set of controls and recover tax capitalization estimates: principal components regression and double machine learning (Chernozhukov et al., 2017). We also exploit the exhaustive coverage of local public services and high degree of time and geographic variation in our dataset to resolve two outstanding questions in the literature. First, we demonstrate that tax capitalization is stronger in areas with greater municipal competition, providing support for a core implication of the Tiebout hypothesis. And second, we measure the impact of education on house prices and show that it is positive for outputs (grades), but negative for inputs (spending per pupil).

(Continuing project)

Central Bank Liquidity Support, Bank Lending, and the End of Currency Competition

Anna Grodecka-Messi and Xin Zhang

Private money creation lies at the heart of currency competition due to seigniorage rents that are attributed to shareholders. However, it undermines the role of central bank in money provision, and it was historically linked to episodes of financial instability and is thus a contentious issue. Shifting from private to public money may come at a cost of bank disintermediation, affecting growth. Hence, such a swap should be well-planned to minimize its cost. In this paper, we study the shift from private to public money in a historical context. The 1897 banking law in Sweden granted the note issuance monopoly to the Swedish central bank. The swap was accompanied by preferential central bank liquidity support to affected note-issuing banks. We examine how this transition influenced the private banks and what role the central bank funding played in the process. Our analysis shows that former note-issuing banks saw a profitability decline of about 14%, with no significant evidence of bank disintermediation. Additionally, these banks raised property lending interest rates to offset the profit losses.

(New project)

Central Bank Profitability and Inflation: Evidence from 350 Years of Central Bank History

Anna Grodecka-Messi

Does central bank profitability matter for central bank's ability to fulfill its mandate? For years, central bank returns were considered irrelevant, being merely a by-product of the conducted monetary policy. This changed, among many other things, when major central banks engaged in quantitative easing, making their balance sheets increasingly vulnerable to varying market conditions. Central bank losses became ubiquitous, but can they actually impede the achievement of the price stability objective? In order to address this question, I collect data on the profitability and the breakdown of revenues and expenditures of Sveriges Riksbank, the oldest still operating central bank in the world, since its establishment in 1668. I use historical return, balance sheet and macroeconomic data to study the effects of return shocks in a VAR model identified with narrative sign restrictions. I show that negative shocks to ROA lead to higher inflation. A comparison with the Bank of England is provided, for which no such relationship is found in modern times.

(New project)

The Cashless Kingdom: On the Role of Money and Seigniorage for Central Bank Returns

Anna Grodecka-Messi

How important are seigniorage and central bank equity in the 21st century? For centuries, central banks enjoyed the monopoly of banknote issuance that allowed them to cover all expenses and purchases. That changed after 2008, when central banks engaged in quantitative easing, which coupled with dwindling demand for central bank currency showed limits to the old financing scheme. In this paper, I study the role of seigniorage, using Sweden as laboratory. In Sweden, the king is still on cash, but cash is notably no longer king. Somehow ironically, Sweden holds a unique place in the monetary history as the inventor of the banknote in Europe. The cash in circulation is rapidly approaching zero in Sweden and this trend has repercussions for the finances of the central bank. The issue of the role of cash is studied in the long run.

(New project)

What Flattens the Supply Curve

Edvin Ahlander, Mathias Klein and Evi Pappa

We compile a unique dataset with over 20 years of monthly price and real output data for Swedish industrial firms and use it to estimate the short and medium-run responses of prices and quantities to exogenous demand shocks. A one percent increase in output due to demand shocks raises prices by 0.35% within a year. The supply curve's elasticity varies with economic conditions and firm characteristics. It flattens with financial uncertainty and steepens during inflationary periods. Higher supply elasticities are found in firms with low competition, labor costs, and sales volatility.

(Continuing project)

The Inflationary Effects of Global Supply Chain Shocks: Evidence from Swedish Microdata

David Finck, Mathias Klein and Peter Tillmann

We examine the dynamic pass-through from producer to consumer prices, using product-group data derived from the microdata underlying the official Swedish PPI and CPI indices. We find a robust pass-through, in line with theoretical models emphasizing production inter-linkages between sectors. The results also display important heterogeneity in pricing behavior both along the supply chain, as well as across product groups. That is, upstream pricing seems much more rigid than downstream pricing in the supply chain and the pass-through across CPI products varies substantially with price-change frequencies. The recent COVID- and high-inflation periods do not significantly affect the size and speed of the estimated pass-through.

