



# RESEARCH NEWS

2007

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 (micro-econometrics, banking, credit risk and corporate governance)

**Malin Adolfson**, researcher (international macroeconomics, monetary policy)

**Mikael Carlsson**, researcher (macroeconomics, econometrics)

**Sophie Claeys**, researcher (empirical banking)

**Daria Finocchiaro**, researcher (monetary economics, macroeconomics)

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

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

**Mathias Trabandt**, researcher (monetary economics, public economics)

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

**Karl Walentin**, researcher (macroeconomics, financial economics)

**Hans Dillén**, guest researcher (monetary economics, financial markets)

**Ola Melander**, guest researcher (credit markets)

**Erik von Schedvin**, research assistant

**Lena Löfgren**, secretary

### Guest Program

During 2007, the following researchers visited the Research Division:

- Lars E.O. Svensson, Princeton University
- Viktors Stebunovs, Boston College
- Falko Fecht, Bundesbank
- Maria Punzi, Boston College
- Alexandre Janiak, ECARES/Université Libre de Bruxelles

- Yavuz Arslan, University of Rochester
- Stefano Gnocchi, Pompeu Fabra
- Rocco Huang, University of Amsterdam
- Judit Montoriol-Garriga, Pompeu Fabra
- Kjell Björn Nordal, Norges Bank
- Erik Hjalmarsson, Board of Governors
- Hans Degryse, Tilburg University
- Steven Ongena, Tilburg University
- Ferre De Graeve, Ghent University
- Gert Peersman, Ghent University
- Eric Leeper, Indiana University
- Kenneth Rogoff, Harvard University
- Christa Hainz, University of Munich
- Massimo Rostagno, ECB
- Susanto Basu, Boston College
- John Fernald, Federal Reserve Bank of San Francisco
- Ulf Söderström, Bocconi University
- James McAndrews, New York Fed
- Todd Clark, Kansas City Fed
- John Faust, Johns Hopkins University
- Federico Ravenna, University of California - Santa Cruz
- Michael Pitt, University of Warwick
- Charles Wyplosz, Graduate Institute of International Studies in Geneva
- Lutz Weinke, Duke University
- Christa Bouwman, Case Western Reserve University
- Robert Kohn, University of New South Wales

*For questions regarding the guest program please contact Kasper Roszbach; Ph. 7870823.*

### Changes in the Research Staff

**Daria Finocchiaro** joined the permanent research staff in September 2007. She defended her Ph.D. at the Institute for International Economic Studies in the month of October. Daria comes from Catania, Italy. She received her Master degree in Economics from Bocconi University and spent one year at Princeton University as visiting student in 2003. She lives in Sweden since 2001. Daria has been working on topics related to wealth heterogeneity, propensity to plan, asset prices and monetary policy. The paper "*Monetary Regime change and business cycles*" analyzes how changes in monetary policy regimes can influence the economic dynamics in a small open economy. This paper estimates a DSGE model on Swedish data incorporating the change in 1993 from an exchange rate targeting to an inflation targeting regime. The results confirm that monetary policy indeed mainly reacted to exchange rate movements in the target zone and to inflation in the inflation targeting regime. Devaluation expectations were the main source of volatility in the target

zone period and shocks to foreign variables were in general more destabilizing under the target zone regime than under inflation targeting.

**Virginia Queijo von Heideken** joined the permanent research staff in September 2007. Virginia comes from Uruguay where she did her undergraduate studies and worked 4 years as an economic analyst in the banking and industry sector. She moved to Sweden in 2001 and spent 2003 as a visiting scholar at New York University. Virginia received her Ph.D. from the Institute for International Economics Studies in Stockholm in September 2007. Her main research interests are monetary economics and asset markets. In her job market paper, "*Monetary Policy Regimes and the Volatility of Long-Term Interest Rates*", she shows that a model where the central bank can not observe the natural rate of unemployment and follows a discretionary monetary policy can explain a lot of the observed volatility in long-term interest rates. Virginia likes travelling, photography and history.

**Hans Dillén** from the Monetary Policy Department spent about 7 months at the Research Division during 2007. He has been working on three papers within the project "*The term structure of interest rates and the monetary policy decision making process*". Two of the papers, of which one has been presented at a research seminar, develop theoretical term structure models. The third paper is empirical and joint work with Erik von Schedvin. It deals with the estimation of step shaped forward rate curves (derived from the theoretical models).

