

## **Consolidation of price and financial stability goals in the monetary policy of central banks**

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### **Abstract**

The article presents a mechanism for consolidating financial stability goals with the price stability goals in the monetary policy of central banks. The study is based on the analysis of different views on the relation between interest rates, inflation, financial stability, and economic growth, as well as methodological approaches to assessing financial stability at the macro level. We suggest using the real interest rates of debt financial instruments as an indicator of financial stability, which can be used to establish financial stability goals at the macro level. To consolidate the goals of price and financial stability, it is suggested to use a matrix of these goals, formed by combining scales of qualitative assessment of price and financial stability. We suggest using the matrix of consolidation of strategic goals on price and financial stability as a basis for the formation of strategic goals of financial stability, taking into account the target inflation values established by central banks. To achieve the goals of price and financial stability simultaneously, we suggest modifying the monetary rule by including the target value of the IFS indicator in it. According to the modified rule, the key rate should be calculated as the sum of the index of financial stability (IFS) and the general index of price stability (IP) minus the risk premium (RNR). Based on the analysis of time series with information on interest rates and inflation in various markets, we carried out the analysis of the financial stability of the Russian Federation for the period from January 2014 to December 2017 and developed a matrix of consolidation of strategic goals in the monetary policy of the Bank of Russia. Based on the

developed matrix, we determined the coordinated target values of financial and target stability and calculated the target level of the key rate for the period of 2018-2020. The results of approbation of the proposed mechanism for coordinating strategic goals on price and financial stability, using the example of the monetary policy of the Bank of Russia, confirm its applicability to the practical operations of central banks. At the same time, they signify of the increasing effectiveness, transparency, and publicity of monetary policy.

**Keywords:** monetary policy; monetary rule; financial stability; price stability

## Relevance

Recent global trends indicate the strengthening of the status of central banks and the expansion of their functions. Understanding the complexity of the development of the global financial system in the context of globalization contributed to the fact that after the global financial crisis central banks of many countries were given new powers and responsibilities. Practically all of them are now in charge of not only price stability, but also financial stability, as well as of ensuring economic growth. This is confirmed by official documents of the central banks that determine the main directions of monetary and credit policy for the next medium-term perspective. For instance, in its report on the main directions of the unified state monetary policy for 2018-2020, the Bank of Russia notes that price and financial stability are the integral elements of the overall macroeconomic stability, without which successful implementation of structural and other types of economic policies is impossible. A consistent and transparent monetary policy, aimed at keeping price stability and fostering financial stability, facilitates social welfare and increases economic certainty, which is important for the development and implementation of the economic strategy at both the public and private levels<sup>1</sup>.

Transformation of the functions and powers of central banks is manifested in modern models of cash management, which is based on the so-called "monetary rule", describing the dependence of the key rate on the level of inflation and the growth rates of real gross domestic product (GDP). Increasing the key rate means tightening monetary policy, and reducing it means easing it. In theory, easing of monetary policy is seen as an instrument to stimulate economic growth in the conditions of the expected recession, as it leads to cheaper loans to the population and business. Tightening monetary policy, on the contrary, is accompanied by an increase in interest rates and is applied in the conditions of the expected revival of the economy in order to

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<sup>1</sup> Monetary Policy Guidelines for 2018-2020. Bank of Russia. URL: [http://www.cbr.ru/eng/publ/ondkp/on\\_18-eng.pdf](http://www.cbr.ru/eng/publ/ondkp/on_18-eng.pdf)

reduce the risks of its "overheating". In this interpretation, monetary policy, in fact, is essentially counter-cyclical and should promote stable economic growth.

Meanwhile, in modern models of monetary policy, the indicator of financial stability is not present in an explicit form, which creates the need for its further modification. The idea of this modification should be reduced to the formation of financial stability goals and their consolidation with the goals of price stability, taking into account the need to achieve positive economic growth rates. Given that in recent decades the interest-rate policy remained the main instrument of the monetary policy of central banks, the solution to this problem lies in the development of a methodology for managing interest rates linked to price, financial and economic stability.

## Overview

A large number of scholars and professionals from different countries study the interconnection of interest rates with price, financial and economic stability. Within the framework of the conducted research, it is possible to single out the list of key topics that cause the greatest controversy. They are as follows:

### *The relation between the level of interest rates and inflation*

The classical work, to which many articles refer, is Fisher's theory [1]. The idea behind Fisher's views is that real rates do not depend on the expected inflation. This, in fact, provides grounds for the introduction of the real rate indicator.

A review of Fisher's theory and a brief account of it are provided in the article by Tymoigne E. [2]. A good review of subsequent theories that develop Fisher's theory is presented by Cooray A. He showed<sup>2</sup>, that the main vector in the development of Fisher's theory is the construction of more complex models that take into account a greater number of factors.

Sargent T. [3] reflected on the views regarding the dependence of rates and inflation. In the conclusions of his article, he notes that the behavior of rates corresponds to Fisher's theory until approximately 1974, with a number of inconsistencies arising after that year. This circumstance is used by the supporters of Keynes's theory to argue in favor of his theory.

The IRS review [4] examined the same issue, but with an emphasis on the long-term perspective. It also considers the Lucas model, which is an extended version of the Fisher model. The conclusions indicate that there are significant difficulties in measuring the indicators used in the models. The main variables of the Fisher model - real rates and inflation expectations -

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<sup>2</sup> Cooray, A. Fisher effect: review of literature. URL:  
[http://www.businessandconomics.mq.edu.au/our\\_departments/Economics/econ\\_research/2002/6-2002Cooray.PDF](http://www.businessandconomics.mq.edu.au/our_departments/Economics/econ_research/2002/6-2002Cooray.PDF)

cannot be measured directly. In this regard, to measure inflation expectations, the IRS uses the yield of 10-year bonds. It is even more difficult to determine the risk premium as part of the interest rate. Because of these difficulties, the verification of the proposed models on real data is difficult.

The group of scholars - Kandel S., Ofer A., Sarig O. [5] - use the study of historical data to demonstrate a negative correlation between inflation expectations and real rates, which does not correspond to the provisions of Fisher's theory. The expected inflation was estimated through the indicator developed by the authors, which is a controversial point of the study. At the same time, the authors give two possible reasons for the negative correlation: taxation of income from inflation and uncertainty of monetary policy. Fisher's theory does not consider these factors.

