RESEARCH NEWS

2008

APP/Forskningsenheten

News from the Research Division

People at the Research Division

Tor Jacobson, head of research (econometrics, banking and credit risk)

Kasper Roszbach, deputy head of research (econometrics, banking, credit risk, corporate governance)

Malin Adolfson, researcher (international macroeconomics, monetary policy)

Mikael Carlsson, researcher (macroeconomics, econometrics, labor markets)

Daria Finocchiaro, researcher (monetary economics, macroeconomics, international macro)

Paolo Giordani, researcher (Bayesian econometrics, forecasting, monetary policy, exchange rates)

Virginia Queijo von Heideken, researcher (monetary economics, credit markets, empirical macro)

Ulf Söderström, researcher (monetary policy, uncertainty, term structure of interest rates)

Mathias Trabandt, researcher (monetary economics, public economics)

Mattias Villani, researcher (Bayesian analysis, econometrics, forecasting)

Karl Walentin, researcher (macroeconomics, financial economics)

Carl Andreas Claussen, guest researcher (political economy)

Andreas Westermark, guest researcher (macroeconomics, labor markets)

Marieke Bos, guest PhD student (microeconomics, credit markets)

Geraldo Cerqueiro, guest PhD student (banking)

Ingvar Strid, research assistant

Erik von Schedvin, research assistant

Lena Löfgren, secretary

Changes in the Research Staff

Ulf Söderström returned as a permanent staff member in September 2008. Ulf obtained his PhD from the Stockholm School of Economics in 1999, and spent four years at the Research Department from 1999 to 2003. From September 2003 to August 2008 he was Assistant Professor and then Associate Professor of Economics at Bocconi University in Milan, Italy. Ulf's research interests

include the formulation of monetary policy in closed and open economies; the effects of model uncertainty on monetary policy; and the relationship between monetary policy and the term structure of interest rates.

Sophie Claeys left the Research Division and moved to Belgium to work at the KBC Head Office.

Malin Adolfson is on leave from the Riksbank to study medicine at Uppsala University.

Kasper Roszbach visited the Philadelphia Fed between April and July. Kasper is currently on a part-time secondment at the Ministry of Finance.

Karl Walentin visited the Board of Governors in November.

Erik von Schedvin is on leave to do a PhD in Finance at Tilburg University.

Andreas Westermark visits the research division for a year, starting in October 2008. During this period, he is on leave from his position as Associate Professor at the Department of Economics, Uppsala University. Andreas is currently working with Mikael Carlsson at the Research Division on DSGE models that analyse the consequences for monetary policy of firm-specific labor and of downward nominal wage rigidities. He is also working on how wage-setting depends on the degree of openness of economies and institutional factors like bargaining power of unions and the degree of downward nominal wage rigidities.

Carl Andreas Claussen from Norges Bank spent about 3 months at the Research Division during 2008. He worked on two projects on monetary policy decisions in monetary policy committees (MPCs). In the first project he studies the relevance for MPCs of a judgment aggregation problem called the 'discursive dilemma'. The dilemma arises when voting directly on the interest rate (conclusion-based procedure) gives different decisions than voting on the premises for the decision (premise-based procedure). He finds that the dilemma will often prevail in MPCs. Furthermore, he finds that the premise-based procedure tend to give better decisions. In the second project he discusses the design of decision structures for monetary policy within central banks. He shows that giving the MPC chairman agenda-setting power is welfare improving if and only if (i) MPC members differ in skills and (ii) members are overconfident or there are communication frictions within the MPC.

Marieke Bos is a PhD student in economics from the Social Research Institute (SOFI) and the Department of Economics at Stockholm University. She is visiting the research division during the academic year 2008-09. She has collected a unique dataset on the social and financial background of pawn broking customers in Sweden. This data enables her to analyze the characteristics of pawnshop customers' access to mainstream and alternative means of finance, and their responses to conditions in credit markets. The project should shed new light on research questions related to credit availability that so far have only been investigated using data from mainstream financial institutions.

Geraldo Cerqueiro visited the Research Division during 2008. Geraldo is a PhD candidate in Finance at Tilburg University, expecting to graduate in 2009. He also holds an MSc in Economics from Pompeu Fabra University and an MPhil in Finance from Tilburg University. His research interests are financial institutions and applied micro econometrics. In particular, his dissertation focuses on the role of credit market imperfections in determining small firms' borrowing incentives, access to credit, and loan contract terms.

