

Report on scientific achievements

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Introduction

This report on scientific achievements consists of four parts. Section 1 presents my research before May 2007, i.e. until I was awarded the degree of doctor of economic sciences. Section 2 is the main part of the report. It outlines the results of articles that constitute the single-topic list of publications as envisaged in article 16, paragraph 2 of the act on academic degrees and titles and degrees and titles in art from 14 March 2003. The title of my scientific achievement is:

**Studies on the usefulness of general equilibrium models
in macroeconomic inference.**

Section 3 discusses the results of other studies that I have conducted since the dissertation defence, i.e. in years 2007-2013. Section 4 provides other information, such as presentations at conferences, citation analysis as well as my achievements in teaching.

1 Scientific achievements before dissertation defence

I began conducting economic research during my master studies at the Warsaw School of Economics, and have continued at the National Bank of Poland since September 2001, and in parallel at the Warsaw School of Economics since October 2003. Moreover, in the period from October 2007 to June 2008 I conducted research at the European Central Bank.

The first two research projects were about factors influencing the rate of return on financial assets. In the study (Rubaszek and Serwa, 2001) we investigated the reasons of the difference between the rate of return on Polish and foreign debt assets. The results indicate that among these reasons are: differences in the growth rate of major stock market indices, the shape of the yield curve and the volatility of the exchange rate. In the second study (Rubaszek, 2002b) I presented the results of application the arbitrage price model for 61 companies listed on the Warsaw Stock Exchange. I pointed out that there is a significant relationship among stock prices, major stock market indices, domestic interest rates, exchange rates and the prices of copper.

With the start of work at the National Bank of Poland my research interests evolved in the direction of econometric models describing foreign trade patterns (Mroczek and Rubaszek, 2003, 2004) and international capital flows (Rubaszek, 2002a). The models I developed were used to predict selected components of the balance of payments in the work carried out at the National Bank of Poland. In 2005 the partial equilibrium model for foreign trade became a part of the large macro-econometric model for the Polish economy ECMOD (Fic et al., 2005a,b), of which I am a co-founder. The new version of the ECMOD (NECMOD) is currently the main prognostic model of the National Bank of Poland.

The main topic of research I conducted until the dissertation defence concerned equilibrium exchange rates, particularly in the application for the Polish zloty. In the initial studies (Rubaszek, 2003, 2004a) I developed the balance of payment equilibrium exchange rate model (BPEER), in which the level of the equilibrium exchange rate depends on: the demand at home and abroad, net foreign assets ¹ and the difference in interest rates on domestic and foreign debt assets. The BPEER is calculated as the theoretical value of the real exchange rate from the single-equation model. Given nonstationarity of the variables present in the BPEER model, in the application for the Polish zloty, the parameters of the model were esti-

¹Defined as the net international investment position.

mated with the fully-modified least squares method. The choice of the method was based on the results of Monte-Carlo simulation described in Rubaszek (2004c). In subsequent years, I was involved in studies on the fundamental equilibrium exchange rate (FEER) model, which is the dominant concept of the equilibrium exchange rate used by international organisations, including the International Monetary Fund (IMF). The FEER is defined as the level of the exchange rate that is consistent with the simultaneous attainment of internal (null output gap) and external (sustainable level of the current account) balance. The method of calculating the FEER requires the estimation of a multi-equation partial equilibrium econometric model for foreign trade, in which one of the exogenous variables is the real exchange rate. The model is solved for the real exchange rate ensuring that in the environment of closed output gap at home and abroad, the current account was at its target level. The solution for the real exchange rate is the FEER. The papers Rubaszek (2004b, 2005) present the estimates of the FEER for the Polish zloty using the methodology developed by the IMF (Isard and Faruqee, 1998). In the articles Rubaszek (2009) and Rubaszek and Rawdanowicz (2009) I proposed the modification of the standard FEER model, which takes into account the real convergence process characteristic for developing economies. The proposed model was used to determine the equilibrium exchange rate for the zloty (Rubaszek, 2009) and four currencies of Central European countries (Rubaszek and Rawdanowicz, 2009). The FEER model described in Rubaszek (2009) is updated quarterly and used at the National Bank of Poland in the analyses supporting the conduct of monetary policy.

