NBP Narodowy Bank Polski

The economic research of Narodowy Bank Polski in 2014

Summary

General characteristics of completed research

In 2014, 83 research projects – that resulted in at least a presentation or publication as a working paper – were conducted. The majority (75) of these were carried out by NBP staff. The remaining projects (8) were conducted as a result of NBP competitions for research projects, whose reports were accepted in 2014.

In terms of the subject of the research projects completed in 2014 (Table 1), most of them (50) are related to the first research area mentioned in "*The Economic Research Framework of Narodowy Bank Polski for 2013-2016*", i.e. macroeconomic stability, including in particular the strategies and effects of monetary policy. A relatively large amount of research, covered by 24 projects, was aimed at the issue of financial stability (2nd area). Nine projects were devoted to quantitative research methods (3rd area).

Table 1. Research areas in "The Economic Research Framework of Narodowy Bank Polski for 2013-2016" covered by research projects completed in NBP in 2014

Area	Number of projects	Including: Research issues	Number of projects
I. Macroeconomic stability – environment, strategies and results of monetary policy	50	I.1. Environment of monetary policy	21
		I.2. Monetary transmission mechanism	7
		I.3. Public finances	5
		I.4. Strategy and communication of monetary policy	3
		I.5. Relationships between monetary policy and macro stability	7
		I.6. Monetary integration with the euro area	7
II. Financial stability	24	II.1. Assessment of the scale and probability of the emergence of risk to financial stability (systemic risk), including the development of relevant methods and tools	2
		II.2. Evolution of the financial system and its influence on the system's effectiveness and stability	4
		II.3. Development of the payment system, including non-cash transactions	2
		II.4. Institutional framework for financial stability	11
		II.5. Relationships between the development, structure and stability of the financial system and economic growth	5
III. Methods of quantitative research	9	III.1. Development of simulation methods	2
		III.2. Development of forecasting methods	3
		III.3. Development of time series and panel data analysis methods	1
		III.4. Development of financial market analysis methods	1
		III.5. Development of inference methods based on short time series, including, in particular, Beyesian inference	2

Source: own elaboration.

The results of the research projects were communicated to the public in the form of presentations and publications, and were also described in reports of the completed research projects selected by the NBP Economic Research Committee in NBP competitions (Table 2 and Table 3). In 2014, 75 studies by NBP staff appeared in national and international publications, including 31 publications in Polish and 44 publications in English – among the latter ones, 15 articles were published in journals from the ISI Master Journal List (see Appendix 1).

Table 2. Number of publications and presentations of NBP staff and reports from Economic Research Committee research projects in 2014

	Total	Including:		Articles in journals from the ISI Master Journal List (see Appendix 1)
		in Polish	in English	
Publications	75	31	44	15
Reports from the completion of Economic Research Committee research projects	8	5	3	X
Presentations	66	18	48	X

Source: own elaboration.

Table 3. Types of publications in the framework of Economic Research Committee research projects completed in 2014

	Number of publications
Materiały i Studia NBP (working papers in Polish)	7
NBP Working Papers	12
working paper of an institution other than NBP	9
article in a scientific journal not on the ISI Master Journal List	14
article in a scientific journal from the ISI Master Journal List	15
book	4
chapter in a book	8
report published on the NBP website	6
report from a completed Economic Research Committee research project	8
Total publications	**83**

Source: own elaboration.

Narodowy Bank Polski is an active moderator of economic discussions, organising conferences and seminars. In 2014, NBP organised 4 international conferences (see Appendix 2) and

29 open scientific seminars. Among other things, these events facilitated the presentation of NBP's research results.

Research issues in 2014

I. Macroeconomic stability – environment, strategies and results of monetary policy

Structural environment of monetary policy

Research projects completed in 2014 related to the structural environment of monetary policy focused mainly on the labour market performance. The next edition of the report on the Labour Market Survey enabled an assessment of the causes of the low pressure on wage growth, indicating in particular the role of relatively unstable contracts and flexible components of compensation. Moreover, the flows into the labour market were analysed, indicating that Polish firms are able to adjust the level of employment quite flexibly, although the share of frictional unemployment, resulting from the misfunctioning of employment agencies, is rather high. Apart from comprehensive market labour analyses, covering also their institutional characteristics in the EU countries, the studies were dealing with some specific issues, such as: assessment of the adequacy of wage and bonus expectations arising from education and work experience by gender in Poland, sensitivity of employment to changes in GDP growth, and the endogenous cycle of the share of wages in the product. A separate topic of research of the labour market was statistical issues related to the information needs of central banks in the area of labour market statistics, and also estimates and forecasts of the Polish population (the so-called residing population).