(Continuing project)

Price Pass-Through along the Supply Chain: Evidence from PPI and CPI Microdata

Edvin Ahlander, Mikael Carlsson and Mathias Klein

We examine the dynamic pass-through from producer to consumer prices, using product-group data derived from the microdata underlying the official Swedish PPI and CPI indices. We find a robust pass-through, in line with theoretical models emphasizing production inter-linkages between sectors. The results also display important heterogeneity in pricing behavior both along the supply chain, as well as across product groups. That is, upstream pricing seems much more rigid than downstream pricing in the supply chain and the pass-through across CPI products varies substantially with price-change frequencies. The recent COVID- and high-inflation periods do not significantly affect the size and speed of the estimated pass-through.

(Continuing project)

A Traffic-Jam Theory of Growth

Daria Finocchiaro and Philippe Weil

We investigate the growth-finance nexus in an endogenous growth model with search frictions and congestion effects in credit and innovation markets. The interplay between these two frictions generates a nonlinear relationship between finance and growth. Financial development eases the financing of innovation but can exacerbate bottlenecks in R&D. In a calibration close to the U.S. economy, finance has a negative impact on growth. This effect is quantitatively small, consistent with the observation that, in the last century, most developed economies have experienced an expansion of the financial sector and almost constant growth rates of GDP.

(Continuing project)

Greenflation

Conny Olovsson and David Vestin

What are the real and nominal implications of a green transition to a state with sustainable energy production, and how should monetary policy react during such transition? Using a New-Keynesian model with an energy and a goods sector, we show that a green transition requires the relative price of energy to increase and the relative price of goods, the marginal cost of production, and the real wage to fall. We prove analytically that if energy is not used in production and nominal wages and goods prices are rigid, a flexible energy price and a monetary policy rule that sees through energy-price changes are sufficient for replicating the flex-price economy. If energy is used in production there will be deviations from efficiency but because energy's share of income is small, these deviations are marginal unless the increase in the carbon tax is aggressive and/or monetary policy ill suited. During the green transition, it is optimal for monetary policy to see through the increasing energy prices and focus on core inflation. The result is a modest increase in CPI.

(Continuing project)

Climate Policy in the Wide World

John Hassler, Per Krusell and Conny Olovsson

We construct a dynamic integrated assessment model of climate and the economy with very high geographic resolution: 1^{O}x 1^{O} latitude-longitude cells, with each cell assigned to a country. Migration is free within, but not allowed across, countries. The model parameterization uses a wealth of data, including the distribution of output, population, energy use, and estimates of the local damages from climate change. It implies huge geographic dispersion in damages from warming. We then conduct three kinds of policy experiments. In one, we note that a modest, uniform carbon tax limits global warming and damages around the world substantially. In a second experiment we let the poorest countries not tax carbon, while the rest compensate by setting higher taxes; the efficiency losses are large. In a final experiment, we find that fast green technology growth alone is a poor substitute for carbon taxes, whether globally available or not.

(Continuing project)

The Safe Non-Hand-to-Mouth

Ettore Savoia

This paper shows that standard consumption theory predicts a substantial marginal propensity to consume (MPC) out of transitory shocks, even among high-income and unconstrained households, when labor income level and risk are negatively correlated. Specifically, a version of the two-period Kimball (1990b) model augmented to account for safe (high-income, low-risk) and risky (low-income, high-risk) households yields two key findings: i) safe and risky households have similar levels of liquid wealth. Intuitively, while the precautionary motive increases with income risk, the ability to self-insure hinges on income levels; ii) among unconstrained, safe households exhibit a higher MPC. This result is because absent wealth effects, higher income risk lowers the MPC. These findings imply that within the wealth distribution, there is a fraction of high-income, low-risk, and unconstrained households with high MPCs, the "Safe Non-Hand-to-Mouth." Simulated models and empirical evidence from Italy and the US support this conclusion, revealing a significant trade-off between economic stimulus and insurance when using targeted transfers.