Rather often scholars attempt to replace the cause-and-effect relation by the statistical relation. For example, Asgharpur H., Kohnehshahri L., Karami A. investigated<sup>3</sup> the relation between inflation and various factors. They found that, in Asian countries, high nominal rates contribute to high inflation and therefore, theoretically, they should be reduced. This is explained by comparing two time series. The authors could not explain, why they decided that it is inflation that depends on rates, and not vice versa, and why they consider the discovered correlation to be a dependency, and not a coincidence. Similarly, Cochrane J. concluded<sup>4</sup>, that raising rates in the US would lead to an increase in inflation.

### **Relation between the level of interest rates and financial stability**

Kuttner K.<sup>5</sup> investigated the relation of low rates to the emergence of a bubble in the real estate market in the United States. He concluded that the formation of a bubble was facilitated not so much by low rates as by an increase in the availability of credit, i.e. increase in money supply. Indeed, the rate of growth of property prices during the boom is so high that it exceeds any reasonable interest rates. Dvoretzkaya [6] generally sees the low rates established in the US economy since the early 2000s as the main reason for all subsequent crises in this country.

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<sup>3</sup> Asgharpur H., Kohnehshahri L., Karami A. The relations between interest rates and inflation changes: an analysis of long-term interest rate dynamics in developing countries. URL: <https://ie.um.ac.ir/parameters/ie/filemanager/%25D9%2585%25D9%2582%25D8%25A7%25D9%2584%25D8%25A7%25D8%25AA%2520%25D8%25A7%25D9%2582%25D8%25AA%25D8%25B5%25D8%25A7%25D8%25AF%25DB%258C/The%2520Relations%2520Between%2520Interest%2520Rates%2520and%2520Inflation%2520Changes.pdf>

<sup>4</sup> Cochrane, J. Do Higher Interest Rates Raise or Lower Inflation? URL: <https://faculty.chicagobooth.edu/john.cochrane/research/papers/fisher.pdf>

<sup>5</sup> Kuttner, K. Low Interest Rates and Housing Bubbles: Still No Smoking Gun. URL: <http://web.williams.edu/Economics/wp/Kuttner-smoking-gun.pdf>

Ajello A., Laubach T., Lopez-Salido D., Nakata T.<sup>6</sup> tried to develop an optimal strategy for managing the key rate to ensure long-term financial stability. Their calculations are based on the Keynesian model of the economy and the analysis of empirical data. As a result, they concluded that financial stabilization requires very small changes in the key rate. This means (but the authors of the article did not come to this conclusion) that the key rate in itself is not a factor, which significantly affects the financial stability. Obviously, the most important factor is the supply of money, especially if you think within the framework of the Keynesian theory.

Arteta C., Kose A., Stocker M., Taskin T. [7] investigated the impact of the policy of negative rates on financial stability. The authors point out that negative rates create threats to financial stability by reducing the profitability of banks and forcing them to take additional risks. Pshenichnikov V.V. [8] suggested that the policy of negative rates would not work at all. The purpose of reducing rates is to increase lending. However, in the conditions of economic recession, the main restrictor of lending is not the supply of money, but the demand for money - because the investment activity is plummeting.

Palley T.<sup>7</sup> expresses moderate criticism towards inflation targeting policies and the fight against asset price increases used by central banks. The criticism boils down to the fact that raising rates and reducing the supply of money work well, but not selectively. To combat bubbles, the banks could use the system of adaptive reserves. The idea of the system is to set an increased limit of reserves for possible losses in order to invest in certain types of assets (prone to the formation of bubbles). In general, the author's idea is clear: it is a selective limitation of liquidity. Although the actual applicability of the proposed method is questionable in view of the fact that the real object of investment can be hidden by creating a chain of counterparties.

The IMF review of financial stability [9] explains the idea that raising rates increases the probability of a crisis in the short term, but in the medium term, the probability of a crisis decreases. Reducing the likelihood of a crisis can be substantially affected by the decrease in the financial leverage of investors (in the broad sense of this word). In practice, it is also necessary to take into account a multitude of secondary factors, first, the dynamics of the volume of credit, i.e. money supply.

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<sup>6</sup> Ajello A., Laubach T., Lopez-Salido D., Nakata T. Financial Stability and Optimal Interest-Rate Policy // Federal Reserve Board 02/2015. URL: [http://www.frbsf.org/economic-research/files/1A-Ajello-Laubach-Lopez\\_Salido-Nakata.pdf](http://www.frbsf.org/economic-research/files/1A-Ajello-Laubach-Lopez_Salido-Nakata.pdf)

<sup>7</sup> Palley, T. Asset price bubbles and monetary policy: why central banks have been wrong and what should be done // Macroeconomic policy institute working paper 05/2008. URL: [https://www.boeckler.de/pdf/p\\_imk\\_wp\\_05\\_2008.pdf](https://www.boeckler.de/pdf/p_imk_wp_05_2008.pdf)

Brunnermeier M., Schnabel I. provide an interesting overview of interdependence of financial crises and actions of central banks. They reviewed 23 cases of financial bubble<sup>8</sup> bursts, starting with the famous tulip mania (the Netherlands, 1634). Conclusion of the article: raising interest rates is the most effective method to prevent the formation of bubbles. However, higher rates can reduce economic growth.

### **Relation between the level of interest rates and economic growth**

The relation between interest rates and economic growth is examined in the article by Jonsson M., Reslow A. [10]. Based on the results of their study, the authors conclude that, for long-term stability, real rates should be approximately equal to the growth rate of real GDP.

Drobyshevsky S.M., Trunin P. V., Bozhechkova A. V., Sinelnikova-Muryleva E.V., [11] investigated the impact of rates on economic growth in Russia based on statistical data. They found that the interest rate policy of the Bank of Russia after the onset of the crisis yielded very poor results.