**Ola Melander** is on leave from the Riksbank to do a PhD in Economics at Stockholm School of Economics, but he is visiting the research division during the fall of 2007. He is currently working on the project "*Financial Frictions and Investment: Evidence from Swedish Firm-Level Panel Data*". The purpose of this project is to test for balance sheet channel/financial accelerator effects in the monetary transmission mechanism in Sweden. The project investigates if a firm's liquidity affects its investment, controlling for any informational content in liquidity for investment opportunities, as predicted by the balance sheet channel.

## Research Projects

### ***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 modelling extreme portfolio risks. After having concluded a number of ongoing research projects within this area, the project is now focusing on the following areas:

#### *Acquisition and structuring of additional data bases*

One goal is to acquire new data from the largest banks operating in Sweden. At the same time, we strive to standardize the inputting of data to facilitate the future updating of the data base. In October 2007 Nordea provided the division with credit data on Swedish firms and individuals. The other major banks are expected to deliver data during the spring of 2008.

#### *The impact of fluctuations in the macroeconomy on corporate bankruptcies*

Two studies about the relation between aggregate fluctuations and default probabilities are being conducted. "*Aggregate fluctuations and business default*" investigates to what extent aggregate fluctuations influence the frequency of default contingent upon both firm specific and industry

specific information. The model's forecasts are evaluated and compared to the best practice models in the field. *"SME and corporate exposure to business cycle risk"* focuses on the differences in macro risk exposure between small and large companies. The motivation for this project is the Basel II Accord's favourable treatment of retail credit and loans to SMEs. The justification is smaller exposure to systematic risk and more exposure to idiosyncratic risk in these categories. However, several studies have found that these categories are more risky than corporate credit, but without finding the reason for this. This study attempts to pin down the reason for the difference between the risk in small and large firms' credit risk.

#### *Modelling of correlation and concentration risks*

Two studies focus on concentration risks and correlations. *"Is firm interdependence within industries important for portfolio credit risk?"* tries to formalize that many firms are affected by each other through judicial, financial and business relations. Conventional methods, such as KMV, do not take into account correlations due to such interactions and can therefore potentially underestimate the credit risk in the banking system. This study develops a new way of incorporating industry specific shocks. An experiment with data from two Swedish banks estimates credit-VaR. A new study, *"Industry effects and business default"* continues this work and develops a more advanced method that allows the shocks that firms are subjected to, to be contingent on what happens in other industries. The aim of this study is to give a more insightful decomposition of the sources of credit risk.

#### *Flexible default risk modelling*

This project compares a logistic default risk model with a nonlinear logistic default risk model, based on regression splines. The estimates will be based on a large panel dataset of yearly accounting information, covering all Swedish limited liability firms between 1990 and 2005.

### ***Open Economy / Macro***

Several papers have already been accepted for publication or are in the final stages of revision. This is still an active research area. The following projects were pursued during 2007:

*"Optimal Monetary Policy in an Operational Medium-Sized DSGE Model"* studies how different ways of modelling monetary policy affect the transmission of shocks and forecasts generated by Ramses (the Riksbank Aggregate Model for Studies of the Economy of Sweden). We compare optimal policy derived from a quadratic loss function for the central bank with an estimated simple instrument rule and quantify the effects on, for example, impulse responses, trade-off frontiers, and projections.

*"Parameter Identification in an Estimated New Keynesian Open Economy Model"* addresses identification issues in a New-Keynesian open economy DSGE model. We use Monte Carlo methods to study the small sample properties of the classical maximum likelihood (ML) estimator in artificial samples generated by the DSGE model.

*"Introducing Financial Frictions and Unemployment into a Small Open Economy Model"* extends Ramses in three dimensions. First, we extend 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, we account for unemployment in the new model. In its present form the Ramses model only allows for variation on the intensive margin with respect to hours worked (i.e. hours worked per employee) in response to changes in

the economy. In other words, the Ramses model has no explicit modelling of unemployment. We integrate a search and matching framework for the labour 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. We change the model so that a fraction of imports are used directly for the production of exports.

*"Sticky Information vs. Sticky Prices: A Horse Race in a DSGE Framework"* uses a fully-fledged DSGE model with sticky information and compares it to Calvo sticky prices, allowing also for dynamic inflation indexation as in Christiano, Eichenbaum, and Evans (2005). We find that sticky information and sticky prices with dynamic inflation indexation do equally well in a DSGE model.

*"Inattentive consumers in general equilibrium"* explores the effects of heterogeneity in planning propensity on wealth inequality, asset prices and welfare. It develops a simple model economy populated by "attentive" and "inattentive" agents. Attentive agents plan their consumption, savings, or stock holdings period by period, while inattentive ones plan every other period. In partial equilibrium with fixed asset prices, inattentive consumers face more uncertainty and save more for precautionary reasons. In general equilibrium, their savings are positively correlated with bond prices, but inattentive consumers still accumulate more wealth. In a simple two-period portfolio choice model driven by uncertain asset returns, however, infrequent revisions of portfolios can produce the opposite result: inattentive investors accumulate less wealth.