(Continuing project)

Labor Income Risk and Monetary Policy: The Within-Wealth MPC Channel

Ettore Savoia

This paper studies how monetary policy affects individual consumption in a Heterogeneous Agent New Keynesian (HANK) model with ex-ante heterogeneity in the income processes. In this model, lower-earning households face higher and more countercyclical income risk. This unequal incidence lowers their Marginal Propensity to Consume (MPC) relative to safer and higher-earning households at the same positive wealth level. In this environment, the effects of a monetary tightening operate along and within the wealth distribution, revealing that income risk heterogeneity amplifies the equilibrium response of aggregate consumption and generates a more persistent output contraction. Unlike standard HANKs, this amplification is driven by the larger elasticities of unconstrained households with higher earnings and lower risk, whose consumption share accounts for the bulk of aggregate consumption.

(Continuing project)

Do We Need Firm Data to Understand Macroeconomic Dynamics?

Michele Lenza and Ettore Savoia

We study the role of heterogeneity in the revenues of individual firms for euro area macroeconomic dynamics. To this end, we specify two models: a standard aggregate vector autoregressive model (VAR) and a "heterogeneous VAR" (HVAR). The VAR model includes only aggregate data, while the HVAR model also incorporates the feedback loop between firms' revenue distribution and aggregate variables. Our results demonstrate that the behavior of firms' revenue distribution plays a significant role in explaining the dynamics of key euro area macroeconomic variables.

(Continuing project)

Intertemporal MPC and Shock Size

Tullio Jappelli, Ettore Savoia and Alessandro Sciacchetano

We elicit the intertemporal Marginal Propensity to Consume (iMPC) based on hypothetical different-size lottery winnings through questions in the 2023-24 Italian Survey of Consumer Expectations (ISCE). Survey respondents were asked to allocate three hypothetical lottery winning amounts (€1,000, €10,000. and €50,000) between consumption and saving in both the year following the survey and over the longer term. The iMPC for a €1,000 win declines from 26% in the first year to about 1% five years after the shock. Larger win amounts have a smaller impact in the first year and a larger impact in the long run. The iMPC for a €10,000 (€50,000) prize declines from 19% (15%) in the first year to 2.5% (4%) in year five. Regardless of the size of the shock, the iMPC shows a weak negative relation to the cash-on-hand amount and a negative relation to income risk. We show that calibrated simulations of incomplete market models with borrowing constraints, income risk, and household heterogeneity are broadly consistent with these empirical findings.

(New project)

MONETARY POLICY AND THEORY

The Impact of Central Bank Transparency on the Decisions of Board Members

Mikael Apel and Marianna Blix Grimaldi

The impact of transparency on the deliberations and decisions of board members of central banks is an important issue in research on policymaking. Increased transparency can have different effects. It can make agents prepare more thoroughly – a disciplinary effect. It can also make agents behave differently due to career concerns, either by making them less inclined to oppose to the majority view – a herding, or conformism, mechanism – or by making them instead want to distinguish themselves more from others – an anti-herding or exaggeration mechanism. It may also make agents more committed to stick to a specific opinion once they have expressed it and less willing to change their mind, even if circumstances change. In this paper, we investigate if the character of the monetary policy meetings, as reflected in the minutes, has changed due to the de-anonymization and, if so, in what ways.

(Continuing project)

Who Said What? Speaker Identification from Anonymous Minutes of Meetings

Daniel Holmer, Lars Ahrenberg, Julius Monsen, Arne Jonsson, Mikael Apel and Marianna Blix Grimaldi

We apply machine-learning techniques to identify speakers at meetings from anonymous minutes issued afterwards. We base our analysis on board meetings of Sveriges Riksbank. We combine topic models with other features to analyze prediction accuracies. We use a BERT-based transformer model as a benchmark.