A number of Russian scholars express rather an unusual view on the theory of low rates. They consider low rates as one of the mechanisms of granting state subsidies to the real sector of the economy. Such articles do not provide sufficient analysis of the macroeconomic effects of lower rates; they focus on the social importance of enterprise support. For example, Sodikova S.Sh. [12] believes that at the end of 2008, the Bank of Russia should not have raised rates, but should have lowered them along with other countries. Sazhina M.A. [13] directly points to the social importance of supporting the real sector with cheap loans and notes the low effectiveness of this support through low-interest lending.

The review of the Bank of International Settlements [14], conducted by the former head of the central bank of Chile, presents the opposite view. Its idea boils down to the following:

- To combat the crisis, it is necessary to provide financial institutions with additional liquidity, but at a rate higher than the market rate and on the security of liquid assets.
- During the crisis, the key rate must be lowered, because lending is declining and the demand for money from banks is falling. Lowering the rate will counteract the drop in demand.

We should note here that the proposed "injection" of the financial system with liquidity during the crisis is very dangerous and useless. Liquidity is achieved by the organizations with proper financial positions. Organizations with poor financial position do not have liquid collateral to obtain a loan. According to the experience of Russian crises, the funds received are used for speculation in financial markets, and not for solving financial problems.

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<sup>8</sup> Brunnermeier M., Schnabel I. Bubbles and central banks: historical perspectives. – Princeton University, 2015. URL: [https://scholar.princeton.edu/sites/default/files/markus/files/bubbles\\_centralbanks\\_historical\\_0.pdf](https://scholar.princeton.edu/sites/default/files/markus/files/bubbles_centralbanks_historical_0.pdf)

Krutko V.V., Mankov V.V., Litunova A.A. [15] noted that the effectiveness of the policy of interest rates directly depends on the debt load of the economy. This means that in countries such as Russia, the policy of interest rates will be of little effect due to low debt load, which is expressed in the relatively low value of the money multiplier. However, low debt load in itself is not a problem; it only renders the policy of low rates useless. Conversely, debt overload in itself is a negative factor as shown in the study of the Eurozone by Podkolzina IA.[16].

According to the documents examined, the following conclusions can be drawn:

1. The relation between interest rates and inflation is ambiguous.
2. The financial instability is achieved not when the real interest rates are low, but when they are decreasing or reach negative values. The increase in rates raises the probability of a crisis in the short term, but in the medium term, the probability of a crisis decreases. Hence, it follows that the management of financial stability involves setting acceptable margins and the rate of change in interest rates.
3. The influence of the short-term interest rate (key rate) on economic growth is insignificant, since it is primarily aimed at ensuring liquidity of the money market. The interconnection of this rate with medium and long-term rates, which shape the investment activity, is not quantitatively defined, which generally reduces the effectiveness of monetary policy.

These findings indicate that there has emerged a need in monetary policy to develop a mechanism for consolidating the ultimate goals for price and financial stability, as well as a mechanism for consolidating the ultimate goals of monetary policy with an operational objective in the form of a key rate. The solution of this task is complicated by the fact that so far there has been no clear and unambiguous macroeconomic indicators of financial stability. The methodology for determining strategic goals for financial stability and an algorithm for its integration into monetary policy have not been developed. We will try to solve these problems in the order of their appearance.

### **Indicators of price and financial stability**

In the economic research and practice, the most commonly used indicators of price stability are consumer price index (CPI) and deflator of gross domestic product (GDP). Out of CPI and GDP deflator, the latter is preferred due to the availability of a broader base of calculation. However, the low rate of updating the statistical data is a significant drawback, which determines the choice in favor of the CPI. In addition, numerically GDP deflator and CPI differ insignificantly. All this predetermines the expedience of using CPI in the monetary policy of central banks.

Central banks of different countries chose the consumer price index, measured for the month in relation to the corresponding month of the previous year to analyze, evaluate, and monitor the level of price stability. This indicator is believed to reflect the change in the value of the set of goods and services consumed by an average household and allows to assess the scale of the impact of rising prices on the welfare of the entire population. In addition, CPI is the most understandable indicator of inflation, and it is widely used by the subjects of the economy, therefore its dynamics makes a significant contribution to the formation of inflationary expectations.

As for financial stability, economic research and practice have not yet proposed an integral indicator that can be used to assess it at the macro level. Meanwhile, indicators for assessing the stability of financial markets and their segments, as well as individual business entities, have already been developed a long time ago.

So far, two methodological approaches to the assessment of financial stability were formed (Table 1), which rely on the dual interpretation of the concept of "financial stability".

Table 1

Theoretical and methodological approaches  
to the diagnosis of financial stability at the macro level

Theoretical approaches	Methodological approaches	Field of Application
1. Definitions based primarily on information characteristics [17-23]	Oriented towards the volatility of financial markets	Level of financial markets and their sectors reflecting the market structure
2. Institutionally Oriented Definitions [24-28]	Oriented towards the sustainability of institutional units	Level of individual sectors of the economy, reflecting its institutional structure, including the banking system

The first methodological approach is focused on the volatility of financial markets, the second - on the stability of institutional units that form both the banking system and the economy as a whole.

In practice, out of the two specified approaches to assessing financial stability at the macro level, the former is used more often. This is due to the fact that it is much easier to calculate the volatility of financial indicators than to conduct a full analysis of the financial stability of organizations. And, indeed, the assessment of financial stability at the macro level by assessing the sustainability of each organization assumes that all, or at least systemically significant organizations will be analyzed. At the same time, it should be noted that the indicators developed under the second approach are designed for individual risk assessment. From these estimates, it is difficult to draw a conclusion about the level of risk in the economy as a whole. As already noted, the risks of financial organizations are interrelated. Moreover, these connections pass



through the non-financial sector of the economy, which the Bank of Russia and central banks of other countries track much less. Thus, measuring the financial stability at the macro level based on the aggregation of individual risks leads to inaccurate results.

Taking into account this circumstance, we consider it reasonable to use the real interest rate of debt financial instruments (IFS) as indicator of financial stability at the macro level.

The real rate is a generalized concept, since it represents the difference between any nominal rate and any indicator of inflation. The study of the relation between financial stability and the real rate requires the concrete definition of the concept of real rate. To this end, we used the indicator "Index of Financial Stability" (IFS), calculated based on the official public reporting.