Other projects related to the the real economy concerned the influence of the global economic crisis on economic growth in Poland, and also the role of market services in the growth processes in Poland. In addition, price and demand elasticity in Polish foreign trade was calculated. The significance of social capital and confidence for economic development was also analysed.

Several research projects completed in 2014 concerned inflationary processes in Poland. One of those projects was aimed at assessing the influence of the domestic output gap on inflation at the disaggregated level and deriving, on this basis, the index of inflationary pressure. The results of the analysis show that the prices of over 50% of the COICOP categories respond to changes in the output gap, while over one third of the prices react to changes in the exchange rate and/or inflation abroad. The strongest response to changes in the output gap is observed in the prices of services and non-durable goods, whereas durable and semi-durable goods, which in the main are classified as tradable goods, show the greatest reaction to changes in the exchange rate. Another important research project related to inflation processes, essential particularly for their forecasting, was devoted to the conditions behind the changes in retail food prices in Poland.

Monetary transmission mechanism

In 2014, a report was published describing in a comprehensive way the results of research on the monetary policy transmission mechanism in Poland. The results of the report indicate that in terms of its features, the monetary policy transmission mechanism in Poland is similar to

the transmission mechanism in more mature market economies with a similar level of development of the system of financial intermediation and a similar monetary policy regime. In particular, the report shows a marked decline in influence of exchange rate changes on consumer prices (CPI) in recent years and an increase in the strength of the reaction of inflation to changes in central bank interest rates, arising from the rapid and somewhat stronger impact of demand disturbances on prices and the increased degree of forward-lookingness in the economy.

The comprehensive analysis of the monetary policy transmission mechanism was accompanied by research and modelling work related to detailed dependencies within this mechanism. The impact of interbank market interest rates on the interest rates on deposits and loans was investigated in relation to the period before and after the outbreak of the financial crisis; the negligible impact of features of individual banks on the transmission of interest rates was also shown (size, liquidity, deposit base). The results of the latest research into the method of formulating inflation expectations by various groups of respondents were published. In another project, the degree of anticipation of consumers' inflation expectations in EU countries was analysed, indicating that inflation expectations in mature economies show greater anticipation than inflation expectations in new member states of the EU, although the differences in this respect between both groups of countries have diminished since the outbreak of the financial crisis.

Public finances and macroeconomic stability

Research projects devoted to public finances concerned the effects of fiscal policy shocks in new member states of the EU, the impact on the stability of tax revenues of a switch from taxing labour to taxing consumption, the disciplining character of national and European fiscal rules on the fiscal policy conducted in Poland, and also the impact of changes in foreign exchange reserves on the country's credit risk. In the framework of analyses coordinated by the European Commission, a long-term forecast of pension costs in Poland was prepared.

Strategy and communication of monetary policy

The strategy of direct inflation targeting, which constitutes the foundation of monetary policy in Poland, has undergone changes. In 2014, a comprehensive study was prepared which analysed the main directions of these changes in selected countries and the modifications of this strategy in Poland. Among the modifications of the inflation target strategy, the following in particular were taken into account: the introduction of operational targets to the strategy, the extension of the strategy to include additional monetary policy objectives, a change to the definition of the inflation target, and a reduction in the importance of the inflation target in the policy of the central bank.

With regard to the communication of the central bank, the influence of macroeconomic projections prepared at NBP on the distribution of expectations of professional forecasters was analysed. Although the aggregated results obtained from the NBP Survey of Professional Forecasters are relatively close to the projections of NBP, the forecasters are characterised by a sig-

nificant diversity in this regard. The inflation forecasts of the experts participating in NBP Survey of Professional Forecasters are affected not only by NBP's inflation projections, but also by the NBP inflation target.

Finally, an inflation index has been developed which coincides with consumers' perception of changes in prices, showing that the rise in prices of goods that are frequently bought significantly influences the perception of inflation in Poland, while the falls in prices go unnoticed.

