



NATIONAL BANK OF KAZAKHSTAN

RESEARCH PROGRAM for 2021-2022



Research objectives of the National Bank of Kazakhstan (NBK) are derived from its mandate to ensure price and financial stability. Sustainable achievement of these goals requires taking into account many factors that shape the economic environment, channels of mutual influence, an informed understanding of the problems faced by the economy of Kazakhstan, and effective communication of this understanding to all interested parties. Researches will allow to obtain necessary knowledge to solve these problems and develop analytical tools for developing economic policy.

The Research Program sets the medium-term directions of the National Bank's research work on macroeconomic policy issues, including monetary, fiscal and macroprudential policies, financial regulation and supervision, development of financial relationships. The directions presented in the Program are of high priority to the NBK, but they do not exhaust the entire research activity of the NBK and do not limit the research agenda of individual employees of the NBK.

The main purpose of the Program is to present to analysts of the NBK and other researchers our vision of most demanded research questions, solutions to which will improve the validity and credibility of decisions being made. By publishing the Program, we hope to attract the attention of independent researchers and give them an opportunity to focus their efforts on studying most relevant, according to the NBK, questions. We expect that this document will give market participants a better understanding of the current informational and analytical environment for making decisions on macroeconomic policy and directions for its development, which are set in the Program.



APPROACHES TO MONETARY POLICY AND MACROECONOMIC COORDINATION

The intersection of objectives and instruments of various economic policy bodies requires mutual consideration and development of ways to coordinate between them to ensure the sustainable achievement of final objectives of economic policy. It requires informed understanding of the interaction mechanisms

of fiscal, monetary and regulatory authorities, properties of transfer channels, and conditions for their activation. In the early stages of analysis, it may be useful to document interactions, developments of theories and testable hypotheses, justification of data requirements and its collection.

1.1. Justification of the framework approach to monetary policy

Transition to a floating exchange rate and inflation targeting resolved a number of old problems and revealed new issues. For example, the central bank's commitment to the adopted approach is critical to the credibility and effectiveness of its monetary policy. This prioritizes questions about the choice of policy settings in the research agenda. How should the target inflation be set? Should other indicators be

stabilized, at what frequency, how deep, what are the costs and advantages of this? To what extent are monetary policy regimes resistant to model errors and uncertainty in estimates?

The ability of monetary policy authorities to form a convincing policy and consistently implement it is crucial for effective policy communication. Traditional monetary policy issues of

choosing the parameters of communication mode, such as the publication of forecasts and the trajectory of the base

rate, in which openness contributes to increasing confidence in policy, remain relevant.

▶ 1.2. Fiscal policy

Taking into account the significant role of and oil revenues in the structure of Kazakhstan's economy in general and in the public finance system in particular, it is necessary to improve an understanding of how fiscal policy affects aggregate demand, cyclical behavior, competitiveness and a number of other related issues. What is the impact of government spending on inflation and how is it mediated? What are the characteristics of such inflation and

how is it manifested? What role do the structure and parameters of tax and non-tax revenues of the budget, and a choice of sources of financing the budget deficit play? How much does the discipline and procyclical nature of government spending affect the competitiveness, productivity, diversification and development of the trading sector? Which fiscal rules are able to improve the interaction with monetary policy? How to ensure an adherence to these rules?

▶ 1.3. Macprudential policy and financial stability

Differences in the objectives of financial regulation, monetary policy and fiscal policy make it difficult to coordinate them effectively, and require a more holistic view of economic policy implementation. Thus, limiting departmental responsibility to formalized short-term indicators, without taking into account mutual influence and long-term consequences of measures taken, can create imbalances and accumulate them to a critical level.

Macprudential policy is designed to fill the gaps in economic policy, but are its tools sufficient? What ways of

interagency coordination can direct economic policy towards achieving long-term systematic goals? What are the features of macroprudential policy in the commodity economy? Are its tasks reduced to countercyclical? What does it contribute to the arsenal of economic policy?