The algorithm for calculating this index is presented in the formulas (1-3):

$$IFS = RR = RN - IP, \quad (1)$$

where:

RR - real average weighted cost of debt financial instruments (borrowings) in percent per year;

RN - nominal average weighted cost of money (borrowings) in percent per year;

IP - index of price increase in the economy in percent per year;

$$RN = (RNC * C + RNB * B) / (C + B), \quad (2)$$

where:

RNC - nominal average weighted interest rate on the loan market in percent per year;

C - volume of outstanding loan on the credit market, bln. Rub.;

RNB - nominal average weighted interest rate on the bond market in percent per year;

B - capitalization of the bond market, bln. Rub.;

$$IP = (Ip * Q + In * N + Ia * A) / (Q + N + A), \quad (3)$$

where:

Ip - consumer price index in percent per year;

Q - volume of real GDP, billion rubles.;

In - index of consumer prices in the real estate market in percent per year;

N - volume of the real estate market, bln. Rub.;

Ia - index of stock prices in percent per year;

A - capitalization of the share market, billion rubles.

As can be seen from formula (3), we estimated the inflation rate by taking into account changes in not only consumer prices, but also in prices for capital and real estate. This is because we use the price index not in the traditional way - as a measure of the profitability of investing in assets, including goods. The use of conventional price indices would give incomplete information. Regardless of how wide the base is for a particular price index, it will not take into account the profitability of some assets. Therefore, the price index was supplemented by the yields of assets most prone to the formation of bubbles.

### **Formation of strategic goals for price and financial stability**

Price stability implies the achievement and maintenance of stable low growth rates of consumer prices. Low inflation leads to preservation of the purchasing power of the national currency, that is, the purchasing power of wages and pensions, which is a necessary condition for improving the welfare of citizens. Low inflation is also a more predictable environment for long-term planning, for making economic decisions. In conditions of stable prices, people are not afraid to save and keep more of their money in the national currency. Savings, in turn, are a long-term source of investment financing. At low growth rates of consumer prices, lenders are ready to provide resources for long periods at relatively low rates, because they are sure that high inflation will not devalue their investments. Thus, price stability creates conditions for investment growth and, as a result, contributes to structural changes in the economy.

At the same time, economic theory does not give an unambiguous answer regarding the optimal level of inflation in the economy. A number of studies provide estimates of the relation between economic growth and inflation. In particular, some threshold level of inflation is estimated, upon the achievement of which, it begins to have a negative impact on economic growth. The threshold value of inflation varies greatly among authors. For emerging markets, it is estimated at 9 to 17%, for developed countries - at 1 to 3% [29-34]. At the same time, the question remains as to the criteria for dividing countries into groups and criteria for the homogeneity of countries within the group. This is especially true for emerging markets, which are the most heterogeneous in terms of development of economies. In addition, the threshold level estimates do not take into account the issue of sustainability of economic growth.

Given the complexity of assessing the optimal level of inflation, most central banks choose the level of the inflation target without a strictly econometric justification, based on the characteristics of the country's economy, the structure of inflation, the need for insurance against deflation. In order to determine the target level of CPI for the medium term, central banks use one of the following options:

- the specific (point) value of the goal,

- a target point with a range of permissible deviations,
- target range.

Most central banks that target inflation to emphasize the impossibility of achieving a target with high accuracy, select a point with a range of acceptable deviations or a target range as the target type. In this case, the range of admissible values reaches ( $\pm 2$  pp), and the target range is within 4 pp.<sup>9</sup>

As for the choice of financial stability goals, neither research nor practice has yet given an answer to this question.

One of the possible solutions to this problem may be the transition from a quantitative assessment of financial stability (by calculating the IFS index) to a qualitative description of financial stability. In order to solve this problem, we propose to use an evaluation scale that allows determining the qualitative level of financial stability by the actual values of the indicators. The scale will use five options of qualitative characteristics of financial stability (Table 2).

Table 2

Scale of qualitative assessment of financial stability

Assessment of financial stability	General Index of Financial Stability (IFS)
High	$n3 < IFS$
Good	$n3 \geq IFS > n2$
Satisfactory	$n2 \geq IFS > n1$
Questionable	$n1 \geq IFS > 0\%$
Low	$IFS \leq 0\%$

As can be seen from Table 3, the levels of financial stability depend on the criteria corresponding to the values  $n1$ - $n3$ . The proposed criteria should be formed on the basis of the financial stability analysis for a number of years, performed using the IFS indicator. Naturally, for each country the criteria for the formation of ranges will be different. In this case, the IFS ranges themselves were formed by us taking into account the following: The "low" level of financial stability warns that negative real rates should not be allowed because it creates the opportunity to speculate on a wide range of goods with borrowed funds. This can quickly lead to high inflation and the formation of pyramids. As for the "satisfactory" level, then  $n1$  is the margin required for more effective prevention of speculation, but without excessive appreciation of loans. The remaining ranges were formed based on the step equal to  $n1$ .

<sup>9</sup> Monetary Policy Guidelines for 2018-2020. Bank of Russia. URL: [http://www.cbr.ru/eng/publ/ondkp/on\\_18-eng.pdf](http://www.cbr.ru/eng/publ/ondkp/on_18-eng.pdf)

### Mechanism of consolidation of strategic goals on price and financial stability

Consolidation of goals for price and financial stability can be achieved if, along with a scale of qualitative assessment of financial stability, we create a scale of qualitative assessment of price stability. In general, such a scale is given in Table 3.

Table 3

Scale of qualitative assessment of price stability

Evaluation of price stability	CPI ( $I_p$ )
Low	$n_3 < I_p$
Questionable	$n_3 \geq I_p > n_2$
Satisfactory	$n_2 \geq I_p > n_1$
Good	$n_1 \geq I_p > 0\%$
High	$I_p \leq 0\%$

As can be seen from Table 3, the scale will use the same five options of the quality characteristics of stability as in Table 2. However, the arrangement of levels is reversed. So a high level of price stability will correspond to the minimal values of the CPI, and a low level to its maximum values. Also, as in the case of financial stability, the proposed criteria for the formation of levels of price stability should be determined based on the CPI analysis over a number of years. In this regard, the criteria for the formation of ranges will be different for each country, but the ranges will be the same.