Ingvar Strid is a PhD student at the Stockholm School of Economics and joined the research division in August 2008. His research mainly deals with computational methods for Bayesian analysis, with applications in estimation of DSGE models. An important aspect of this work is to understand the trade-offs between statistical and computational efficiency of various Bayesian methods in a parallel computing context.

Research Projects

The following research projects were pursued during 2008:

Credit and Banking

Credit Risk

The credit risk project was initiated in 1999. The Riksbank has an obvious interest in ensuring that commercial banks use good risk management models. Another driving force behind the project has been the Basel II accord. In the early phase of the project, the focus was on methods for modeling extreme portfolio risks. After having concluded a number of ongoing research projects within this area, the project is now focusing on the following areas: using non-parametric methods for modeling default risk, bank borrower relationships in the event of distress, internal bank ratings, and the determinants of loss-given-default.

Some specific studies in this area include a paper with Leonard Nakamura on "*Credit Ratings and Monitoring Ability*", which looks into the value of private information included in internal bank ratings. Another project, on "*The Anatomy of the Bank and Borrower Relationship*", with Nakamura and Mester, investigates how bank relationships with distressed firms evolve. A new working paper on "*Firm Default and Aggregate Fluctuations*", jointly with Rikard Kindell and Jesper LIndé, investigates the out-of-sample value of macroeconomic variables for predicting firm bankruptcies.

Moreover, the Research Division has started in 2008 two projects with the cooperation of Geraldo Cerqueiro and Steven Ongena - a professor in empirical banking at Tilburg University. Both projects exploit a novel and unique dataset that was recently acquired by the Research Division. The dataset contains information about all business lending activities of an important commercial bank in Sweden for the period 2002-2006. Specifically, it contains very detailed information on all individual accounts for each corporate client, such as loan rates, degree of collateralization, and repayment performance.

The first project analyzes the relation between loan defaults and the consequent losses that are recorded by the bank. This question is particularly relevant in the context of credit risk models, which often assumes that these two outcomes are independent.

The second project investigates whether lenders' behavior has an effect on borrowers' risk-taking. In particular, this project analyzes the impact on the variance of firms' future earnings of the rates charged by lenders on business loans. Although the mechanism analyzed is an important foundation of modern financial theories, it has not been to date subject to proper empirical testing.

Pawn Credit

In 2008 the Swedish pawnbrokers association experienced the biggest increase in the number of customers since 1866. Up till now they served more than 4% of the Swedish adult population on a regular basis. This project attempts to find answers to what the motive behind this (growing) demand for pawn credit is. A unique new data set is utilized containing a panel of 200,000 Swedish pawnshop customers followed at a bimonthly frequency over the period 1999-2005. The data includes all information that both the pawnbrokers and Upplysningscentralen (UC), have on the pawnshop customers.

Bank Credit and the Decision to Take Pawn Credit
This paper investigates the role exclusion from mainstream bank credit plays in the demand for pawn credit. For this purpose a bivariate probit model is estimated that simultaneously analyzes (i)

the decision to provide a loan, or not, by regular banks and (ii) the decision by the individual to go to the pawnshop for credit.

Does Pawn Credit Get you In or Out of Trouble?
A panel regression is chosen to analyze how three categories of credit constrained individuals handle income shocks differently and what role pawn credit plays.

Do Immigrants Need Pawn Credit More?
Many immigrants, especially immigrants from non-Western countries, have a difficult situation in the Swedish society. This paper investigates if there is evidence that immigrants by exclusion from regular credit are more prone to expensive credit, like pawn credit.

Macroeconomics and Monetary Policy

The Term Structure of Interest Rates and the Monetary Transmission Mechanism
This project provides empirical evidence that the term structure of interest rates is an integral part of the monetary transmission mechanism. Based on these findings, the standard monetary business cycle model is augmented to generate an endogenous term structure of interest rates where movements in the term structure (and in term premia) have a direct effect on private agents' spending decisions. The model features bond market segmentation through adjustment costs for bond holdings and transaction costs between money and bonds.

Estimating Natural Rates in a DSGE Framework
The paper estimates the natural rates of interest, output, and unemployment in a Dynamic Stochastic General Equilibrium model with search and matching frictions on the labor market and equilibrium unemployment. Particular focus is put on the estimated degrees of uncertainty surrounding the natural rate estimates, uncertainty originating from random disturbances, measurement errors, estimated parameters, and model misspecification.

Robust Monetary Policy with Labor Market Frictions
The paper studies robust monetary policy across competing models of the labor market, estimated using Bayesian techniques. In particular, robust monetary policy rules across models are constructed, allowing for across-model risk aversion and model misspecification.