Central bank's traditional function is being the lender of last resort. In the last decade, traditional mechanisms of providing emergency liquidity have been actively developing. How much has the reform of this mechanism in Kazakhstan brought it closer to best practices?

Priorities for 2021

- Justification for the selection of monetary policy parameters.
- Developing criteria for operational independence of central bank.
- Conducting empirical research to identify and evaluate parameters of fiscal policy transfer channels.
- Analysis of framework approach to fiscal policy, development of fiscal rules, fiscal sustainability metrics, including consolidated and non-oil deficit.
- Analyzing the international practice of macroprudential policy, its history, opportunities and challenges regarding Kazakhstan.
- The evolution of the provision of emergency liquidity assistance.



ANALYTICAL TOOLS OF MACROECONOMIC POLICY

2.1. Improving macroeconomic models

The quarterly projection model (QPM) is the main one of macroeconomic models used by the NBK for making decisions on monetary policy. It is based on the theory of business cycles and combines dynamic, stochastic and structural properties. A forward-looking monetary policy, based on targeting forecasts and managing expectations, requires an understanding of how economic agents interact, how they make decisions and information based on, how their expectations are formed, and what constraints are taken into account.

For the economy of Kazakhstan, the central issues are the distribution of raw material revenues, the policy of budget expenditures and their financing, the capital structure of banks and companies, foreign exchange risk and credit risk,

financial losses and financial accelerators. Accordingly, one of the central tasks of monetary policy is to continue working on the development of macroeconomic models of Kazakhstan which reflect the following characteristics and elements:

- fiscal policy and fiscal rules that determine budget expenditures and sources of their financing;
- heterogeneous households which have savings, take loans, make defaults;
- heterogeneous companies that choose their capital structure, make defaults and have limited access to credit;
- real estate and financial markets;
- banks that lend based on credit risk and their ability to absorb it;
- market participants who form

expectations and make decisions under uncertainty and imperfect information.

In such model macroeconomic policy can have a strong and lasting impact on aggregate demand, competitiveness, real exchange rate and the trajectory of economic development. Creating such a realistic macroeconomic model that is

understandable and usable will require the developer to select only the most significant phenomena from this list.

Developing a macro-economic model will require research on each component class of agents to develop component elements and satellite models.

▶ 2.2. Modelling inflation processes

The need to understand pricing processes in the markets of goods and services stems directly from the mandate on price stability. The task of operational analysis is to monitor these processes, the predictive characteristics of inflation forecast models, and make adjustments to them. A more fundamental research task is to develop pricing models and forecast price levels. The most popular areas for research on inflationary processes are the assessment of nominal price rigidity; development of more informative inflation metrics, including using alternative data and methods for processing them; development of filtering methods and assessment of trends in seasonality, volatility and frequency characteristics of price processes; issues of systematic bias in the assessment of inflation due to changes in the quality of goods; empirical

estimates of price elasticity and demand to income; assessment of lags and depth of exchange rate transfer; analysis of mechanisms for forming inflation expectations; identification of the relationship with the level of competition and regional integration; analysis of supply and demand inflation factors.

To monitor and forecast prices for regulated goods and services, it is necessary to develop pricing models in a non-competitive environment. In particular, the issues of hidden and accumulated inflation, its causes and manifestations, methods of diagnosis, assessment of losses caused and conditions for transferring to open inflation, as well as analysis of practices, institutions and factors in the formation of tariffs of natural monopolies to improve the forecast, analysis of the consequences of hidden inflation are relevant.

▶ 2.3. Households

An understanding of the economic behavior of households is central for the economic policy development.

Household consumption is the largest component of aggregate demand and the most important criterion for

assessing the quality of economic policy. In addition to consumption and savings, households make decisions about purchasing housing, investing savings, choosing a place of residence, profession, job, education, starting a family, and the number of children. Such analysis should form behavioral models of households taking into account their heterogeneity, improve medium-term forecasting models of real estate and labor markets, inform public policy, and create a component for the macroeconomic model.