The combination of scales of qualitative assessment of price and financial stability allows forming a matrix of consolidation of strategic goals on price and financial stability (Table 4).

Table 4

Matrix of consolidation of strategic goals  
on price and financial stability

Financial stability price stability	High ( $I_p \leq 0\%$ )	Good ( $n_1 \geq I_p > 0\%$ )	Satisfactory. ( $n_2 \geq I_p > n_1$ )	Questionable ( $n_3 \geq I_p > n_2$ )	Low ( $n_3 < I_p$ )
High ( $n_3 < IFS$ )	X				
Good ( $n_3 \geq IFS > n_2$ )		X			
Satisfactory. ( $n_2 \geq IFS > n_1$ )			X		
Questionable				X	

( $n1 \geq \text{IFS} > 0\%$ )					
Low ( $\text{IFS} \leq 0\%$ )					X

As can be seen from Table 4, the consolidation of goals is achieved if the same quality levels are met. So a high level of price stability should correspond to a high level of financial stability. Conversely, a low level of price stability signifies a low level of financial stability.

The presence of an inverse relation between the criteria for levels of price and financial stability is explained by the fact that financial stability indices are calculated as real interest rates by subtracting the price level from nominal interest rates. Based on this, an increase in inflation will lead to a decrease in real interest rates, and a decrease in inflation - to their growth. This is clearly confirmed by the graphs shown in Fig. 1.

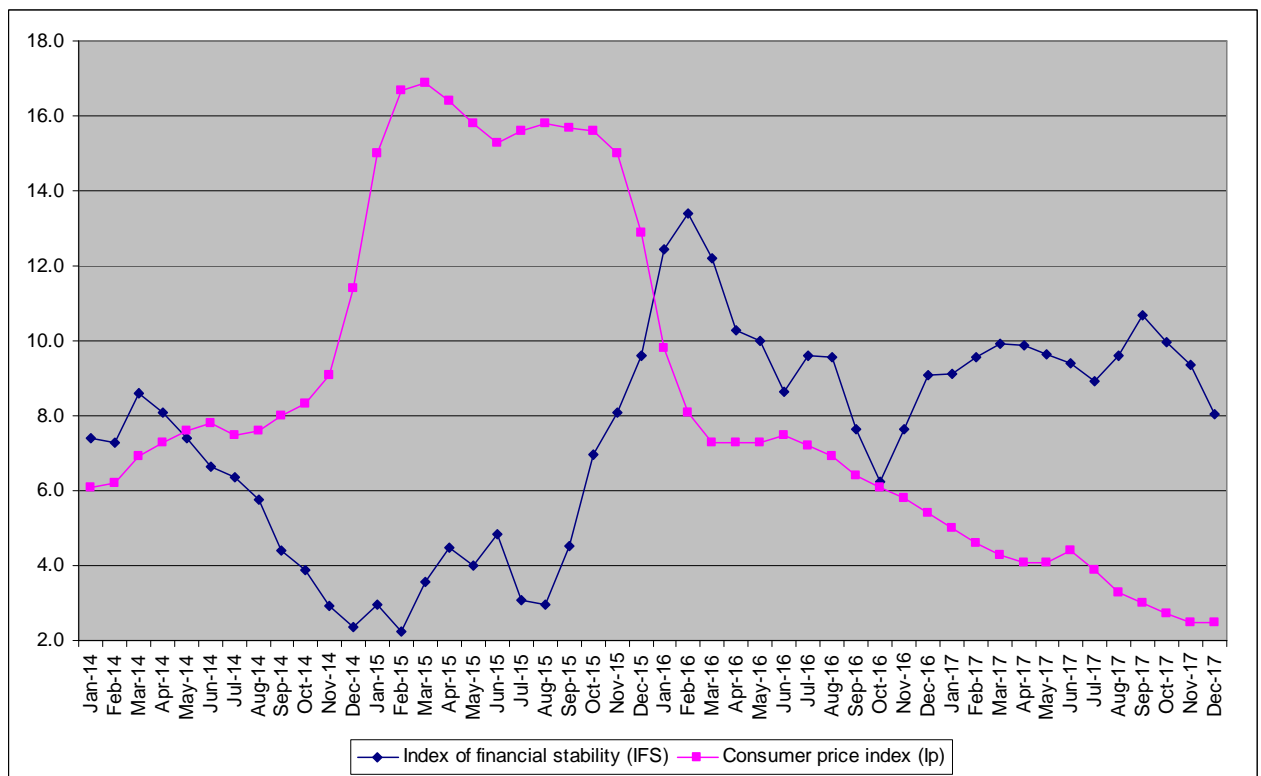


Fig. 1. Dynamics of Indexes of Financial Stability (IFS) and the CPI in the Russian Federation

The graphs shown in Fig. 1, show the dynamics of the financial stability index (IFS) and (Ip) in the Russian Federation for 2014-2017. From the presented graphs, it is evident that the curves of the financial stability index (IFS) and the CPI move in opposite directions.

The matrix of consolidation of strategic goals on price and financial stability can be used as a basis for the formation of coordinated strategic goals for financial and price stability. Given the

need to ensure price and financial stability at a relatively high level, the coordinate system for these purposes should be selected from squares corresponding to the "high" and "good" characteristics. In Table 4, the preferred ranges for selecting strategic targets are highlighted in dark.

### **Interest-oriented policies aimed at achieving the goals of price and financial stability**

Most countries in the world use inflation targeting as the goal of monetary policy. At the same time, the mechanism for achieving this strategic goal is based on the targeting of a short-term key rate, which is formed based on the dynamics of the main parameters of the economic situation, such as inflation and economic growth. It is believed that the level of the key rate has an impact on economic growth through the mechanism of linking loan rates to the level of the key rate. Money market rates are assumed to affect other interest rates in the economy and the prices of financial assets, as well as the dynamics of the exchange rate, which in turn determines the decisions of economic agents regarding consumption, savings, and investment, and ultimately contributes to the formation of price and GDP growth rates. In this way, the easing or tightening of monetary policy is translated into the economy. And the predicted steady and long-term deviation of inflation from the target in the medium term can serve as the basis for changing the key rate.

Based on the prevailing practice of forming interest rate policy, it is logical to assume that in order to achieve the goal of price and financial stability simultaneously, it is necessary to modify the monetary rule by including the target value of the IFS indicator. This can be done as follows.