Relationships between monetary policy and macro stability

Research into the relationships between monetary policy and macro stability was of a dual character. On the one hand, it covered work on the creation of a model with strong theoretical foundations (DSGE), in which financial frictions and macroprudential policy were taken into account. Using one of these models, researchers attempted to answer the question on conducting macroprudential policy in a heterogenous monetary union, showing that such a policy can be effective if it is of a decentralised character (reacting to local macroeconomic conditions). In another model calibrated for Poland and the euro area, it was shown that the presence of foreign currency loans weakens the transmission of monetary policy and that the optimal situation is a high share of loans denominated in the domestic currency in the credit portfolio of households. On the other hand, an assessment was carried out of the effects of applying certain macroprudential instruments (DtI, LtV), and the application of unconventional monetary policy during the global financial crisis by the central banks of the USA, the euro area, the United Kingdom and Switzerland was analysed in detail.

Monetary integration with the euro area

Among the research work related to monetary integration with the euro area, in the first place one should mention the comprehensive report on the economic challenges of integration of Poland in this currency area. These include in particular the following ones: firstly, the low level of convergence, increasing the risk of a build-up of macroeconomic imbalances after adoption of the euro; secondly, the limited structural competitiveness, generating the risk of growing external imbalances in relation to the process of convergence of wages; thirdly, the features of the Polish labour and property markets, which differ from those of the largest euro area economies, which may cause the common monetary policy to be inadequate to the cyclical situation in Poland; fourthly, the inadequate efficiency of adjustment mechanisms to mitigate the consequences of the above-mentioned challenges.

Other work in this area of research concerned the issue of counteracting unstable booms while entering the euro area and the significance of the dualism of the labour market for the macroeconomic stability of a country belonging to the euro area. It is also worth paying attention to the project on the counterfactual assessment of the possible impact of Poland joining the euro area in 2007. The results of this research show a marked increase in volatility of the economy in such conditions – both of GDP growth and inflation.

II.   Financial stability

Work connected with the stability of the financial system concentrated to a large extent on theoretical models of financial stability, on an institutional framework for financial stability, and on the impact of new supervisory and regulatory changes on the functioning of the financial system, and above all, on the functioning of banks.

Measuring the scale and probability of materialization of risks to financial stability (systemic risk). Development of relevant methods and tools

A project completed in 2014 investigated the concept of systemic risk and its features using the experience from the global economic crisis. Definitions of systemic risk were analysed, as well as the factors contributing to its development and transmission (contagion effects). The research also presented a conceptual model for systemic risk analysis. Factors determining procyclicality were identified. Potential regulatory measures were allocated to mitigate identified factors and potential ways of limiting these factors were suggested. Practical recommendations for conducting macroprudential supervision were also presented.

In another project, the sovereign default risk of individual euro area countries was studied. The probability of a so-called credit event occurring was calculated for these countries, along with a loss given default on the basis of spreads from the sovereign Credit Default Swap contracts. Macroeconomic and institutional factors responsible for the growth of credit risk in individual countries were analysed and occurrence of contagion effects between individual countries was verified. This research was followed-up by an analysis of the time-varying sovereign credit risk of Poland.

Evolution of the financial system. Influence of this evolution on effectiveness and stability of the financial system

The majority of the projects on the evolution of the financial system concerned the banking sector or the real estate sector. The influence of selected economic factors were studied, such as the spread between interest rates on loans and deposits, households' income risk, persistance of households' income, and the generosity of the pension system on the optimal level of credit to households in the economy. The conclusions from the theoretical model were confirmed by the calculations conducted on empirical data from OECD and European Union countries. With the help of a theoretical model of a network of banks, it was investigated how potential bank failures cause problems in the whole banking sector. Two channels of shock transmission were analysed: the channel of interbank exposures and the channel of correlated asset sales. The results of the research show that the structure of the interbank market affects the transmission of shocks, while the effectiveness of the market regulator's assistance depends on the timing of intervention. The level of competition of the Polish banking sector was also measured with the use of various empirical methods known in the literature. An increase in competition before 2004 was observed and a fall was noted in 2008. The impulse behind the rise in competition was the process of Poland's integration with the European Union, while the factor behind the fall in competition was the global financial crisis.

