Anchoring of inflation expectations: the case of Russia

Abstract

We quantified inflation expectations of Russian households with a monthly frequency starting from 2013 to mid-2017 based on surveys conducted by the Public Opinion Foundation commissioned by the Bank of Russia. In addition, short-, medium- and long-term inflation expectations of professional forecasters were formed on the basis of surveys conducted by the Center for Development of the Higher School of Economics from 2000 to mid-2017 every quarter.

In this paper we found that the short- and medium-term inflation expectations of Russian economic agents are not yet fully anchored. It is demonstrated that changes in short-term and medium-term inflation expectations in the Russian economy depend largely on the current inflation, and not on actions and statements of monetary authorities. These facts can cause a loss of output during monetary policy aimed at reducing inflation. In this regard, the Bank of Russia should continue to pursue a consistent policy of inflation targeting, raise the level of confidence of the population, firms, the expert community in the undertaken actions and implemented measures in the field of monetary policy.

Introduction

Modern economic literature, devoted to modeling the consequences of monetary policy, pays much attention to the problem of inflation expectations (Ehrmann, 2015). This is due to the fact that inflation expectations are an important factor of inflation.

The way in which inflation expectations are formed affects the consequences of disinflationary policies. If the expectations of economic agents do not respond to the actions and statements of the central bank, the attainment of the objectives of anti-inflation programs can be stretched for a long time and accompanied by significant losses of the aggregate output. Therefore, the monetary authorities, whose goal is price stability, it is necessary to take into account the inflation expectations of economic agents.

One of the indicators of successful use of inflation targeting as a monetary policy regime is the stabilization ("anchoring") of inflation expectations of economic agents. For the monetary authorities, the ability to influence their actions or statements on the process of forming inflationary expectations is extremely important (Bernanke, 2004), (Nabiullina, 2017).

In his famous speech (Bernanke, 2004) noted that stable inflation expectations of economic agents lead to the fact that commodity price shocks (primarily energy prices) are not transferred completely to the prices of final goods, which leads to much less impact on

consumer prices compared with the economies of those countries in which inflationary expectations are de-anchored. Similarly, exchange rate fluctuations have less impact on domestic prices and economic activity, when inflation expectations of economic agents are stable, as evidenced by the results of the work (Devereux & Engel, 2003). De-anchoring of inflation expectations leads to a significant adverse effect, spreading through the shocks of the aggregate supply, which manifests itself in increasing volatility of inflation and output. The consequences of this effect depend on the intensity of the actions of the monetary authorities aimed at compensating for increased inflationary expectations. If the central bank does not react aggressively enough to increase inflation, the emerging expectations of inflation can ultimately become self-fulfilling and even self-reinforcing (Bernanke, 2004). Therefore, stabilization of inflation expectations is extremely important for the successful implementation of the inflation targeting policy.

The Bank of Russia also notes the high importance of anchoring inflationary expectations on the way to achieving the target level of inflation[1].

Literature review

There are several formal criteria to understand whether the inflation expectations of economic agents are anchored or not. So, in work (Ehrmann, 2015) it is asserted that inflation expectations are completely anchored if they are not sensitive to the dynamics of actual inflation. If so, then the coefficient β in the regression Eq. (1) should be insignificant:

$$\pi_{t+h}^{e} = \alpha + \beta\pi_{t-1} + \varepsilon_t, \quad (1)$$

where π_{t+h}^{e} – inflation expectations at time t on the horizon h periods, π_{t-1} – the last available at the time of forecasting the value of actual inflation.

In the study (Łyziak & Paloviita, 2017), inflation expectations are considered anchored if they do not respond to changes in short-term inflation expectations. Formally, this means that in the regression Eq. (2) the coefficient γ must be insignificant:

$$\pi_{t+n}^{e} = \alpha + \gamma\pi_{t+m}^{e} + \varepsilon_t, \quad (2)$$

where π_{t+n}^{e} – long-term inflation expectations, π_{t+m}^{e} – short-term inflation expectations (n>m).