The algorithm for calculating the IFS index indicates that the indicator of financial stability does not depend on monetary policy, since it does not include the level of prices and their change. In other words, IFS is an independent variable. Therefore, it can be fixed at the desired (target) level, and the policy of the key rate can be further developed taking into account the given level of IFS.

The nominal rate (RN) can be expressed from formula (4):

$$RN = IFS + IP, \quad (4)$$

On the other hand, the nominal rate can be represented as the sum of risk-free rate and risk premium:

$$RN = RNF + RNR, \quad (5)$$

where:

RNF - nominal risk-free rate,

RNR - risk premium.

If you use the key rate ( $r$ ) as the risk-free rate, you can find it from formulas (4) and (5):

$$r = \text{IFS} + \text{IP} - \text{RNR}, \quad (6)$$

In formula (6), the target value of the financial stability index for the forthcoming period should be used as IFS. It is assumed that it should change fairly smoothly, or stay at a constant level. At the same time, it is necessary to use a realistic forecast of price growth as an IP, rather than a planned value. Similarly to the IP indicator, the risk premium RNR should be calculated based on statistical data for the past periods of time.

### **Practical aspects of the application of the proposed mechanism for the consolidation of strategic objectives**

Some practical aspects of applying the proposed mechanism for consolidating the goals on price and financial stability will be considered using the example of the monetary policy of the Bank of Russia. To do this, we shall calculate the values of the IFS targets and the key rate for the period 2018-2020 using the methodology proposed above.

Taking into account the Bank of Russia's strategic target for inflation of 4% for the entire mid-term period 2018-2020, we formed the final and operational goals of the Bank of Russia's monetary policy in a new format, which includes the coordination of the goals on price and financial stability. The algorithm for the formation of these goals consisted of the following stages.

***Stage1. Based on the analysis of the dynamics of the index of price stability CPI ( $I_p$ ), we created the evaluation scale of price stability applicable to the Russian economy.***

Analysis of the CPI dynamics shows that the overall level of price stability throughout the whole period under review was in the range of 2.5-16.9 %%. The CPI reached especially high values in 2015, which was the result of relatively soft monetary policy. This softening was used to overcome the crisis effects. Since 2016, there has been a gradual return to a more stringent monetary policy. And, as a consequence, we saw a decrease in the level of inflation. Taking into account the maximum (16.9%) values of the CPI, we created an evaluation scale for determining the levels of price stability of the Russian economy (Table 5).

Table 5

Evaluation scale of price stability for Russia

Evaluation of price stability	General Index of Price Stability ( $I_p$ )
High	$I_p \leq 0\%$
Good	$4\% \geq I_p > 0\%$
Satisfactory	$8\% \geq I_p > 4\%$
Questionable	$12\% \geq I_p > 8\%$
Low	$I_p > 12\%$

In Table 5, the proposed ranges of IPS were formed taking into account the following. The "low" level of price stability indicates that the consumer price index exceeding 12% is undesirable and can be allowed as an extreme measure for the localization of the crisis phenomena in the monetary market. Regarding the size of the ranges in the evaluation scale, they were chosen taking into account the number of levels, maximum value of CPI in the analyzed period, and equal spans of the levels themselves. As a result, a step of 4% was selected for this scale.

***Stage 2. Based on the analysis of the dynamics of financial stability index IFS, we developed the evaluation scale of financial stability applicable to the Russian economy.***

The analysis of the dynamics of the index (IFS) shows that the overall level of financial stability throughout the entire period under review varied from 2.7% to 13.7% (Fig.1). At the same time, the highest level of financial stability was registered in the 1st quarter of 2014 (pre-crisis period) and the first half of 2016 (the beginning of recovery from the crisis). In 2017, the financial stability of the economy gradually declined and fell to a level of 8.3% at the end of the year.

Taking into account the dynamics of IFS, we have formed an evaluation scale for determining the levels of financial stability of the Russian economy (Table 6).

Table 6

Evaluation scale of financial stability for Russia

Assessment of financial stability	General Index of Financial Stability (IFS)
High	$6\% < \text{IFS}$
Good	$6\% \geq \text{IFS} > 4\%$
Satisfactory	$4\% \geq \text{IFS} > 2\%$
Questionable	$2\% \geq \text{IFS} > 0\%$
Low	$\text{IFS} \leq 0\%$

In Table 6, the proposed ranges of IPS were formed taking into account the following. The "low" level of financial stability warns that negative real rates should not be allowed because it creates an opportunity to speculate on a wide range of goods with borrowed funds. As for the "satisfactory" level, the 2% is the margin needed for more effective prevention of speculation, but without excessive appreciation of loans. Based on the above, we selected a step equal to 2%.

***Stage 3. Taking into account the strategic goal of inflation set by the Bank of Russia for the period 2018-2020 and target matrices, we identified the strategic objectives for financial stability in the form of specific index values IFS.***



Let us keep in mind that in the monetary policy for 2018-2020 the Bank of Russia sets the strategic inflation targets at 4% for each year<sup>10</sup>. The choice of the goal for inflation in Russia was due to the peculiarities of the economy and the structure of inflation. The Bank of Russia cites the following main arguments in favor of the 4% level:

- Insurance against deflation (the inflation target should not be too low or close to zero, as this can create risks of deflation);
- Nature of inflationary expectations (for Russia, a high level of inflationary expectations is typical);
- Impact of the growth rates of prices of imported goods (imported goods are also included in the consumer basket of Russians);
- Insurance against the transition to a high inflation area (if you set a target for inflation, for instance, in the range of 6-8%, then, after the target is achieved for the common basket, the prices of individual consumer goods may grow at a rate of 10-12%, which will in turn substantially reduce the quality of life of Russians).

This means that price stability in the near mid-term will be maintained at the "Good" level. In accordance with the matrix of consolidation of strategic objectives (Table 7) this level of financial stability with a similar evaluation will correspond to this level of price stability. Based on this compliance, we have established a target range for financial stability, corresponding to the target range for price stability. It should lie in the range of  $6\% \geq \text{IFS} > 4\%$ . The viability of this level is confirmed by the values IFS, achieved at the end of 2017 (Fig. 3).