A number of studies concerned the analysis of the situation in the housing market and commercial real estate market in Poland and in 16 towns – the voivodships capital cities – in the years 2002-2011. The economic significance of the housing sector was analysed, both as an employer and producer of services. A destabilising role of a housing sector for the economy, and in particular for the financial system, through its cyclical character and recurrent real estate crises was also investigated.

As a result of the analyses conducted, a hedonic model of housing prices was created, taking into account the geospatial attributes of the real estate. It turned out that this model valued the real estate more accurately than the standard hedonic analysis. With the help of an imbalance model analysing cycles in the real estate market, it was shown that such a model forecasts the future real estate prices precisely. The created model takes into account the delayed reaction of the supply of new housing to demand and the cyclical nature of the real estate market. In another study, a hedonic index of transaction prices for commercial real estate was presented.

Development of the payment system, including non-cash transactions

Factors determining the development of non-cash transactions were presented on the basis of data from individual EU countries from 2000-2012. The number of payment cards issued and the size of transactions concluded with the use of cards were analysed. A constructed model enabled forecasts on payment cards usage to be made. In another research project, the positive influence of the use of contactless payment cards by Poles on the development of non-cash transactions was confirmed. From the calculations it follows that Poles using contactless cards make approx. 25-30% more card payments than the average person who uses payment cards.

Institutional framework for financial stability

A large part of the research concerns the role of central banks in maintaining the stability of the financial system. This includes presenting results of a survey conducted among the national central banks in EU countries on their engagement in preserving financial stability. An index to assess the level of engagement of central banks was created using publicly available data and survey data. The central banks of the Netherlands and the Czech Republic show the highest level of engagement in ensuring financial stability. The institutional determinants of the effectiveness of policies stabilising the financial system were also presented. Among these determinants, an important role was played by democratic accountability and transparency of the central bank's communication strategy with regard to financial stability. These concepts were defined in the study. Central bank activity related to central bank's responsibility for the stability of the financial system was discussed. Challenges facing central banks after the global financial crisis were presented. The most important challenges include defining financial stability and systemic risk, as well as quantifying these concepts. The coordination of macroprudential policy with monetary policy also poses a problem. Examples were presented of central banks' actions which could contribute to increased stability of the financial system. Another study presented theoretical issues as well as European experience gathered so far in establishing institutional arrangements for macroprudential policy. The theoretical analysis enabled to specify desirable elements of the macroprudential mandate. On the basis of the empirical research concerning the European experience, two macroprudential institutional models were

distinguished: the single institution model and the collegial body model. In most EU countries, the central bank has been granted a leading role in macroprudential policy.

Other studies concerned the influence of financial market regulations, guarantees of financial services, and the banking union on the stability of the financial system. The state of financial market regulations was analysed. The analysis also concerned changes in international law, particularly changes in EU and Polish law, in response to the financial crisis of 2007-2009. Solutions with regards to guarantee schemes for financial services in banking, insurance and investment sectors in EU countries were analysed, with an emphasis on the material component of protection. The scope and method of protection was assessed. Financial potential of guarantee schemes was investigated, taking into account the financing method, the funds accumulated and the potential liabilities. In particular, the effect of default of global systemically important financial institutions (G-SIFIs) was taken into account. The financial potential of guarantee funds proved to be insufficient to ensure financial stability in many EU countries.

Another study dealt with the impact of credit guarantee systems on the supply of loans for small and medium-sized enterprises in Central, Eastern and South-Eastern Europe. The degree of usage of guarantees by small and medium-sized enterprises (SMEs) and the main reasons for the relatively low propensity of SMEs to take loans was examined. The barriers that banks face when making use of credit guarantees to secure loans were presented, as well as the potential ways to improve the guarantee systems. Demand for credit guarantees for SMEs as well as a need to extend availability of these guarantees was recognized. Guarantees could reduce, but not eliminate, the need to establish other forms of credit insurance in the region. Financial institutions are reporting that excessive administrative requirements and regulations are hindering the application of credit guarantees.

The reasons why Europe has begun to create a banking union were examined. The aims of the banking union were discussed, as well as the weaknesses of the supervisory pillar, which may hinder its effective functioning. The most important stages in the process of constructing a banking union and the single supervisory mechanism (SSM) and the single resolution mechanism (SRM) were presented. The structure and decision-making procedures of the SSM and SRM were analysed. Potential consequences of the creation of the banking union for the European financial safety net framework were also discussed. It was noticed that the banking union is capable only of reducing selected problems of the EU financial system, while at the same time, the construction flaws of the SSM may limit the effectiveness of the functioning of the banking union.