My work on the equilibrium exchange rates was summarised in the doctoral dissertation Rubaszek (2007), which was defended on 15 May 2007. The selected fragments of my dissertation and the dissertation of dr Dobromil Serwa were published as a book „Analiza Kursu Walutowego (Analysis of the Exchange Rate)” Marcinkowska-Lewandowska et al. (2009)². In addition, I described the most important aspects related to equilibrium exchange rate

²Prof. Wanda Marcinkowska-Lewandowska was the supervisor of both PhD theses.

modelling in the chapter of the book „Polityka Pieniężna (Monetary Policy)” edited by prof. Andrzej Sławiński (Rubaszek, 2011).

2 Single-topic list of publications

Since defending my doctoral dissertation my research interests have shifted towards general equilibrium, macroeconomic models. My first project in this field was to build a two-country dynamic stochastic general equilibrium model (DSGE) for the euro area and the United States (Rubaszek, 2006). The model was used at the National Bank of Poland in the analyses of the external environment for the Polish economy. In the next years I conducted research aimed at determining the usefulness of general equilibrium models in macroeconomic inference. In particular, work focused on the following three research problems.

1. How accurate are macroeconomic forecasts from DSGE models?
2. Are general equilibrium models able to explain the level and dynamics of the current account?
3. In what areas are the general equilibrium models with heterogeneous households useful in the analysis of monetary and macro-prudential policy?

The result of this work is in the form of the following seven articles, of which five are published in journals that are on the ISI Master Journal List. I believe that these articles constitute the single-topic list of publications as envisaged in article 16, paragraph 2 of the act on academic degrees and titles and degrees and titles in art from 14 March 14 2003.

- i. The article “On the forecasting performance of a small-scale DSGE model” published in *International Journal of Forecasting* (Rubaszek and Skrzypczyński, 2008). The paper was previously published in the form of the working paper series of the Warsaw School

of Economics (Rubaszek and Skrzypczyński, 2007a) and the National Bank of Poland (Rubaszek and Skrzypczyński, 2007b).

- ii. The article “Putting the New Keynesian DSGE model to the real-time forecasting test” published in *Journal of Money, Banking and Finance* (Kolasa, Rubaszek and Skrzypczyński, 2012). The paper was previously published in the form of the working paper series of the European Central Bank (Kolasa, Rubaszek and Skrzypczyński, 2009).
- iii. The article “On the empirical evidence of the intertemporal current account model for the euro area countries” published in *Review of Development Economics* (Ca’ Zorzi and Rubaszek, 2012a). The paper was previously published in the form of the working paper series of the European Central Bank (Ca’ Zorzi and Rubaszek, 2008).
- iv. The article “The role of two interest rates in the intertemporal current account model” published in *Macroeconomic Dynamics* (Rubaszek, 2012d).
- v. The article “Determinants of credit to financial corporations in a life-cycle model” published in the working paper series the European Central Bank (Rubaszek and Serwa, 2012) and the National Bank of Poland (Rubaszek and Serwa, 2011).
- vi. The article “Mortgage down-payment and welfare in a life-cycle model” published in *Bank i Kredyt* (Rubaszek, 2012c).
- vii. The article “Monetary policy in a non-representative agent economy: A survey” published in *Journal of Economic Surveys* (Brzoza-Brzezina, Kolasa, Koloch, Makarski and Rubaszek, 2013). The paper was previously published in the form of the working paper series of the National Bank of Poland (Brzoza-Brzezina et al., 2011).

Below I present the summary of the contribution of the above-mentioned articles to the economic literature. The description is divided into three major parts, each one assigned to

the research problems outlined above.

2.1 The accuracy of macroeconomic forecasts from DSGE models

The first research problem concerns the accuracy of macroeconomic forecasts from DSGE models. This question appeared in the economic literature a decade ago, when Smets and Wouters (2003) showed that, in comparison to vector autoregressions (VAR), forecasts from an estimated DSGE model are characterised by a lower value of the root mean squared forecast error (RMSE). Since that moment, there has been a significant rise in popularity of DSGE models in academic and financial institutions. However, in the initial years the documentation of the quality of macroeconomic forecasts from DSGE models was relatively scarce. In particular, in 2007 there were no studies that would compare the accuracy of forecasts from the DSGE model to those elaborated by experts.