Optimal Monetary Policy in an Operational Medium-Sized DSGE Model
The paper constructs optimal policy projections in Ramses, the Riksbank's open economy medium-sized DSGE model for forecasting and policy analysis. Bayesian estimation of the parameters of the model indicates that they are relatively invariant to alternative policy assumptions and supports that the model may be regarded as structural in a stable low inflation environment. Past policy of the Riksbank until 2007:3 (the end of the sample used) is better explained as following a simple instrument rule than as optimal policy under commitment. The paper shows and discusses the differences between policy projections for the estimated instrument rule and for optimal policy under commitment, under alternative definitions of the output gap, different initial values of the Lagrange multipliers representing policy in a timeless perspective, and different weights in the central bank loss function.

Introducing Financial Frictions and Unemployment into a Small Open Economy Model
This is a join project with Lawrence Christiano. The project extends Ramses in three dimensions. First, it extends the current Ramses model so that stock prices, bankruptcy rates of firms and, more generally, risk are allowed to affect the macro economy and vice versa. This is achieved by assuming that there are imperfections in the financing of firms along the lines laid out in Bernanke, Gertler and Gilchrist (1999). Second, it accounts for unemployment in the new model. The new version of RAMSES integrates a search and matching framework for the labor market as developed by Mortenson and Pissarides (1994) in order to account for variations in both the hours worked per employee and the number of people employed. Finally, Swedish exports contain a considerable

amount of imported inputs. The Ramses model is not able to address this feature of the data. In the new version, the model is changed so that a fraction of imports are used directly for the production of exports. During 2008 work on this project mainly consisted of estimation of the model and handing over of the model to the modeling division for implementation in the policy process.

Household indebtedness and the Macroeconomy: the Swedish Case
The aim of this paper is to identify and quantify the different mechanisms that can explain the observed increase in households' debt in Sweden. The paper builds a theoretical model where households are heterogeneous in their labor income, borrow using their houses as collateral and consume both durable and non durable goods. House prices are assumed to move procyclically with an aggregate shock. Letting house prices react to macroeconomic volatility, allows studying the effects of the "Great Moderation" on household indebtedness through an extra price channel. The main results are that the decrease in down payments and real interest rates can explain the increase in households' debt. Contrary, the increase in idiosyncratic volatility and the direct effect of lower aggregate volatility on wages has a negligible impact on households' debt. Last, the lower volatility in house prices acts in the opposite direction, decreasing indebtedness.

Labor Market

The broad aim of this project is to deepen our knowledge about the interaction between the labor market and macroeconomic outcomes, and the role played by stabilisation policy. Recently, important steps have been taken in the development and estimation of Dynamic Stochastic General Equilibrium models (DSGE). However, the labor market in this type of models have, up to date, been modelled in a very stylized way. Not only does this simplified view of the labor market prohibit the analysis of a number of important issues, it also implies strong restrictions on DSGE models when confronted with the data.

The first ongoing project aims at incorporating firm-specific labor and bargaining between the firm and workers within the firm in an otherwise standard DSGE model with staggered wage and price contracts. Beside incorparating a more realistic model of the labor market, this also entails an analysis of issues like how labor market institutions affect dynamics of the economy and what the role for stabilisation policy is in this framework.

In a second, already started project, the starting point is the empirical observation that nominal wages almost never fall. This observation can be explained in a rational setting by introducing asymmetric conflict-costs in the bargaining problem between firms and workers (see Holden, 1994, European Economic Review). By adapting the model developed in the first project above, it is possible to study the effects of downward rigid nominal wages in a general equilibrium setting. This is done in a simple way in Carlsson och Westermark (2008), B.E. Journal of Macroeconomics (Advances). In this project the analysis is extended to handle issues related to the dynamic developments of the wage distribution and its effects on price-setting. Another goal is to relax restrictions in Carlsson and Westermark (2008) to enable the study of the optimal level of inflation target.

These two projects builds on a macro approach to study the link between the labor market and other markets. An alternative approach is to start at the micro level and use micro data in order to study this link. Sveriges Riksbank/APP has aquired a very rich micro data base containg information on firms and their employees that is very useful for this purpose.

In a third ongoing project, the goal is to study the dynamics between price-setting and unit labor cost (which can be shown to be a measure of marginal cost under certain conditions) on the firm level using the Riksbank micro data. The idea here is to test the empirical relevance for different proposed microfoundations for price-setting used in competing models of the business cycle, as well as, collecting stylized facts useful for model building.