(Continuing project)

Unconventional Monetary Policy and Bank Lending Behaviour

Marianna Blix Grimaldi and Supriya Kapoor

Though unconventional monetary policy is still new, already there is a conventional wisdom that the impact of monetary policy is related to the composition of the asset mix. This may be incomplete and potentially misleading. We investigate how the impact on similarly QE-exposed banks changes depending on heterogeneity of exposures at bank level.

(Continuing project)

Four Facts about International Central Bank Communication

Christoph Bertsch, Isaiah Hull, Robin L. Lumsdaine and Xin Zhang

This paper introduces a novel database of text features extracted from the speeches of 53 central banks from 1996 to 2023 using state-of-the-art NLP methods. We establish four facts: (1) central banks with floating and pegged exchange rates communicate differently, and these differences are particularly pronounced in discussions about exchange rates and the dollar, (2) communication spillovers from the Federal Reserve are prominent in exchange rate and dollar-related topics for dollar peggers and in hawkish sentiment for others, (3) central banks engage in FX intervention guidance, and (4) more transparent institutions are less responsive to political pressure in their communication.

(Continuing project)

Liquidity, Capital Pledgeability and Inflation Redistribution

Paola Boel, Julian Diaz and Daria Finocchiaro

The post-pandemic inflation surge has revived debates on its costs, with no clear consensus on whether it disproportionately impacts low-income households. We investigate the redistributive effects of expected inflation induced by collateralized debt in a microfounded monetary model with heterogeneous discount factors. In equilibrium, this leads to borrowing, lending and a tractable distribution of money and capital holdings. We show that inflation acts as a progressive tax, affecting lenders more. It also reduces capital accumulation, limiting borrowing and redistributing wealth. When loan-to-value ratios are high, inflation can increase inequality. Finally, for a given level of inflation, collateralization decreases wealth inequality.

(Continuing project)

The Housing Channels of Monetary Policy

Daria Finocchiaro, Ettore Savoia, Karl Walentin and Andreas Westermark

In standard New Keynesian heterogeneous agent (HANK) models, labor demand shifts are the primary channel for monetary policy transmission, while asset price changes have minimal impact. Most of the current HANK literature oversimplifies by merging business capital and housing, ignoring mortgage debt. This paper explores how monetary policy operates when mortgage debt is explicitly modelled and housing's roles as a consumption good, investment good, and collateral is considered. Since housing supply is inelastic in the short run, monetary policy shocks can significantly impact house prices, influencing collateral constraints and borrower consumption. We calibrate the model on U.S. data, studying the effects of monetary policy on inflation, output, and wealth distribution and quantifying the distinct role of housing and mortgages in the monetary policy transmission.

(Continuing project)

The Inflationary Effects of Quantitative Easing

Mathias Klein and Xin Zhang

We provide new evidence on the inflationary effects of Quantitative Easing (QE) using Swedish administrative data at the bank, firm, and product level. For identification, we rely on bank-firm lending relationships and the heterogeneous participation rates of banks in the government bond purchase program by the Swedish central bank. Our results show that the bond purchase program led to a significant and persistent increase in producer prices. Importantly, we find that the degree of financial frictions considerably influences firms' price response: low leverage firms do not change their prices, whereas high leverage firms raise their prices significantly. This divergent pricing behaviour can be rationalized by a significant increase in long-term borrowing and interest rate expenses among high leverage firms. The difference in price responses across high and low leverage firms is less pronounced for exogenous changes in the repo rate implying that the transmission mechanism of QE differs from the one of conventional interest rate policy.

(Continuing project)

Refereed publications accepted in 2024

Torben M. Andersen, Joydeep Bhattacharya, Anna Grodecka-Messi and Katja Mann, Pension Reform and Wealth Inequality: Theory and Evidence, European Economic Review

Christoph Bertsch, Isaiah Hull, Robin L. Lumsdaine and Xin Zhang, Central Bank Mandates and Monetary Policy Stances: Through the Lens of Federal Reserve Speeches, Journal of Econometrics

Jens Christensen, Nikola N. Mirkov and Xin Zhang, Quantitative Easing and the Supply of Safe Assets: Evidence from International Bond Safety Premia, Journal of International Economics

Mathias Klein and Ludger Linneman, Tax shocks, firm entry, and productivity in the open economy, Journal of International Money and Finance