According to the head of the Bank of England (King, 2005), inflation expectations are anchored if the central bank can influence them. This statement can be represented in the form of a formal econometric test by the following Eq. (3):

$$\pi_{t+h}^{e} = \lambda^{*}\pi_{t+h}^{*} + (1-\lambda^{*})\pi_{t-1} + \varepsilon_t, \quad (3)$$

where π_{t+h}^{*} – inflation target of the central bank.

[1] http://www.cbr.ru/eng/publ/ondkp/on_18-eng.pdf

If it turns out that the coefficient $(1-\lambda^*)$ is statistically insignificant, then we can say that the monetary authorities influence the inflation expectations of economic agents.

In (Łyziak & Paloviita, 2017), Eq. (3) was changed by adding the central bank forecast for inflation for h periods ahead π_{t+h}^{for} (it can deviate from the inflation target):

$$\pi_{t+h}^{e} = \lambda^{*}\pi_{t+h}^{*} + \lambda^{for}\pi_{t+h}^{for} + (1-\lambda^{*}-\lambda^{for})\pi_{t-1} + \varepsilon_t \quad (4)$$

The closer the value $(1-\lambda^{*}-\lambda^{for})$ to zero in Eq. (4), the greater the ability of the central bank to manage inflation expectations.

An interesting approach to testing the "anchoring" of inflationary expectations was proposed in the work (Gürkaynak, Levin, Marder, & Swanson, 2007). The authors tested the impact of economic news and statements by representatives of monetary authorities on the yield of long-term nominal and inflation-indexed government bonds in Chile, Canada and the US. During the study, the authors concluded that the rates on long-term nominal bonds in the US are very sensitive to macroeconomic news and statements by the head of the Federal Reserve. According to the model proposed by the authors of the article, this indicates an incomplete "anchoring" of inflationary expectations of economic agents.

In Canada, long-term interest rates show much less sensitivity to domestic and international economic news than in the US, which, according to the authors (Gürkaynak, Levin, Marder, & Swanson, 2007), indicates a greater than "US anchor" inflation expectations. Similar results are obtained for the Chile.

Data

Information about inflation expectations of households in the Russian economy can be obtained from two sources on the basis of surveys:

- survey of consumer expectations of the population, conducted by Rosstat;

- surveys of the Public Opinion Foundation (POF) commissioned by the Bank of Russia "Measuring inflationary expectations and consumer sentiments of the population."

Rosstat conducts its surveys on a quarterly basis, starting in the third quarter of 1998. The question and options for the answer are formulated as follows: "From your point of view, in the next year prices for basic goods and services will: a) significantly decrease, b) decrease slightly, c) stay at the same level, d) increase slightly, e) increase significantly". Using the balance method, Rosstat provides information on the dynamics of expectations of future price changes.

The Public Opinion Foundation has been conducting its surveys on a monthly basis since April 2014 (until now, surveys have been irregular, and the Bank of Russia website has

information on surveys beginning in September 2013[2]). Respondents are asked a number of questions about the expected price dynamics, suggesting qualitative and quantitative answers. To the question: "How do you think the prices will generally change in the next 12 months (year)?" - 5 variants of the answer are suggested: "a) they will decrease, b) will not change, c) will grow slower, d) will grow in the same way as now, e) will grow faster than now."

The formulation of the question and answers coincides with that used by the European Commission (Arioli, et al., 2016) in the study of inflation expectations in the EU countries. If the questioned chooses one of the answer options corresponding to the price increase, he is asked a question suggesting the choice of the range in which the expected rate of price growth will be. The wording is as follows: "How much do you think the prices will rise in the next 12 months?". There are 11 options for a choice from less than 2% to over 51%. On the basis of quantitative answers, the median is calculated, which is used as an indicator of inflation expectations.