In response to the global financial crisis, the banking sector underwent fundamental regulatory changes imposed by Basel III, the Dodd-Frank Act, and also by the introduction of a new European supervisory architecture. It was checked whether the new institutional frameworks will have a positive impact on the financial conditions of commercial banks in Central and Eastern Europe (CEE). The effectiveness and level of competition in banks in two periods was empirically examined: before the crisis and during the global economic and financial downturn. The results of the analysis revealed a fall in the effectiveness and level of competition in the banking sectors of EU countries, although this fall was lower in the banking sectors of Central and Eastern European countries. It was also examined whether the changes in finan-

cial supervision in countries outside the euro area, including in Poland, increased the effectiveness of supervisory institutions. Preliminary results of the analysis did not indicate a negative impact of the single supervision on the banking sectors in CEE countries.

Relationships between the development, structure and stability of the financial system and economic growth

Some of the studies of this group of studies concerned the relationships between banks and the real sector. The determinants of the relationships between Polish enterprises and the banks was examined. Among others, the study found that the use of non-bank sources of funding, the innovativeness of the business, good business conditions and a growth in competition among banks are factors conducive to the maintenance of the relationship of the company with a single bank. A study examined whether the financial problems of foreign parent banks also limit the supply of loans by Polish banks. The financial problems of banks were related to the occurrence of liquidity shocks in the banking sectors of individual countries during the global financial crisis. The results presented by the study indicate no negative impact of the financial situation in the parent banks on lending to the real sector entities by Polish banks. Polish banks received liquidity assistance from the parent banks between 2008-2009. The influence of banking sector regulations on economic growth was also examined. A tightening of regulatory factors causes a negligible restriction to economic growth. At the same time, regulations increase the stability of the financial system and as a result, they stabilise economic growth.

The problem of whether an excessively large financial system could adversely affect economic development in the European Union countries was also analysed. It was found that the relationship between the size of the financial system and economic growth is not linear and there might be evidence for a reverse U-shaped relationship. An oversized financial system may therefore adversely affect economic development.

III.   Quantitative research methods

Like in previous years, the number of research projects in quantitative methods was much smaller than the number of projects involving applied research, which is why they will be described without a division into subsections. It should be stressed that such an emphasis of research is typical for central banks, where theoretical research should not dominate applied research.

The type of theoretical research that was relatively most widely represented in 2014 was devoted to examining simulation and forecasting models. A large part of these concerned DSGE models. These models are currently widely used in research conducted at the NBP and other central banks, which is an important justification for the work in this area. One of the very important practical issues is the identification of parameters of DSGE models – one of the projects was devoted to this. Another extremely important practical issue is the optimal frequency of reestimation of DSGE models – this issue was dealt with in another paper (forthcoming in *International Journal of Central Banking*). Finally, much effort was devoted to provide a better description of the public finance sector in the forecasting and simulating model SOE.PL.

VAR and SVAR models are also important analytical and research tools. In 2014, three research projects were devoted to this class of models. The first concerned the normalisation of structural VAR models. As part of the project, it was shown that the most popular normalisation methods can lead to an overestimation of confidence intervals of impulse response functions. The second project concerned the use of Bayesian methods to estimate and identify SVAR models, with particular emphasis on the use of prior information to estimate parameters of simultaneous dependence (publication in *Economic Modelling*). The third project concerned the use of Bayesian VAR models to forecast inflation. In particular, the impact of assumptions about prior distributions on the accuracy of point and interval forecasts of the CPI index was analysed.

Other research projects concerned, among others, modelling of the monetary transmission mechanism in underdeveloped, emerging markets and the use of Bayesian averaging, factor models, and multidimensional exponential smoothing models for the preparation of macroeconomic forecasts. Work continued on the development of analytical tools to examine the dependencies on financial markets. In particular, this concerns the application of copulas to examine the dependencies between asset prices and prices of CDS contracts for estimating the probability of country default.