A fourth study will involve studying how wage setting is affected by productivity shocks using matched employeer-employee data. An important issue is how the wages of incumbents are affected relative to new hires since this question lies at the hart of the search-matching model's ability to match the data (see e.g. Pissarides, 2008, Haefke, Sonntag and Van Rens, 2008, and Gertler, Huckfeldt och Trigari, 2008). This is especially interesting given that RAMSES II will incorporate a search-matching formulation of the labor market.

Project three and four is pursued within the "The Eurosystem Wage Dynamics Network" and involves collaboration with researchers from IFAU and the University of Girona.

Bayesian Econometrics

Regression Density Estimation
This project develops models and Bayesian econometric methods for estimating a conditional predictive density while making relatively few assumptions about its functional form and how that functional form changes across the space of covariates. The first paper from the project "Regression Density Estimation using Smoothly Varying Normal Mixtures" dealt with the case of continuous data, and applied the methods to a nonlinear time series model of inflation and a nonparametric Value-at-Risk model. The methodology is now extended to handle discrete data, e.g. binary (0-1) or counts.

Steady State VARs with Stochastic Volatility
It extends the Bayesian Steady State VAR methodology (currently used at the Riksbank) to allow for stochastic volatility in the structural shocks. This is an important feature of the data, and models with constant variance tend to generate forecasts uncertainty bands that are too wide. The project has now entered the forecast evaluation phase, where point and density forecasts are evaluated on a real-time data set for Sweden. The MATLAB code written for this project can also automatically predict observations that are missing as a result of publication lags (e.g. GDP).

Bayesian Inference for Second Price Common Value Auctions
This project develops methods for fast and reliable Bayesian inference in common value auctions using a highly accurate linear approximation of the equilibrium bid function. The methodology has been applied to data from coins auctions on eBay. The model fitted the data well and generated accurate out-of-sample predictions. eBay's detailed information on sellers and the buyers' rating of sellers was shown to have no impact on the number of bidders or on the auction prices.

Forecasting Macroeconomic Data with Change-Point Models
The aim of this project is to explore the performance of change-point models for real-time macroeconomic forecasting. Changes in mean, persistence and volatility in macroeconomic time series data have been well documented for several countries, including Sweden, through various change-point models. The paper "Forecasting Macroeconomic Time Series with Locally Adaptive Signal Extraction" introduces a new class of state-space models and evaluates their forecasting performance. The model compares favourably to similar models in the literature, especially in interval forecasting. The plan is to extend the methodology to a multivariate setting.

Modeling Multivariate Distributions Using Copulas and Marginally Adapted Distributions
Many tasks in forecasting (e.g. forecast projections involving more than one variable) and policy analysis (e.g. monitoring portfolio risk) require models of the joint distribution of several variables. When the assumption of normality for all variables is not adequate this becomes a complex task. This project explores new methods of forming non-normal multivariate distributions that improve on common models by utilizing information contained in the marginal distribution of the variables.

Recent Publications

Carlsson, Mikael and Andreas Westermark, "Monetary Policy under Downward Nominal Wage Rigidity", *The B.E. Journal of Macroeconomics*: Vol. 8: Iss. 1 (Advances), Article 28, 2008

Favara, Giovanni and Paolo Giordani,"Reconsidering the Role of Money for Output, Prices and Interest Rates", *Journal of Monetary Economic,* forthcoming

Giordani, Paolo and Robert Kohn, "Bayesian Inference Using Adaptive Sampling", *Advances in Econometrics: Bayesian Econometrics,* Volume 23, 2008

Lindé, Jesper, "The Effects of Permanent Technology Shocks on Labor Productivity and Hours in the RBC model", *Journal of Economic Dynamics and Control,* forthcoming

Nessén, Marianne, Jesper Lindé and Ulf Söderström, "Monetary Policy in an Estimated Open-Economy Model with Imperfect Pass-Through", *International Journal of Finance and Economics,* forthcoming

Strid, Ingvar and Karl Walentin, "Block Kalman Filtering for Large-scale DSGE Models", *Computational Economics*, forthcoming

Villani, Mattias, "Steady State Priors for Vector Autoregressions", *Journal of Applied Econometrics*, forthcoming

Working Papers

The working papers are downloadable from our external web page *www.riksbank.se*. If you want to publish a working paper please contact Mikael Carlsson, Ph. 7870433. Note that to be considered for publication a paper should first have been presented at a research seminar.