*"How Far Are We from the Slippery Slope? The Laffer Curve Revisited"* analyzes how the behaviour of households and firms in the US compared to the EU-15 adjust if fiscal policy changes taxes. Hence, the goal of this paper is to examine the shape of the Laffer curve quantitatively in a simple neoclassical growth model calibrated to the US as well as to the EU-15 economy. We show that the US and the EU-15 area are located on the left side of their labour and capital tax Laffer curves, but the EU-15 economy being much closer to the slippery slopes than the US. Our results indicate that since 1975 the EU-15 area has moved considerably closer to the peaks of their Laffer curves. A dynamic scoring analysis shows that more than one half of a labour tax cut and more than four fifth of a capital tax cut are self-financing in the EU-15 economy.

### ***Financial Markets***

This is an area that brings together a number of studies on financial markets that are not included in the credit risk part.

*"An estimated DSGE model with housing collateral"* (in collaboration with researchers at MAO/APP) aims to determine the quantitative relationship between macroeconomic variables and the housing sector. We use a setup with residential investment and a fraction of credit constrained household and estimate the model on Swedish data using Bayesian methods. Preliminary results indicate that shocks in the housing sector have generated only a small part of the variation in macro variables in Sweden in the last 20 years. On the other hand, a substantial part of the monetary transmission mechanism takes place through the effect of the interest rate on the value of housing collateral. This part has increased over time as banks have increased the maximum loan-to-value ratio of mortgage loans.

*"Foreign bank entry in the EU: the impact on the structure and organization of supervisory authorities"* takes as its departure the supposition that European integration of the banking market in combination with delegated supervision could lead to a financial stability problem. The study investigates what a national supervisory agent can do when a foreign bank fails. This should be of

special interest for the new member countries whose banking market is often dominated by foreign banks.

*"Do Central Banks React to House Prices?"* is a project that studies the conduct of monetary policy by three major central banks over the last few decades. Using Bayesian methods, the paper shows that the Bank of Japan and the Bank of England have reacted to house price inflation increasing interest rates, while the U.S. Fed has not.

*"An Analysis of Central Bank Governance Mechanisms"* uses data from a new survey among approximately 90 Central Banks and analyzes the recruitment process for top positions in central banks while considering accountability features like openness and transparency.

*"Household indebtedness, macroeconomic volatility and credit market conditions"* is a project that aims to explain the increase in household indebtedness observed in Sweden in the last ten years. The model in the paper is a business cycle model with frictions in housing markets, where agents are heterogeneous and experience aggregate and idiosyncratic shocks.

Two projects are in collaboration with researchers at the Federal Reserve Bank of Philadelphia and study the banks' effectiveness in the monitoring of its borrowers:

*"The anatomy of the bank and borrower relationship. Evidence from distressed firms"* aims at increasing our understanding of the way in which banks in practice implement the supply of credit to "relationship clients" and use private information. According to economic theory small opaque firms typically rely on bank loans because their specialization in screening and monitoring can solve potential moral hazard and adverse selection problems. For these reasons such firms are expected to have better access to credit through banks. This project employs detailed information about the course of events before loan defaults and bankruptcies to study how banks behave towards their relationship clients and how those relations affect access to bank credit.

*"Credit ratings and bank monitoring ability"* investigates to what extent Swedish banks are superior to external rating agencies in the monitoring of corporate creditworthiness.

### ***Labour market***

The aim of this project is to deepen our knowledge about the interaction between the labour market and macroeconomic outcomes, and the role played by stabilization policy. Recently, important steps have been taken in the development and estimation of Dynamic Stochastic General Equilibrium models (DSGE). However, the labour market in this type of models has been modelled in a very stylized way.

A first study involves modelling wage bargaining between employers and unions. This would make it possible to analyze such issues as how labour market institutions affect the economy's dynamics and what the role for stabilization policy is in this framework.

A second study departs from the empirical observation that nominal wages almost never fall. This observation can be explained in a wage negotiation model if the parties face asymmetric costs

of conflict. By adapting the model developed in the first study, we can study the effects of downward rigid nominal wages and the possible role and scope for stabilization policies.

A third study takes the model developed in the first study to the data. This can be interesting, not only because we could then estimate structural parameters governing labour market outcomes, but also because a less restrictive modelling of the labour market would presumably affect the empirical results in other dimensions of the model as well.