Appendix 1

List of publications of NBP staff in journals from the ISI Master Journal List, which were published (at least in the electronic form) in 2014:

- Borys Paweł, Rzońca Andrzej, Ciżkowicz Piotr, *Panel Data Evidence on the Effects of Fiscal Policy Shocks in the EU New Member States*, Fiscal Studies, Institute for Fiscal Studies, vol. 35(2), 189-224.

- Brzoza-Brzezina Michał, *Financial Frictions and Macroprudential Policy*, International Journal of Central Banking, vol. 10(2), 249-261.

- Brzoza-Brzezina Michał, Kolasa Marcin, Jacquinot Pascal, *Can We Prevent Boom-Bust Cycles During Euro Area Accession?*, Open Economies Review, vol. 25(1), 35-69.

- Brzoza-Brzezina Michał, Kotłowski Jacek, *Measuring the Natural Yield Curve*, Applied Economics, vol. 46(17), 2052-2065.

- Brzoza-Brzezina Michał, Makarski Krzysztof, Wesołowski Grzegorz, *Would it have paid to be in the eurozone?*, Economic Modelling, vol. 41(C), 66-79.

- Growiec Jakub, Growiec Katarzyna, *Social Capital, Trust, and Multiple Equilibria in Economic Performance*, Macroeconomic Dynamics, vol. 18, 282-315.

- Growiec Jakub, Growiec Katarzyna, *Trusting Only Whom You Know, Knowing Only Whom You Trust: The Joint Impact of Social Capital and Trust on Happiness in CEE Countries*, Journal of Happiness Studies, vol. 15(5), 1015-1040.

- Hałka Aleksandra, Kotłowski Jacek, *Does the Domestic Output Gap Matter for Inflation in a Small Open Economy?*, Eastern European Economics, vol. 52(3), 89-107.

- Kolasa Marcin, Lombardo Giovanni, *Financial Frictions and Optimal Monetary Policy in an Open Economy*, International Journal of Central Banking, vol. 10(1), 43-94.

- Kolasa Marcin, *Real convergence and its illusions*, Economic Modelling, vol. 37(C), 79-88.

- Łyziak Tomasz, *Formation of Inflation Expectations by Different Economic Agents. The Case of Poland*, Eastern European Economics, vol. 51(6), 5-33.

- Łyziak Tomasz, Mackiewicz-Łyziak Joanna, *Do Consumers in Europe Anticipate Future Inflation? Has It Changed Since the Beginning of the Financial Crisis?*, Eastern European Economics, vol. 52(3), 5-32.

- Olszak Małgorzata, Pipień Mateusz, *Cross Country Linkages as Determinants of Procyclicality of Loan Loss Provisions*, European Journal of Finance, http://dx.doi.org/10.1080/1351847X.2014.983138.

- Rubaszek Michał, Serwa Dobromił, *Determinants of credit to households: An approach using the life-cycle model*, Economic Systems, vol. 38(4), 572-587.

- Sznajderska Anna, *Asymmetric effects in the Polish monetary policy rule*, Economic Modelling, vol. 36, 547-556.

Appendix 2

International conferences organised by NBP in 2014:

- 15 April 2014 – *A Decade of Mobility, Poles in Contemporary Migration Spaces*.

  The conference summed up the migration experience of Poles over the ten years after Poland's accession to the European Union.

- 30 June - 4 July 2014 – *3rd Summer Workshop.*

  The conference presented the latest research of Polish economists working in Poland and abroad on the current situation in macroeconomics and finance.

- 24 October 2014 – *The Future of the European Economy. Building Market Economies in Europe: Lessons and Challenges after 25 Years of Transition.*

  This was the fourth edition of the annual conference of NBP devoted to the future of the European economy, organised in cooperation with the IMF. The aims of the conference included an assessment of the process of building a market economy in Central and Eastern Europe, and a discussion on the experience of transformation and the challenges facing the region after 25 years since the beginning of this process.

- 13-14 November 2014 – *Workshop on short term forecasting.*

  The aim of the workshop was to share knowledge and experience on applied methods in forecasting key macroeconomic variables (e.g. inflation, output, GDP) in central banks and other forecasting institutions.

- 17-18 December 2014 – *Identification in Macroeconomics.*

  During the conference the results of the latest research on identification in macroeconomic modelling were discussed. Leading economists dealing with this problem (Fabio Canova, Ivana Komunjer, Daniel Waggoner, Tao Zha) took part in the conference.