In the article Rubaszek and Skrzypczyński (2008) we filled this gap of the literature. We compared the quality of point forecasts generated by a small-scale DSGE model and formulated by experts in the survey conducted by the Federal Reserve Bank of Philadelphia (called *Philadelphia Fed Survey of Professional Forecasters*, SPF). In this forecasting contest we have also included VAR models estimated using both classical and Bayesian (BVAR) methods. The forecasting competition concerned the three main macroeconomic variables describing the U.S. economy: the GDP growth rate, inflation of the GDP deflator and the level of the Treasury bills rate. The quality of the *ex-post* forecasts was evaluated on the basis of quarterly data from the period 1994-2006. To ensure the comparability of model and expert-based forecasts, we account for the fact that economic data are revised by using real-time data (RTD) from the Federal Reserve Bank of Philadelphia “Real-Time Data Set for Macroeconomists”. The results of our study indicate that:

- the RMSE for the GDP growth rate is lower for the DSGE model than the SPF, but the difference is not statistically significant;

- the RMSE for inflation and the interest rate is lower for the SPF than the DSGE model, where the advantage of the SPF is statistically significant;
- the accuracy of forecasts from VAR and BVAR models is comparable to the precision of forecasts from the DSGE model.

The above results would suggest that the usefulness of the DSGE model in macroeconomic forecasting is limited. However, in the paper Rubaszek and Skrzypczyński (2008) we have not accounted for the fact that the SPF experts have an information advantage over an estimated model in the form of access to data of higher frequency than quarterly. The examples of this type of data are monthly information on inflation, industrial production, employment changes, as well as data from financial markets such as changes in stock indices, exchange rates or interest rates.

The above issue has been addressed in the paper Kołasa, Rubaszek and Skrzypczyński (2012) that compares the quality of forecasts from a large-scale DSGE model to forecasts formulated by the SPF. The forecasting competition also included BVAR models with *a-priori* distribution derived from the DSGE model (DSGE-VAR, see. Del Negro and Schorfheide, 2004). As in the previous work, the comparison was done for the three main macroeconomic variables describing the U.S. economy: the GDP growth rate, inflation of the GDP deflator and the Treasury bills rate. The quality of *ex-post* forecasts was evaluated on the basis of quarterly real-time data from the period 1994-2008, which were taken from the “Real-Time Data Set for Macroeconomists”. In relation to the previous study, the extension was based on:

- expanding the DSGE model;
- including the DSGE-VAR model;
- evaluating the quality of density forecasts;

- analysing the quality of forecasts conditional on experts' judgement.

The conditional forecasts are constructed in such a way to exploit the information advantage of the SPF in forecasting the current quarter (at the time of forecast formulation the information set includes the data till the previous quarter). In particular, we assumed that forecasts for the current quarter are given by experts, and for further horizons by an estimated model. Our main results indicate that:

- i. compared to the SPF, the accuracy of forecasts from the DSGE model is relatively high for the GDP growth rate and relatively low for inflation and the interest rate (as in the previous study);
- ii. the result (i) is driven by the information advantage of the SPF: the precision of conditional forecasts from the DSGE model for inflation and the interest rate is comparable to that from the SPF;
- iii. RMSEs for the DSGE model tend to be lower than those for the DSGE-VAR models;
- iv. the absolute quality of forecasts is poor both for the DSGE model and the SPF: the correlation between forecasts and actuals is very low and the forecasts are not effective;
- v. density forecasts from the DSGE and DSGE-VAR models are poorly calibrated, as evidenced by the results of the Berkowitz (2001) test.

The main conclusion from the above study is that the preparation of macroeconomic forecasts should consist of two steps. First, the starting point of the forecast, i.e. the values for macroeconomic variables for the current quarter (nowcast), should be set by the experts. Second, forecast values for the remaining quarters should instead come from the DSGE model, without making any further adjustments by the experts. The additional conclusion is such that the absolute quality of forecasts, both model and expert-based, is low. This would

suggest that the current state of knowledge allows only to a limited extent for accurate inference about future economic events.