The second and third studies described above imply a macroeconomic evaluation of the microfoundations on which the DSGE models stand. An alternative approach is to start from the micro level and use micro data. Sveriges Riksbank/APP has acquired a very rich microeconomic database of firms and their employees that is well suited for the task at hand.

A fourth study, which is already at an advanced state, aims at evaluating the empirical relevance of different models of the labour market (search models vs. effective wage models and bargaining models) in terms of their implications for job creation, using the micro database.

A fifth study studies the dynamics between price setting and labour costs (and other factor costs) with the aid of the Riksbank's micro database. The idea is to collect stylized facts about the structural mechanisms of the economy to be used for further theoretical work.

Studies 1-4 are conducted in collaboration with researchers at Uppsala University. Study 5 is a joint effort together with staff at the APP/Utreddningsenheten within the framework of "The Eurosystem Wage Dynamics Network".

### ***Bayesian analysis***

Economic time series are usually modelled under the maintained assumption that the underlying economic process does not change over time. Specifically, one usually assumes that the level, persistence and volatility of the time series are constant over time. To meet this assumption the models are usually estimated for a sample period when the economy was relatively stable. More seasoned data will not be used at all even though they could contain valuable information. This approach can be especially problematic when the economy relatively recently has undergone a structural shift, or if such a change has taken place gradually. It could also be the case that the economy has changed in some regards, but in others have remained quite stable for a long period of time. Some projects undergone during 2007 develop Bayesian statistical methods with the aim of discovering and modelling possible structural shifts in the economy.

"*Forecasting Macroeconomic Data with Change-Point Models*" aims 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. However, nothing is known of their forecasting performance.

There are many indications that most developed economies have experienced a decline in volatility in macroeconomic variables over time. Models with constant variance tend to generate forecasts uncertainty bands that are too wide. "*Steady State VARs with Stochastic Volatility*" extends the Bayesian Steady State VAR methodology (currently used at the Riksbank) to allow for stochastic

volatility in the structural shocks. Point forecasts and the forecast densities from the new model are evaluated using real time data for Sweden and the U.S.

Other projects developing Bayesian statistical methods include:

"*Modelling 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.

"*Regression Density Estimation using Smoothly Varying Normal Mixtures*" develops models and Bayesian econometric methods for estimating a conditional predictive density  $p(y|x)$  while making relatively few assumptions about its functional form and how that functional form changes across the space of covariates,  $x$ . We illustrate the methods on several applications, including a nonlinear time series model of inflation and a nonparametric model of financial volatility where we estimate Value-at-Risk surfaces.

"*Bayesian Inference for Second Price Common Value Auctions*" develops methods for fast and reliable Bayesian inference in common value auctions using a highly accurate linear approximation of the equilibrium bid function. The objects' values and the number of participating bidders are modelled conditional on a number of auction-specific covariates and we propose algorithms for Bayesian variable selection among these covariates.

### Recent Publications

**Adolfson, Malin, Michael K. Andersson, Jesper Lindé, Mattias Villani and Anders Vredin**, "Modern Forecasting Models in Action: Improving Macroeconomic Analyses at Central Banks", *International Journal of Central Banking*, forthcoming

**Adolfson, Malin, Stefan Laseén, Jesper Lindé and Mattias Villani**, "Bayesian Estimation of Open Economy DSGE Model with Incomplete Pass-Through", *Journal of International Economics* 72, 2007, 481-511

**Adolfson, Malin, Stefan Laseén, Jesper Lindé and Mattias Villani**, "Evaluating An Estimated New Keynesian Small Open Economy Model", *Journal of Economic Dynamics and Control*, forthcoming

**Adolfson, Malin, Jesper Lindé and Mattias Villani**, "Bayesian Analysis of DSGE Models – Some Comments", *Econometric Reviews* 26(2-4), 2007, 173-185

**Adolfson, Malin, Jesper Lindé and Mattias Villani**, "Forecasting Performance of an Open Economy DSGE Model", *Econometric Reviews* 26(2-4), 2007, 289-328

**Alexius, Annika and Mikael Carlsson**, "Production Function Residuals, VAR Technology Shocks, and Hours Worked: Evidence from Industry Data", *Economics Letters*, forthcoming.