▶ **2.4. Corporate credit demand**

The objective of the research of real sector companies related to the conduct of the monetary policy is to improve the understanding of the factors of corporate credit demand, assess the ability of companies to use it productively, and assess credit risk. Better estimates of borrowers' absorptive capacity and a better understanding of the long-term consequences of decisions will make it possible to explicitly take into account the relationship between price and financial stability issues in the course of conducting monetary policy. Solving this problem will re-

quire developing more effective methods for collecting and analyzing companies' financial statements, assessing their operational efficiency, productivity, and creditworthiness.

Thus, household analysis can significantly improve the understanding of the labor market. Traditional metrics - unemployment, employment, and productivity - turn out to be uninformative and insensitive to the level of economic activity. A more extensive and in-depth study of the labor market, its flexibility and ability to reallocate of labor force, and the constraints it faces and imposes on participants will require analysis of the results of household surveys, labor market surveys, and alternative sources.

Apart from issues related to monetary policy, research in the field of corporate finance will be relevant for the development of SMEs. How the credit limit and the restriction of private capital hinder the development of the business? How subsidies affect the sustainability of the business?

▶ **2.5. Balance of payments models**

Weak export diversification, manifested dependence on imports, and a high share of foreign investment in the commodity sector make Kazakh-

stan's economy extremely susceptible to terms of trade shocks. The impact of external shocks on the economy, aggregate demand, international investment

position, and the channels through which external shocks affect the demand and supply of foreign currency in the domestic currency market, inflation, and other indicators is a priority area of research.

Along with external factors, we will con-

tinue to study internal processes, such as the implementation of major oil and gas projects and state infrastructure programs, as well as the pace of lending, from the point of view of their impact on the dynamics of the balance of payments.

Priorities for 2021

- Systematize the requirements for macro-economic models of Kazakhstan and the approaches to their development.
- As part of the further development of the NBK's model system, start developing macroeconomic models, including partial or general equilibrium models, that take into account the most relevant, important and characteristic features of the Kazakhstani economy, including fiscal policy, credit supply and demand, capital structure, credit risk, and heterogeneity of agents.
- Analyze pricing mechanisms and the spread of inflation, including models for generating inflation expectations and their role in generating inflation.
- Develop models for generating inflation and evaluate the contribution of bank credits, interest rates, exchange rates, budget expenditures and sources of their financing.
- Develop more informative inflation metrics based on alternative data.
- Based on household survey data, identify typical households and develop models of their behavior in the markets of consumer goods, savings, credit, labor, and real estate.
- Study the labor market and its alternative metrics.
- Identify the main types of companies and develop models of their behavior, including corporate financing, investment activities, labor market, pricing policies
- Develop standard models of creditworthy demand for credit.
- Identify the relationship between the capital structure, investment behavior, and operational efficiency of the business companies.
- Improve models for forecasting balance of payments items to assess their mutual influence, elasticity to shocks and potential impact on the economy.



LIQUIDITY AND PRICING IN FINANCIAL AND RELATED MARKETS

3.1. Efficiency barriers in financial markets

The main formal financial markets in Kazakhstan are the foreign exchange market and money market, and, with a much smaller extent, the stock markets, including the market of government bonds (GB). These markets, being the most liquid, represent the first link in the transmission mechanism of monetary policy. Understanding of these markets, their interaction with each other and with the real sector, their efficiency and information capacity in pricing are key for the effectiveness of monetary policy and for development of the financial sector. To form the most complete picture of each of these markets, a systematic analysis using a variety of approaches and methods is required, including a qualitative description of markets; analysis of related and substitute markets; inventory and

characterization of its main participants; market regulation, its legal framework and mechanisms for ensuring discipline; microstructure and infrastructure of the market; quantitative analysis of ownership structure, behavior, restrictions, assessment of liquidity and efficiency, capacity, depth, competitiveness and concentration, and informativeness.

The money market is important as the first link in the transmission mechanism of the monetary policy. The volatility of supply in the primary liquidity market is largely due to expected changes in accounts, which are related to the tax payment calendar. What limits the ability of the money market to smooth out expected shocks? What are the limitations of arbitrage between money market segments?