The two studies discussed above have been published in international journals from the ISI Master Journal List and have been cited in many other articles (26 and 12 citations according to Google Scholar, as of 31 May 2013), including the publication of Del Negro and Schorfheide (2012) that will constitute a chapter in an upcoming volume of the “Handbook of Economic Forecasting.”

2.2 Current account analyses

The second research problem concerns the usefulness of general equilibrium models in the analyses of the current account level and dynamics. This topic appeared in the economic literature in the early 80’s of the last century, when Sachs (1981) and Buiters (1981) proposed the intertemporal model of the current account (ICA). In this model the current account is seen as the difference between national savings and investment, which in turn are determined by expectations about economic growth and the future level of the interest rate. Compared with the traditional, intratemporal approach, the ICA model puts considerably less emphasis on international price competitiveness and relative demand in explaining current account movements.

In the article Ca’ Zorzi and Rubaszek (2012a) we analysed whether the ICA model is able to explain the current account dispersion in the euro area countries observed in the period 2001-2006. To this end, we proposed a theoretical general equilibrium model for an open economy in which the balance on the current account depends on:

- the initial conditions (the value of external debt, the stock of productive capital and the state of economic development measured by GDP *per capita*);
- the expected pace of real convergence;

- the degree of segmentation in capital markets.

Subsequently, for each of the 12 countries constituting the euro area in the period 2001-2006, we simulated the model to determine the theoretical values for the rate of savings, investment and the current account balance (i.e. the values implied by the theoretical ICA model). The comparison of theoretical and actual values showed that for the analysed period the ICA model is able to explain about 70% of the current account dispersion among euro area countries. In addition, the ICA model proved to be much more effective in explaining the dispersion in the savings rate than in the rate of investment. This would indicate that the integration of financial markets, which took place after the creation of the euro area, had an impact on the intertemporal consumption smoothing, rather than led to changes in the investment dynamics. In the last part of the article, on the example of Portugal, we showed that the fragmentation of financial markets and a decline in expectations about the pace of real convergence should lead to the elimination of the current account deficit. The experience of the recent crisis showed that this claim has been confirmed by later empirical observations. In summary, the main conclusion of the article Ca' Zorzi and Rubaszek (2012a) is that the standard ICA model is able to successfully explain the differences in current account balances among the twelve euro area countries before the outbreak of the recent crisis, as well as the adjustment in the imbalances observed during the crisis.

The empirical support for the standard ICA model shown in Ca' Zorzi and Rubaszek (2012a) is largely driven a high degree of financial markets integration characteristic for the euro area countries before the outbreak of the debt crisis. In the case of other countries, however, the empirical support for the standard ICA model is far less satisfying (see. the review of the literature in Singh, 2007). One of the main conclusions of the ICA model is that fast growing countries should run large current account deficits, much larger than those observed in reality (see. the broader discussion in Obstfeld and Rogoff, 1996). In the article Rubaszek (2012d) I put forward a hypothesis that the low support for the standard ICA

model for developing countries can be explained by the invalidity of the assumption stating that lenders can deposit and borrowers lend at the risk-free interest rate. In the real world the lending rate is often sizeably higher than the deposit rate. The problem of different interest rates on loans and deposits was for the first time discussed in the economic literature by Irving Fisher 1930 within the two-period framework, which was extended for multi-period setup by by Hassin and Lieber (1982). The authors show that for various configurations of income path, consumers are willing to take a loan at the deposit rate and deposit their savings at the lending rate. Thus, the value of savings and loans is null, and the spending are equal to the current income. In the paper Rubaszek (2012d) I present a similar reasoning for a developing country inhabited by households interested in raising the current level of consumption on account of expected income increase. However, given that the price of substitution between future and current consumption is equal to the high rate on loans, the value of households loans is relatively small. Furthermore, the high rate on loans reduces investment. As a result, the interest rate spread limits the level of the current account deficit. According to my best knowledge this is the first study that examines the impact of the difference between the rate on loans and deposits on the current account within the ICA model framework.³

The main conclusion from the above two studies is that the standard ICA model is able to explain the level and dynamics of the current account for countries with a high degree of development and integration of financial markets. The implications of the ICA model for developing countries (very high current account deficit) does not coincide with the empirical evidence, which might be due to the presence of the difference between the loan and deposit rates.