**Calvet, Laurent, John Y. Campbell and Paolo Sodini**, "Down or Out: Assessing The Welfare Costs of Household Investment Mistakes", *Journal of Political Economy*, forthcoming

**Claeys, Sophie and Koen Schoors**, "Bank supervision Russian style: Evidence of conflicts between micro- and macro- prudential concerns", *Journal of Comparative Economics*, forthcoming

**Claeys, Sophie, Koen Schoors and Rudi Vander Venet**, "The sequence of bank liberalization: Financial repression versus capital requirements in Russia", *Comparative Economic Studies*, forthcoming

**Claeys, Sophie and Rudi Vander Vennet**, "Determinants of Bank Interest Margins in Central and Eastern Europe: A Comparison with the West", *Economic Systems*, forthcoming

**Frisell, Lars and Johan Lagerlöf**, "Eliciting Demand Information through Cheap Talk: An Argument in Favour of a Ban on Price Discrimination", *Economics Letters*, forthcoming

**Frisell, Lars and Johan Lagerlöf**, "A Model of Reputation in Cheap Talk", *Scandinavian Journal of Economics*, forthcoming

### Working Papers

The working papers are downloadable from our external web page [www.riksbank.se](http://www.riksbank.se) under Published/Publications. 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. 201. Price Setting Transactions and the Role of Denominating Currency in FX Markets**, by Richard Friberg and Fredrik Wilander

**No. 202. The Geography of Asset Holdings: Evidence from Sweden**, by Nicolas Coeurdacier and Pilippe Martin

**No. 203 Evaluating An Estimated New Keynesian Small Open Economy Model**, by Malin Adolfson, Stefan Laséen, Jesper Lindé and Mattias Villani

**No. 204 The Use of Cash and the Size of the Shadow Economy in Sweden**, by Gabriela Guibourg and Björn Segendorf

**No. 205 Bank supervision Russian style: Evidence of conflicts between micro- and macroprudential concerns**, by Sophie Claeys and Koen Schoors

**No. 206 Optimal Monetary Policy under Downward Nominal Wage Rigidity**, by Mikael Carlsson and Andreas Westermark

**No. 207 Financial structure, Managerial Compensation and Monitoring**, by Vittoria Cerasi and Sonja Daltung

**No. 208 Financial Frictions, Investment and Tobin's  $q$** , by Guido Lorenzoni and Karl Walentin

**No. 209 Sticky Information vs. Sticky Prices: A Horse Race in a DSGE Framework**, by Mathias Trabandt

**No. 210 Acquisition versus greenfield: The impact of the mode of foreign bank entry on information and bank lending rates**, by Sophie Claeys and Christa Hainz

**No. 211 Nonparametric Regression Density Estimation Using Smoothly Varying Normal Mixtures**, by Mattias Villani, Robert Kohn and Paolo Giordani

**No. 212 The Costs of Paying – Private and Social Costs of Cash and Card Payments**, by Mats Bergman, Gabriela Guibourg and Björn Segendorf

**No. 213 Using a New Open Economy Macroeconomics model to make real nominal exchange rate forecasts**, by Peter Sellin

**No. 214 Introducing Financial Frictions and Unemployment into a Small Open Economy Model**, by Lawrence J. Christiano, Mathias Trabandt and Karl Walentin

**No. 215 Earnings Inequality and the Equity Premium**, by Karl Walentin

**No. 216 Bayesian forecast combination for VAR models**, by Michael K Andersson and Sune Karlsson

**No. 217 Do Central Banks React to House Prices?** by Daria Finocchiaro and Virginia Queijo von Heideken

**Conferences, Workshops, etc.**

**Workshop on productivity: "Understanding and Predicting Productivity Growth"**, November 30 - December 1, 2007

The aim at this workshop was to answer the following questions: (i) What are the key factors for understanding total factor productivity (TFP) growth at the disaggregate level (e.g. information and communication technology, capital, human capital, organizational structure, competition). (ii) What are important determinants for understanding the recent development of aggregate TFP outcomes? For example, has composition effects been at play and if so what, in turn, drives such effects? (e.g. what role does globalization play) (iii) Can we improve forecasts of aggregate TFP growth by using disaggregate data? (iv) What data do we need to deepen our understanding of TFP growth? To address the last question, there was a panel session on data issues with representatives from statistical agencies as well as academia. Among others, Susanto Basu, Eric Bartelsman and John Van Reenen participated in the workshop.

**Reading group**

Since September 2007 the research division started a reading group that meets twice a month. The purpose of this reading group is to read and discuss research frontier papers across all fields of economics and econometrics. After having tested the reading group format at the research division during the fall of 2007, we are now planning to open up the reading group from January 2008 to all employees at the Riksbank. Further information about upcoming reading group meetings will be distributed via internal mail. For questions regarding the reading group please contact Mathias Trabant, Ph. 7870438.

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