For the foreign exchange market, the most important issues are related to the effectiveness of its pricing, volatility and informativeness. What is “good” volatility and how to distinguish it from the “bad” one? Do agents’ actions reflect the expected impact of fundamental factors? Are agents ready to take open positions? How important is off-market interaction between agents?

The foreign exchange forward market is the least studied market due to the fact that it is not organized and is located outside the regulatory perimeter. Its study will significantly improve the understanding of the money and

foreign exchange market, with which it is associated and on which it has a significant informational impact.

In addition to analyzing available and liquid markets, researches should also focus on studying missing markets and markets that remain not liquid, such as the unsecured money market, foreign exchange derivatives markets, long-term interest rate swaps, and non-government securities. The purpose of the analysis is to find out the reasons for the absence of these markets, identify barriers to their development, understand demand for them, apply critical analysis to the taken measures and develop recommendations.

▶ **3.2. Bank deposit market**

Deposit market is interesting for research as the main source of funding for banks. Its relationship with the money market and other liquid funding markets remains poorly studied. The answer for question is permanently linked to questions of monetary policy and financial stability. How effectively does the deposits

market allocate its funds? To what extent it is exposed to the threat of spreading irresponsible behavior (i.e. moral hazard)? What is the role of the lack of responsibility of banks for the systemic consequences of their decisions? How to neutralize this kind of system externalities?

▶ **3.3. Housing market**

Real estate plays one of the important roles in the financial system and the transmission mechanism of the monetary system, as a key link in the financial amplifier of macroeconomic cycles, and as one of the purposes and the collateral for a bank loan. Conducting early warning diagnosis for the purposes

of macroprudential policy requires monitoring the stability of housing prices, assessment of the investment component in current demand and in household assets. To assess the financial stability of individual banks, pricing models based on real estate attributes are highly demanded. By

adding administrative data, this extended model will allow to run remote and rapid assessment of pledged real estate, including for the purposes of stress testing of banks and monitoring the quality of independent assessment.

In the longer term, the task of ensuring financial stability requires taking into

account housing policy, its scope and methods, including subsidized lending programs, assessing its systemic consequences for fiscal sustainability, the labor market, urbanization, and competitiveness, as well as the consequences of its distributional effect, including on behavioral norms and public expectations.

Priorities for 2021

- Analyze liquidity and pricing efficiency, identify the causes of market or government failure, and develop recommendations for improving the efficiency of government and non-government securities markets, primary liquidity, foreign exchange markets, and foreign exchange and interest rate derivatives markets.
- Analyze problems of pricing in the market of retail deposits, and identify barriers to effectiveness and ways to overcome them.
- Develop assessment methods of investment demand for housing, identify factors of its formation and contribution to price growth.
- Analyze the housing credit market, assess subsidy mechanisms in the framework of housing policy, their long-term systemic consequences for the stated goals and financial stability.
- Develop a hedonic model for assessing the value of real estate, analyze pricing in the housing markets.



REGULATION AND DEVELOPMENT OF FINANCIAL RELATIONS

4.1. The mechanisms for resolution of corporate insolvency

One of the most likely reasons for having the high level of loss given default (LGD) is the weakness of institutions to ensure the rights of creditors to promptly transfer control over the borrower's assets, and choose the most effective way for restoring the value of claims. In order to confirm this hypoth-

esis and develop methods for solving the problem, it is necessary to conduct a legal and comparative analysis of corporate insolvency legislation and individual bankruptcy legislation, as well as an analysis of law enforcement practices, case studies, and surveys of interested parties and participants in the process.

4.2. Improvement of diagnostic methods of banks

The main research questions about banks are related to the development and improvement of monitoring and analysis tools, assessment of loan portfolio quality, stability and capital adequacy, stress testing methods, and viability evaluation. The purpose of these studies will be to forecast loan supply for the macroeconomic model, assess systemic risk, and analyze macroprudential measures.