The two studies have been published in international journals from the ISI Master Journal List, and the first of them has been cited in ten other articles (according to Google Scholar,

³This might be related to numerical problems. The introduction of the interest rate spread causes that the ICA model can not be solved by standard perturbation methods as changes in interest rates are not continuous around the steady state.

as of 31 May 2013).

2.3 Heterogeneous agent general equilibrium models

The homogeneity of households is one of the usual assumptions in general equilibrium models, including the models discussed in the previous points. This assumption, although far from the reality, is taken mainly due to the numerical reasons. However, with the increasing power of computers and the development of numerical algorithms (Aiyagari, 1994; Huggett, 1996) there has been increased interest in general equilibrium models, in which households are heterogeneous in terms of income, wealth, age, etc. A number of studies, the review of which is presented by Heathcote et al. (2009), show that heterogeneity may be very important in the analyses on the transmission mechanism of macroeconomic policy changes on the economy.

In the three articles discussed below I analysed the usefulness of general equilibrium models with heterogeneous households in the studies on the effects of monetary and macro-prudential policy on the economy.

In the article Rubaszek and Serwa (2012) we analysed factors that should affect the level of household debt in the long run. Toward that goal, we developed a life-cycle model in which households are heterogeneous in terms of age, income and wealth. The model, which was calibrated on the basis of data for the U.S. economy, was subsequently used to carry out a series of simulations. They pointed out that in the long-term the debt to GDP ratio should depend on:

- i. the difference in the interest rates on loans and deposits;
- ii. the uncertainty related to future income;
- iii. the persistence of the individual income process.

In the empirical part of the article we showed that the implications of the theoretical model are confirmed by the data for the panel of 36 OECD countries from the period 1995-2009.

In the article Rubaszek (2012c) I expanded the theoretical model from the previous work for the housing sector. I assumed that households are also heterogeneous in terms of the size of house they live in, which can be owned or rented. Another change was that the model parameters were calibrated for the Polish economy. I used the model to determine the effects of macro-prudential policy related to a change in the minimum down-payment requirement when buying a home. The simulation results show that an increase of the own contribution from 10% to 30% should lead in the long-term perspective to:

- i. a decrease in the ownership ratio by 8 percentage points;
- ii. a delay in the first house purchase (the average age of the head of household increases from 27 to 32 years);
- iii. a decline in the value of household mortgage debt (from of 43% of GDP to 23% of GDP).

The evaluated welfare loss associated with the limited access to credit was estimated at 0.12% level of life-time consumption. It should be noted, however, that the calculations does not take into account the potential economic gains stemming from increased macroeconomic stability.

The third article is a review study (Brzoza-Brzezina, Kolasa, Koloch, Makarski and Rubaszek, 2013). In my part of the paper I showed that the heterogeneity of households in terms of income has a significant impact on the level of the real interest rate in the steady state. To this end, I conducted a series of numerical simulations with the two standard heterogeneous households models (Huggett, 1993; Aiyagari, 1994). In these models, the rate of interest is determined by the asset market equilibrium condition. In the Huggett model (without capital), this condition states that the value of deposits is equal to the value of loans. In the Aiyagari model (with capital), the equilibrium condition states that value of deposits must be equal to the total value of loans and the capital stock. The results of simulations

indicate that an increase in individual income uncertainty should lead to the accumulation of precautionary savings, hence to a decrease in the level of the interest rate. The tightening of credit conditions, by diminishing the aggregate value of credit in the economy, also leads to a reduction in the level of the interest rate. Consequently, these models allow to explain why the observed level of the interest rate is typically lower than the level implied by the representative households models (called *risk free interest rate puzzle*, see. Canzoneri et al., 2007). In my part of the article I have also discussed why in the heterogeneous households models it is possible to derive a positive optimal inflation rate⁴. This is due to the fact that in this class of models one can account for the redistributive effects of inflation (Akyol, 2004) or the impact of inflation on the level and structure of savings (Algan and Ragot, 2010).

The main conclusion of the above three studies is that the general equilibrium models with heterogeneous households are able to provide a number of interesting results on the impact of monetary and macro-prudential policy on the economy. In particular, I have shown that these models can be useful in studies on:

- the equilibrium value of the debt to GDP ratio;
- the effects of macro-prudential policy;
- the natural interest rate and the optimum level of inflation.