No. 219, by Per Åsberg and Hovick Shahnazarian, "Macroeconomic Impact on Expected Default Freqency"

No. 220, by Virginia Queijo von Heideken, "Monetary Policy Regimes and the Volatility of Long-Term Interest Rates"

No. 221, by Lars Frisell, Kasper Roszbach and Giancarlo Spagnolo, "Governing the Governors: A Clinical Study of Central Banks"

No. 222, by Hans Dillén, "The Monetary Policy Decision-Making Process and the Term Structure of Interest Rates"

No. 223, by Virginia Queijo von Heideken, "How Important are Financial Frictions in the U.S. and the Euro Area?"

No. 224, by Ingvar Strid and Karl Walentin, "Block Kalman filtering for large-scale DSGE models"

No. 225, by Malin Adolfson, Stefan Laséen, Jesper Lindé and Lars E.O. Svensson, "Optimal Monetary Policy in an Operational Medium-Sized DSGE Model"

No. 226, by Tor Jacobson, Rikard Kindell, Jesper Lindé and Kasper Roszbach, "Firm Default and Aggregate Fluctuations"

Other Research Activities

Workshops

Modeling and Forecasting Economic and Financial Time Series with State Space models (Oct 2008)
State space models are a powerful tool to tackle difficult inference and forecasting problems common in economic and financial series. Given the emphasis placed on forecasting and nowcasting in modern central banks and other financial institutions, state space models seem a much under-utilized tool in the econometric community. Topics included inference, parameter variation, common factor models, measurement errors and filtering, data revision, and mismatched frequencies.

Household Indebtedness, House Prices and the Economy (September 2008)
In the last few decades, house prices have undergone major medium-run fluctuations in many industrialized economies. Boom-bust cycles in house prices, coupled with a substantial increase in household indebtedness, have drawn the attention of policymakers and academics towards the developments in housing markets and their impact on economic activity and financial stability. In that context, the aim of this workshop was to discuss recent swings in house prices and the increasing indebtedness of households, and their impact on the economy. The workshop addressed the following topics: (i) credit markets, institutional change, and household indebtedness, (ii) household finance and the determinants of household indebtedness, (iii) the relationship between household indebtedness, housing markets, and consumption, (iv) household indebtedness, housing markets and their implication for economic activity and financial stabiltiy. To address the last topic, we also had a panel session with Franklin Allen, Tim Besley, Nobuhiro Kiyotaki and Víctor Ríos-Rull.

Special Seminars

In May the Research Division travelled to Vienna and had a two-day workshop with the Economic Studies Division at the Oesterreichische Nationalbank (Central Bank of Austria).

Reading Group

Since September 2007 the Research Division started a reading group that meets approximately once a month. The purpose of this reading group is to read and discuss research frontier papers across all fields of economics and econometrics. For questions regarding the reading group please contact Virginia Queijo von Heideken, Ph. 7870439.

Teaching

In the summer, three researchers from the Research Division, together with other people, taught a graduate monetary policy course at Uppsala University.

External Evaluation

In October, **Marvin Goodfriend** (Carnegie Mellon University), **Lucrezia Reichlin** (London Business School) and **Gregory Udell** (Indiana University) visited the division to write an external review of the Research Division.

Guest Program

During 2008, the following researchers visited the Research Division:

- Paul Söderlind, University of St. Gallen
- Richild Moessner, BIS
- Giovanni Favara, University of Lausanne
- Alessandra Bonfiglioli, Institute for Economic Analysis, Barcelona
- Wouter den Haan, University of Amsterdam
- Casper de Vries, Erasmus University
- Bartosz Mackowiak, ECB
- Guido Ascari, University of Pavia
- Klaus Adam, ECB
- Skander Van den Heuvel, Wharton
- Liam Graham, University College in London
- Antonio Moreno, University of Navarra
- Iftekhar Hasan, Rensselaer Polytechnic Institute
- Markus Brunnermeier, Princeton University
- Maurizio Bovi, Institute of Studies and Economic Analyses
- John Geweke, University of Iowa
- Eric Leeper, Indiana University
- Caterina Mendicino, Bank of Portugal
- Julian Messina, Universitat de Girona
- Marvin Goodfriend, Carnegie Mellon University
- Wilko Bolt, Holländska centralbanken
- Bob Hunt, Philadelphia Fed
- Niels Arne Dam, Danmarks Nationalbank
- Marco Bonomo, Fundacion Getulio Vargas
- Harry Leinonen, Finlands bank
- Antonella Tutino, Board of Governors
- Simon Gilchrist, Boston University
- Ricardo Reis, Columbia Unviersity

Correspondence to the editor:
Virginia Queijo von Heideken
Research Division
Sveriges Riksbank
SE-103 37 Stockholm, Sweden
Ph. +46 8 787 04 39
Email: virginia.queijo.von.heideken@riksbank.se