However, the Bank of Russia conducts its own assessment of inflation expectations based on the results of qualitative issues. Russian Central Bank use probabilistic Carlson-Parkin method (Carlson & Parkin, 1975), modified by (Berk, 1999). As perceived inflation, its official value is used, calculated by Rosstat, available at the time of the survey. The results of quantification are very different from the results obtained on the basis of the median values. In December 2017, a direct estimate of inflationary expectations of households based on the median was 8.7%, while the estimate of the Bank of Russia based on the probabilistic method was 2.4%[3].

The methodology for quantifying inflation expectations with 5 alternatives is set out in detail in (Berk, 1999). The Bank of Russia uses this methodology to estimate household inflation expectations, but does not disclose the details of its implementation (in particular, how are the options for answers chosen by less than 1% of respondents chosen). In addition, the CBR is adjusting respondents' responses to consistency, discarding contradictory responses from one and the same respondent about the expected and perceived price dynamics. Such an adjustment can be made by holding questionnaires of respondents in our hands, which we could not find in the public domain.

Therefore, in our study we apply the methodology from the work (POF, which will allow us to obtain a series of inflation expectations (which can be compared with the results published by the Bank of Russia), as well as thresholds of sensitivity to zero and perceived inflation (which the Central Bank of Russia does not publish).

[2] https://www.cbr.ru/eng/DKP/infl/

[3] https://www.cbr.ru/Collection/Collection/File/3729/Infl_exp_17-12.pdf

In accordance with the approach of the Bank of Russia, respondents, taken with a lag of two months, use the official inflation rate as perceived inflation[4].

In the event that the answer is "prices will decrease", 0% of respondents choose (numerically, this may not be 0, but a very small number of respondents whose share of rounding gives 0), then the probabilistic quantification method will not be applied, since the density function of the normal distribution can approach zero, but cannot be exactly zero. Therefore, instead of 0%, by analogy with the work (Henzel & Wollmershäuser, 2005), the value 0.025% is used (obtained on the basis of the formula 1/(2n+1), where n is the number of respondents, in the case of POF surveys n = 2000).

In the reports of the Central Bank of the Russian Federation "On inflation expectations and consumer sentiments of the population", the shares of respondents who chose the answer options "prices will grow slower", "prices will not change", "prices will decrease", are given without breakdown (combined in the total amount). The data on these shares were taken from the annexes to the detailed reports "Measuring inflation expectations and consumer sentiments based on population surveys" (available from September 2013, missing data for May-June, August-September and November-December 2014). In this regard, regular (monthly) estimates of inflationary expectations can be obtained from January 2015. However, the probabilistic method for quantifying inflation expectations is also applicable to irregular data, so the values of expected inflation in individual months are estimated from September 2013.

The results of the application of the methodology of quantification of inflationary expectations, proposed in the paper (Berk, 1999), data FOM surveys are presented in Fig. 1. In addition to our estimates of inflationary expectations, the graph shows estimates of the Bank of Russia published in reports posted on the official website.

[4] The use of the lag is due to the fact that the statistics on the growth of prices for the previous month goes to the sixth working day of the next month, and the POF survey can be conducted at the beginning of the month, therefore, for example, on November 5, the household is informed of inflation in September, it turns out that in November the respondent forms inflation expectations, based on September information, that the appropriate lag of 2 months