It should be noted that currently the main constraint to the development of heterogeneous agent models is the lack of efficient algorithms to solve them in the case of aggregate shocks.

The three studies have been published in the international journal from the ISI Master Journal List, the domestic journal and the working paper series of the European Central Bank

⁴In the representative agent models the optimal rate of inflation is close to zero (New-Keynesian model) or negative (Friedman rule).

3 Other publications

Apart from the single-topic list of publications, I have been the author of other articles since defending the doctoral dissertation. Here I present a short description of these works.

In my opinion, the most important of my publications other than those listed in section 2 is the book „Modelowanie Polskiej Gospodarki z Pakietem R. (Modelling the Polish Economy with R)” (Rubaszek, 2012b). It consists of 11 chapters, each containing a description of a selected econometric topic, empirical illustration based on Polish data and computer codes written in the R package, which allows for the replication of the results. The topics are: spectral analysis, unit root tests, ARMA, VAR and ARCH models, yield curve models, option pricing models, portfolio investment theory and capital market equilibrium models. The book is supplemented by materials posted on my website <http://akson.sgh.waw.pl/~mrubas/EFzR/EFzR.html>.

The second item is the article Kolasa, Rubaszek and Taglioni (2010) that analyses the transmission channels of the global crisis on the Polish economy. We used firm-level data for Polish companies to conduct a series of panel regressions explaining income, investment, export sales and the value of imports. Our main finding is that, in comparison to domestic companies, foreign-owned firms were more resilient to external demand contraction and worse availability of external financing. The reason of the difference is the access to intra-group finance.

The third important item is the article Kocięcki, Kolasa and Rubaszek (2012b) that proposes an innovative Bayesian method of combining expert and model-based density forecasts. In addition to the presentation of the method (developed by Andrzej Kocięcki), we demonstrate how to combine forecasts generated by the autoregressive model and formulated by the SPF experts.

The next three publications are about exchange rate forecasting. In the article Rubaszek, Skrzypczyński and Kołoch (2010) we showed that forecasts for the nominal exchange rate of the Polish zloty from non-linear models (artificial neural networks and Markov switching

models) are not more accurate than naive forecasts, which are assuming that the exchange rate is generated by a random walk process. In the article Ca' Zorzi and Rubaszek (2012b) we analysed whether it is possible to beat the random walk in forecasting the real exchange rates for nine major world currencies. Our findings indicate that a model assuming a slow reversion to the sample mean is able to better predict future changes in the exchange rates than the naive model. Another interesting result is that the accuracy of forecasts is higher if the speed of mean-reversion is calibrated rather than estimated. In the study Rubaszek (2012a) I found that the model accounting for the relationship between the real exchange rate and the real interest rate disparity is able to generate more accurate forecasts for the real exchange rate than the random walk process.

The last publication worthy noticing is the article Kocięcki, Ca' Zorzi and Rubaszek (2012a) that proposes a new method of estimating the structural Bayesian VAR model. The advantage of the method is its efficiency: it enables the exact drawing from the *posterior*, without the use of Monte Carlo simulators. In the empirical part we show how this method can be used to estimate the parameters of the structural VAR model, in which the *prior* is given by the New Keynesian setup.

4 Other information

My works described in the previous sections of this report were presented at numerous domestic and international conferences and seminars, including the conference *Macromodels*, seminars organised by the European Central Bank, National Bank of Poland, Warsaw School of Economics, annual meetings of the *Econometric Society*, *Money Macro and Finance Research Group* or *EcoMod*. In the Annex to this report I provide the details of conferences at which I presented articles constituting the single-topic list of publications.

My publications are cited in national and international journals. The number of citations

in *Google Scholar* stand at 234, which means that the value of the *h-index* is 10 (as of 31 May 2013). The number of citations by Ideas/Repec, which records only citations of articles from the internal database, amounts to 53, including 4 self-citations (the current list of citations is available at <http://ideas.repec.org/e/pru76.html>). The number of articles, its place of publication and the number of citations classify me at 12th place out of 307 registered authors in the Repec ranking for Polish economists (current ranking is available on the website of <http://ideas.repec.org/top/top.poland.html>). The number of citations by the Web of Science database is 13, including 2 self-citations (as of 31 May 2013).