Joonseok Oh and Anna Rogantini Picco, Macro Uncertainty, Unemployment Risk, and Consumption Dynamics, International Economic Review

Working papers

No. 429, Emma Bylund, Jens Iversen and Anders Vredin, Monetary policy in Sweden after the end of Bretton Woods

No. 430, Niklas Amberg and Bo Becker, Banking Without Branches

No. 431, Niklas Arvidsson, Fumi Harahap, Frauke Urban and Anissa Nurdiawati, Climate impact assessment of retail payment services

No. 432, Christoph Bertsch, Isaiah Hull, Robin L. Lumsdaine, and Xin Zhang, Four Facts about International Central Bank Communication

No. 433, Roberto Billi, Jordi Galí, and Anton Nakov, Optimal Monetary Policy with r* < 0

No. 434, Jens H. E. Christensen and Xin Zhang, Quantitative Easing, Bond Risk Premia and the Exchange Rate in a Small Open Economy

No. 435, Niklas Amberg, Tor Jacobson and Yingjie Qi, Supply-Chain Finance: An Empirical Evaluation of Supplier Outcomes

No. 436, Torsten Persson and Guido Tabellini, Optimal Contracts and Inflation Targets Revisited

No. 437, Niklas Arvidsson, Fumi Harahap, Frauke Urban and Anissa Nurdiawati, Potential Climate Impact of Retail CBDC Models

No. 438, Michele Lenza and Ettore Savoia, Do we need firm data to understand macroeconomic dynamics?

No. 439, Gabriella Linderoth and Malte Meuller, Inflation-Dependent Exchange Rate Pass-Through in Sweden: Insights from a Logistic Smooth Transition VAR Model

No. 440, Jens H. E. Christensen, Nikola N. Mirkov and Xin Zhang, Quantitative Easing and the Supply of Safe Assets: Evidence from International Bond Safety Premia

No. 441, Toni Ahnert, Christoph Bertsch, Agnese Leonello and Robert Marquez, Bank fragility and the incentives to manage risk

No. 442, Daria Finocchiaro and Philippe Weil, A Traffic-Jam Theory of Growth

No. 443, Tullio Jappelli, Ettore Savoia and Alessandro Sciacchetano, Intertemporal MPC and Shock Size

No. 444, Anders Kärnä and Samantha Myers, Plundered or profitably pumped-up? The effects of private equity takeover

No. 445, Jakob Almerud, Dominika Krygier, Henrik Lundvall and Mambuna Njie, Measuring Riksbank Monetary Policy: Shocks and Macroeconomic Transmission

Non-refereed publications

Niklas Amberg and Bo Becker, What happens when banks no longer have branches?, SUERF Policy Brief No. 875

Anna Grodecka-Messi and Xin Zhang, Private Bank Money vs Central Bank Money: A Historical Lesson for CBDC Introduction, SUERF Policy Brief No. 781

John Hassler, Per Krusell and Conny Olovsson, Sustainability, in Macroeconomics, edited by M. Azzimonti, P. Krusell, A. McKay, and T. Mukoyama

Mathias Klein, Emanuel Skeppås and Oskar Tysklind, Price changes on goods and services during the high inflation period: insights from microdata, Sveriges Riksbank Economic Commentary No. 15

Mathias Klein, Klara Strömberg and Oskar Tysklind, Inflation dynamics in the high inflation period: insights from microdata, Sveriges Riksbank Economic Commentary No. 14

Other research activities

Conferences and Events

On 23-24 May, the Riksbank organized a conference on The Quest for Nominal Stability: Lessons from Three Decades with Inflation Targeting. The conference brought together prominent academics in the field as well as current and former central bankers. Participants discussed a broad range of issues regarding the theory and practice of inflation targeting. It included welcome remarks by Anna Breman (First Deputy Governor of Sveriges Riksbank), and presentations by Guido Tabellini (Bocconi University), Michael Woodford (Columbia University), Franklin Allen (Imperial College London), Silvana Tenreyro (London School of Economics), Olivier J. Blanchard (Peterson Institute for International Economics) and Mervyn King.