In formulating specific strategic goals for financial stability in the medium term, we took into account that the strategic goal for inflation was set by the Bank of Russia at the upper boundary of the target range (4% of the  $4\% \geq \text{IPS} > 0\%$ ). The presence of an inverse relation between the criteria for levels of price and financial stability (Fig. 1) has predetermined a strategic goal for financial stability at 4%.

***Stage 4. Taking into account strategic objectives for financial stability, we defined the operational objectives of monetary policy in the form of given key rate values.***

To determine the target ranges and specific key rate values, it was necessary to calculate the planned IP and RNR levels.

We determined the ***Planned IP level*** based on a comparative analysis of the dynamics of IP and CPI (Fig. 2) .

As can be seen from Fig. 2, the trajectory of the CPI does not coincide with the trajectory of the general inflation index. The overall inflation index changes more dynamically than the CPI and

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<sup>10</sup> Monetary Policy Guidelines for 2018-2020. Bank of Russia. URL: [http://www.cbr.ru/eng/publ/ondkp/on\\_18-eng.pdf](http://www.cbr.ru/eng/publ/ondkp/on_18-eng.pdf)

reacts more quickly to crisis events. Against the increase in prices, the CPI lags behind the IP by 1 month, against a decrease - by 3 months. During the analyzed period, most of the time it was below the CPI. This trend was typical for the 2015 crisis. The lower level of general inflation can be explained by the deeper fall of real estate and capital prices compared to the consumer goods in the context of the crisis. The only exception happened in September 2014 - February 2015 (beginning of the crisis) and September 2016 - October 2016 (beginning of recovery from crisis). Further improvement of economic conditions contributed to the convergence of IP and CPI trajectories.

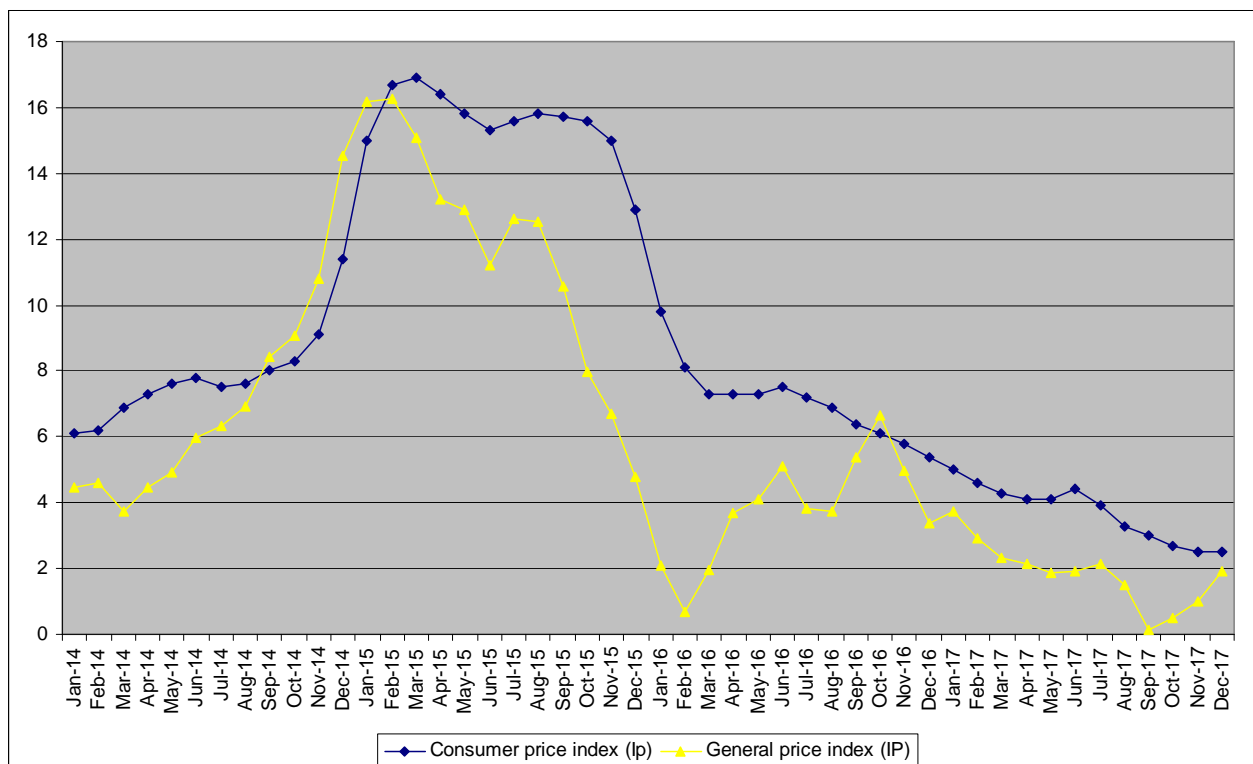


Fig. 2. Dynamics of the general inflation index (IP) and the CPI (Ip)

Given the inflation target of 4% set by the Bank of Russia, and the convergence of the IP and CPI trajectories in the conditions of economic stabilization, we determined the target IP at 4% throughout the period 2018-2020.

**The risk allowance RNR** was determined based on statistical data for the past periods.

Fig. 3 shows a graph of the dynamics of the risk premium RNR in Russia, which was calculated as the difference between the weighted average nominal rate and the key rate. As it can be seen from Fig. 3 RNR goes down very smoothly, the decrease is well approximated by linear dependence on time. The relation is quite strong - the coefficient  $R^2 = 0.8313$ , coefficient of linear correlation  $R = -\sqrt{0.8313} = -0.912$ .

In the equation of linear dependence in the diagram  $x$  stands for the number of the month, beginning January 1900. If the starting point is January 2014, then the equation takes the form  $y = 5.329 - 0.0781x$ .