The additional information related to my research activity is that I was awarded a grant by the National Science Center under the program SONATA BIS announced on 15 September 2012. I am the co-author of the project „Rozwój metod prognozowania makroekonomicznego z wykorzystaniem modeli klasy DSGE (Forecasting with DSGE models)” that is headed by dr. Marcin Kolasa. The project will be realized in the coming years.

At the end, I would like to mention that in addition to the research activity I am also committed to teaching. It is worthy to number three aspects in this field. First, I have developed a program for the lecture “*Ekonometria Finansowa II (Financial Econometrics II)*”, which is documented in the form of the book “*Modelowanie Polskiej Gospodarki z Pakietem R (Modelling the Polish Economy with R)*” (Rubaszek, 2012b). Second, I have prepared the lecture in English “*Applied Econometrics*” within the Global SGH programme. Third, I have supervised 14 master theses and currently run the master’s seminar for 6 students.

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Appendix. Presentations at conferences

The list of presentations of articles that constitute the single-topic list of publications and are the subject of habilitation.

Domestic conferences

1. Warsaw Economic Seminars, Warsaw, December 2011, presentation “Mortgage down-payment and welfare in a life-cycle model”
2. Conference „Modelowanie Danych Panelowych: Teoria i Praktyka”, Warsaw, May 2012, presentation “Life-Cycle Determinants of Consumer Credit”
3. NBP Economic Institute Seminar, November 2011, presentation “Wkład własny przy zakupie mieszkania a dobrobyt w modelu cyklu życia”
4. Conference “DSGE and beyond – expanding the paradigm in monetary policy research?”, September 2011, presentation “Monetary policy in a non-representative agent economy: A survey”
5. NBP Economic Institute Seminar, Warsaw, March 2011, presentation “Determinanty kredytu dla gospodarstw domowych w modelu cyklu życia”
6. Conference “Macromodels 2010”, Pultusk, December 2010, presentation “Life-Cycle Determinants of Consumer Credit”
7. Warsaw Economic Seminars, Warszawa, Warsaw, March 2010, presentation “The Role of Two Interest Rates in the Intertemporal Current Account Model”
8. Warsaw Economic Seminars, Warszawa, Warsaw, March 2009, presentation “On the forecasting performance of a small-scale DSGE model”
9. NBP Economic Institute Seminar, Warsaw, February 2009, presentation „Międzyokresowe podejście do modelowania salda obrotów bieżących”

Foreign conferences

1. Conference “Seventh ECB Workshop on Forecasting Techniques: New directions for forecasting”, Frankfurt am Main, May 2012, presentation “Putting the New Keynesian DSGE model to the real-time forecasting test”
2. Conference “Spring Meeting of Young Economists 2012”, Mannheim, May 2012, presentation “Mortgage down-payment and welfare in a life-cycle model”
3. Conference “65 European Meeting of the Econometric Society”, Oslo, August 2011, presentation “Life-cycle determinants of credit to households”
4. ZEI workshop “Heterogeneity in Macroeconomics”, Bonn, June 2011, presentation “Life-cycle determinants of credit to households”
5. Conference “15th International Conference on Macroeconomic Analysis and International Finance”, Rethymno, May 2011, presentation “Life-cycle determinants of credit to households”
6. Conference “42nd Annual Conference of the Money Macro and Finance Research Group”, Limassol, September 2010, presentation “Putting the New Keynesian DSGE model to the real-time forecasting test”
7. Conference “EcoMod 2010”, Istanbul, July 2010, presentation “The role of two interest rates in the intertemporal CA model”
8. Conference “1st International Symposium in Computational Economics and Finance”, Sousse, February 2010, presentation “The role of two interest rates in the intertemporal current account model”
9. Conference “64 European Meeting of the Econometric Society”, Barcelona, August 2009, presentation “On the forecasting performance of a small-scale DSGE model”
10. Conference “First Macroeconomic Forecasting Conference”, Rzym, March 2009, presentation “On the forecasting performance of a small-scale DSGE model”



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