Researches should be aimed at improving the understanding of banks' behavior, ways to obtain and enrich information about the state of the loan portfolio, and developing models for an objective assessment of loans quality. The following actions have a great practical importance for supervision, financial stability, and the performance of monetary policy: well-timed and reliable identification, ver-

ification and justification of bank losses and bank capital adequacy, diagnostics of unproductive practices, and the quality of credit decisions.

This will require the development of methods for diagnosing loan portfolios, development of models for evaluation of credit risk and expected losses, development of systems for collecting data about the state of the loan portfolio on a loan-level basis, and the use and development of databases of the financial status of borrowers.

Available data about banks' loan portfolios do not contain the necessary information to assess the level of loss given default (LGD). To do this, you need data that allows you to track the change of owners of the loan claims, from loan application and until the end of the life of the claim rights. Such data will help to reliably assess losses in case of default, start searching for the reasons for their high level in Kazakhstan, and answer to related questions. Is a high level of LGD an indicator of weak creditor protection mechanisms and does it increase the probability of default?

▶ 4.3. Structural model of a bank as a tool for analysis

The bank's structural model refers to the bank's vision of optimal management decisions with consideration of balance sheet and prudential constraints, current and expected conditions in the funding and lending markets. The goal is to assess the bank's response to certain

regulatory requirements, scenario analysis and forecast of the bank's behavior depending on its state, development of the banking sector, modeling credit supply, and studying the properties of the credit channel.

▶ 4.4. Interdependence, externalities and systemic risks

Financial stability and the ability to provide services under high-stress situations depend on how economic agents and sectors are interrelated, as suppliers and lenders in the chain and network. The direct practical application of such analysis is to identify related parties. This will also provide

an understanding of how capital risks and liquidity risks spread through the system, under which conditions they are absorbed or amplified. The ultimate goal of this type of researches is to develop ways to minimize negative financial externalities.

Priorities for 2021

- Conduct analysis of legislation and practices of corporate bankruptcy in order to identify the potential for improving their effectiveness.
- Develop methods of remote assessment of the quality of bank's loan portfolio, cash flows, collateral, credit risk of large borrowers and homogeneous retail sub-portfolios.
- Develop models of borrowers' credit behavior for running stress testing of a bank's loan portfolio.
- Analyze the recommended prudential liquidity requirements, the potential of these tools to improve the sustainability of funding, and the development of banking practices for managing liquidity risks.



THE FUTURE OF THE PAYMENT SYSTEM

▶ 5.1. Prospects of the national payment system

The rapid development of technology is transforming financial services and opening up new opportunities for the development of payments. Payment services were subjected to significant changes in recent years due to the emergence of new payment methods, platforms and interfaces. Digital identification, instant payments, and integration of payment channels to meet customer expectations are opening up opportunities for new players and transforming the industry.

There are new participants, which are sometimes unregulated, that come to the front side of payment systems, so that the boundaries between payment instruments, systems, and unregulated mechanisms are being blurred. Does the emergence of new technologies require changes in market regulation? How to ensure equal competitive conditions for participants? What are the requirements for the payment infrastructure imposed by the growing needs of the market?

▶ 5.2. Digital currency of the NBK

The growing role of digital technologies in the financial sector, the changing needs of business and citizens make it necessary to study the place, role and prospects of issuing and

using digital currencies by central banks. Central bank digital currency can ensure high transparency of transactions, reduce the risks of illegal transactions, and increase inclusiveness. But its

issuance also carries a number of risks, for the leading role of second-tier banks, as for the central bank's ability to ensure the reliability, stability and security of payments. All this leads to the need to

assess the feasibility of issuing a digital currency in Kazakhstan, determine the goals and objectives, advantages and risks, the effect on the payment market, monetary policy and financial stability.

Priorities for 2021

- Conduct a research on the latest trends and technologies in the payment industry, analyze the transformation of payment services, including the role of banks and fintech companies.
- Conduct a research to analyze and evaluate ongoing reforms in the field of modernization of national payment systems in the world, their impact on the state of competition and the development of the domestic financial market.
- Conduct a feasibility study of issuing a central bank's digital currency and its impact on monetary policy and financial stability by taking into account international experience.



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