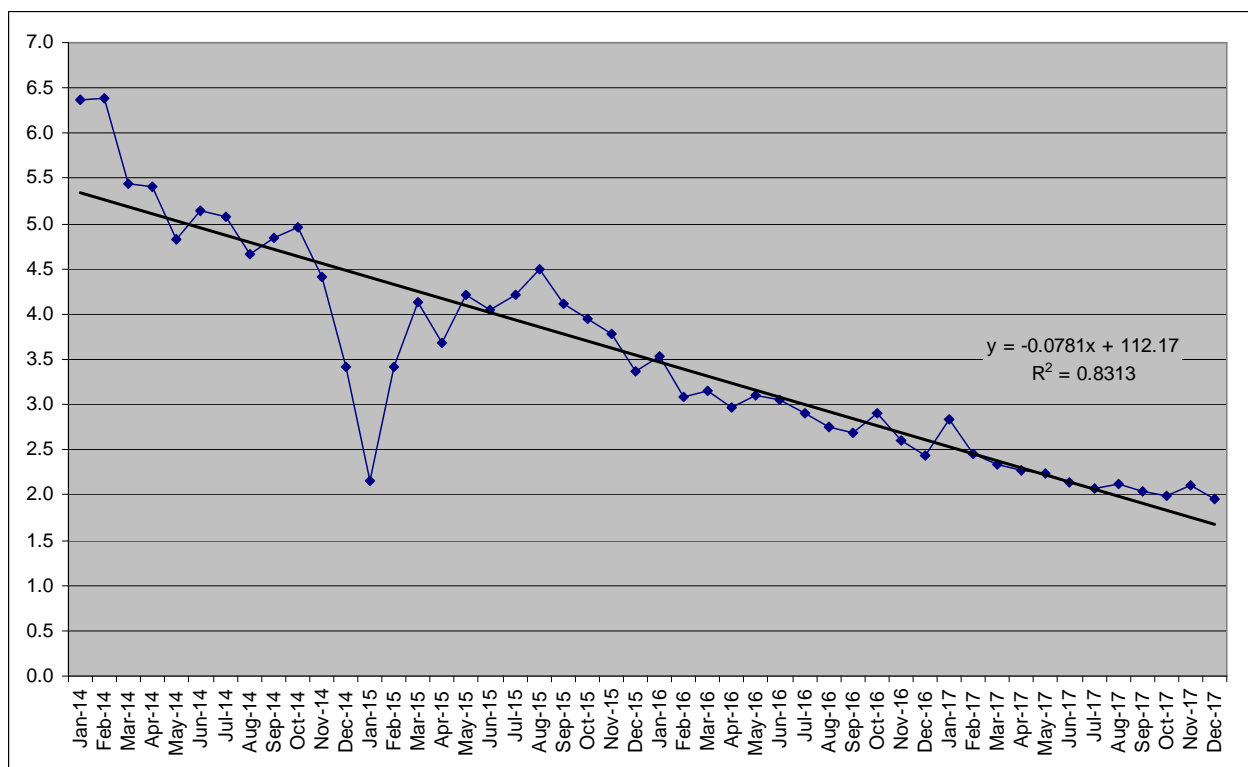


Fig. 3. Risk premium in Russia in 2014-2017.

The reason for such a smooth decline of RNR is that in 2014 the Bank of Russia cancelled the refinancing rate and switched to targeting the market rates. At the same time, the key rate has become a target for market rates, which subsequently resulted in their convergence. We estimate that the decline in RNR will stop after reaching a value of 2-2.5%. It will not reach zero, since the Bank of Russia targets rates based on low-risk instruments, and not on the average for the market. In this regard, for further calculations we used the value  $RNR = 2\%$ .

Based on the obtained planned values of the price stability index (IP) of 4%, the risk premium (RNR) of 2%, and taking into account the strategic objectives for financial stability at 4%, we defined operational objectives for monetary policy in form of the key rate (Table 7).

Table 7

#### Operational goals of monetary policy

Goals and scenarios	Goal of price stability (Ip)	Goal of financial stability (IFS)	Index of Price stability (IP)	Risk premium (RNR)	Key rate (group 3+group 4-group 5)	Target range of financial stability (IFS)	Target range of key rate (gr. 7+group 4-group 5)
1	2	3	4	5	6	7	8
2018	4,0	4%	4,0	2,0	6,0%	$6\% \geq IFS > 4\%$	$8,0\% \geq r > 6,0\%$
2019	4,0	4%	4,0	2,0	6,0%	$6\% \geq IFS > 4\%$	$8,0\% \geq r > 6,0\%$
2020	4,0	4%	4,0	2,0	6,0%	$6\% \geq IFS > 4\%$	$8,0\% \geq r > 6,0\%$

According to the obtained results presented in Table. 9 in the medium-term period 2018-2020, the key rate should remain at 6.0%. In this case, the range of changes in the key rate should be limited to 2.0 percentage points, and the minimum value of the key rate should not fall below 6.0%, while the maximum should not rise above 8.0%.

## **Conclusions**

The conducted research allows coming to the following general conclusions:

1. Expanding the functions of central banks as megaregulators of financial stability requires the development of quantified objectives for financial stability and the mechanism for their consolidation with the objectives of price stability.
2. It is reasonable to use the real interest rates of debt financial instruments as an indicator of financial stability (IFS), which can be applied to establish financial stability goals at the macro level.
3. Selection of strategic objectives for financial stability should be carried out by moving from quantitative to qualitative assessment of financial stability. For this purpose, it is necessary to form an evaluation scale, which allows determining the qualitative level of financial stability by the actual values of the indicators.
4. Consolidation of goals for price and financial stability can be achieved if, along with a scale of qualitative assessment of financial stability, we create a scale of qualitative assessment of price stability. The combination of scales of qualitative assessment of price and financial stability allows forming a matrix of consolidation of their strategic goals.
5. The matrix of consolidation of strategic goals on price and financial stability can be used as a basis for the formation of strategic goals of financial stability, taking into account the inflation target values set by central banks.
6. To achieve the goals of price and financial stability simultaneously, it is suggested to modify the monetary rule by including the target value of the IFS indicator in it. According to the modified rule, the key rate should be calculated as the sum of the index of financial stability (IFS) and the general index of price stability (IP) minus the risk premium (RNR).
7. The results of approbation of the proposed mechanism for coordinating strategic goals on price and financial stability, using the example of the monetary policy of the Bank of Russia, confirm its applicability to the practical operations of central banks. At the same time, they signify the increasing effectiveness, transparency, and publicity of monetary policy.

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