On 21-22 November, the Riksbank organized a conference on Monetary and Financial History: Lessons for the 21st Century. The conference commemorated the 150-year anniversary of the first issuance of the Swedish Krona, and featured both theoretical and empirical contributions on the use of historical data to address questions relevant for current policy issues. It included welcome remarks by Anna Seim (Deputy Governor of Sveriges Riksbank), and keynote speeches by Christina Romer (University of California Berkeley) and Charles Calomiris (Columbia Business School).

Together with the Center for Monetary Policy and Financial Stability (CeMoF) at Stockholm University, the Research Division organized the Third Workshop for PhD students in Money and Finance on 29 April. The Research Division also organized the session "Bank Runs and Distress Mitigation Tools" at the annual meeting of the Central Bank Research Association (CEBRA) at the House of Finance, Goethe University, in Frankfurt on 28-30 August.

Greater Stockholm Macro Group, and Workshop in Financial Intermediation and Monetary Economics

Together with Per Krusell (IIES, Stockholm University and CeMoF), the Research Division has been organizing a monthly internal seminar series for macro researchers from all major institutions in Stockholm and Uppsala. This series is known as "Greater Stockholm Macro Group" (GSMG) and aims at fostering exchange of ideas and cooperation among macro researchers in the Stockholm area.

Starting this year, together with Adrien d'Avernas (Swedish House of Finance, Stockholm School of Economics) and Roine Vestman (Stockholm University and CeMoF), the Research Division is organizing a workshop in Financial Intermediation and Monetary Economics. The workshop meets every two months and gathers faculty and PhD students to discuss recent research.

Internship Program

The Research Division organises an internship program for PhD students in Economics, Finance or Statistics enrolled at Swedish or foreign universities. The selected interns spend a period of two to three months at the Riksbank – either at the Research Division or at a policy department – during the periods April to June or August to December, and the application deadline is typically in February each year. This year, the Riksbank welcomed five PhD student interns: Davide Bucci (University of Surrey), Adrian Monninger (Johns Hopkins University), Alexandra Piller (University of Bern), Hedda Thorell (Stockholm University) and Viktória Vidaházy (Geneva Graduate Institute).

Research Seminars

The Research Division organizes weekly research seminars, mainly with international speakers. The seminars usually take place on Tuesdays, and attendance is open to Riksbank employees as well as to academics. Seminars have been in-person and virtual events. The homepage of the Research Division has a complete list of both upcoming and past seminars.

Teaching and Advising

Several staff members taught monetary economics and quantitative methods to PhD students from Stockholm University. Conny Olovsson taught the course "The Climate and the Economy" at Stockholm University, together with John Hassler. Xin Zhang gave a guest lecture on "Nature Language Processing in Economics" at Warwick Business School. Anna Grodecka-Messi advised bachelor students at Stockholm University, while Daria Finocchiaro and Ulf Söderström advised PhD students at Uppsala University.

Miscellanea

Marianna Blix Grimaldi participated in the meetings of the International Banking Research Network, Thomas Jansson participated in the Household Finance and Consumption Network, Andreas Westermark participated in the Central Bank Network on Historical Monetary and Financial Statistics, while Xin Zhang participated in the Challenges for Monetary Policy Transmission in a Changing World Research Network. Xin Zhang was on the organizing committee of the online seminar series Applied Machine Learning, Economics, and Data Science, and on the scientific committee of the Conference on Nontraditional Data, Machine Learning, and Natural Language Processing in Macroeconomics hosted by Bank of Italy.

Upcoming events in 2025

We are planning for the fourth PhD workshop in Money and Finance, jointly with CeMoF, and for a research conference on the interactions between monetary and fiscal policy. The Riksbank will also host the first WIRE (Women in Research in the ESCB) workshop. The Research Division will teach again a second-year PhD course on monetary economics, in cooperation with faculty from Stockholm University. The purpose of the course is to introduce students to modern New Keynesian models for monetary policy and business-cycle analysis.

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This newsletter, as well as other information about the Research Division at Sveriges Riksbank, is available online at https://www.riksbank.se/en-gb/about-the-riksbank/the-tasks-of-the-riksbank/research/