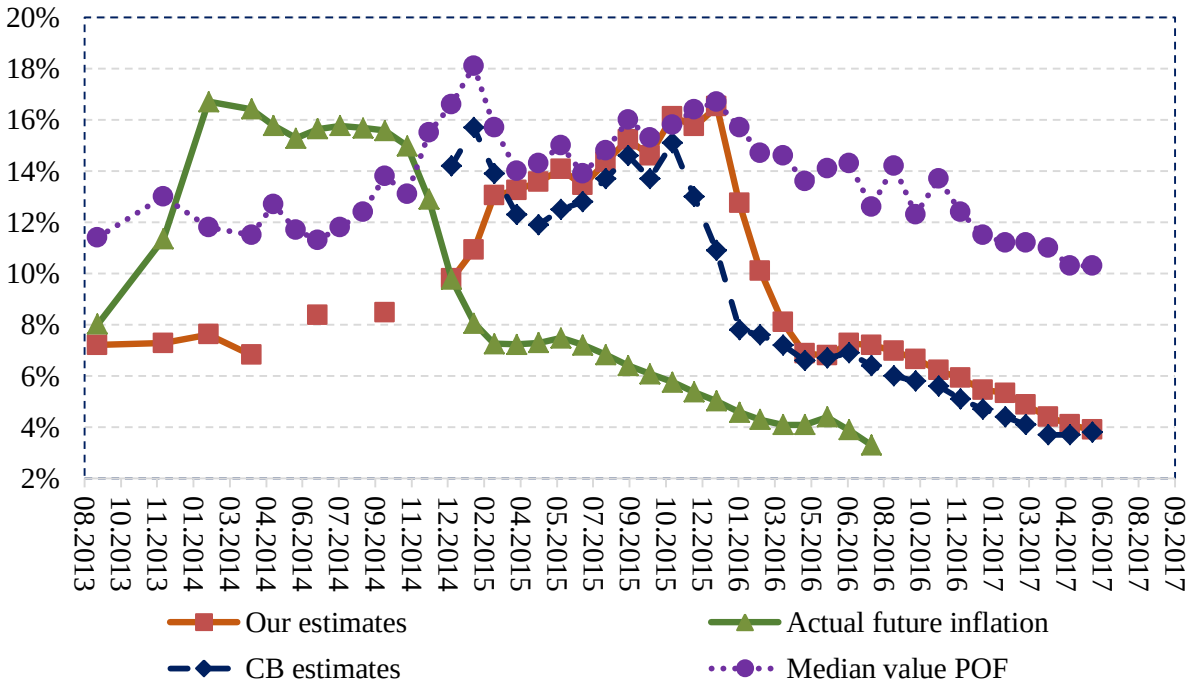

Figure 1 – one-year inflation expectations of Russian households 2013:09-2017:06

It follows from Fig. 1 that the average values of quantified inflation expectations in the period from February 2015 are higher than the actual one after inflation. Thus, it can be concluded that Russian households have systematically inflated inflation expectations. As a rule, this is explained by the fact that, often, consumers under inflation understand the rise in prices for food products, with the purchase of which they face most often. Product inflation in the period under review was significantly higher than the growth rate of prices for the entire consumer basket. A shift in the inflationary expectations of households is also indicated by a small number of intersections of the inflation expectations and actual inflation rate in 12 months.

In addition, it follows from 1 that the estimates of inflation expectations made by the Bank of Russia, although close to ours, are, however, systematically lower. These differences may be due to the fact that the Central Bank of Russia in another way handles the response options that 0% of respondents have chosen, and also because the Bank of Russia is weeding out the "untenable" responses of the respondents.

Surveys of experts (firms, banks, research institutes) in the Russian economy on inflation expectations on a quarterly basis, since 2000 has been carried out by the Center for Development of the Higher School of Economics (HSE). Based on the responses of experts, a consensus forecast is made about the expected inflation. The peculiarity of the survey is the fact that every quarter information is collected about the forecast of consumer prices before the end of this year, the forecast of inflation for the next year, and also, starting from the third quarter of 2011, inflation forecasts for two, three, four, five and six years respectively. Thus,

in the first quarter, when answering the question about the inflation forecast before the end of the year, experts open their inflation expectations by about 12 months, and when answering the same question in the fourth quarter, it will only take 3 months. When answering the question about the inflation rate next year, the forecast period is 24 months in the first quarter, and 15 months in the fourth quarter. For econometric testing of inflation expectations hypotheses, inflation forecasts for 12 months are of interest. In order to get forecasts of inflation experts for 12 months. We used a weighted average of inflation expectations by the end of this year and for the next year.

Figure 2 shows the dynamics of inflation expectations of experts for 12 months, as well as the actual level of inflation after 12 months.

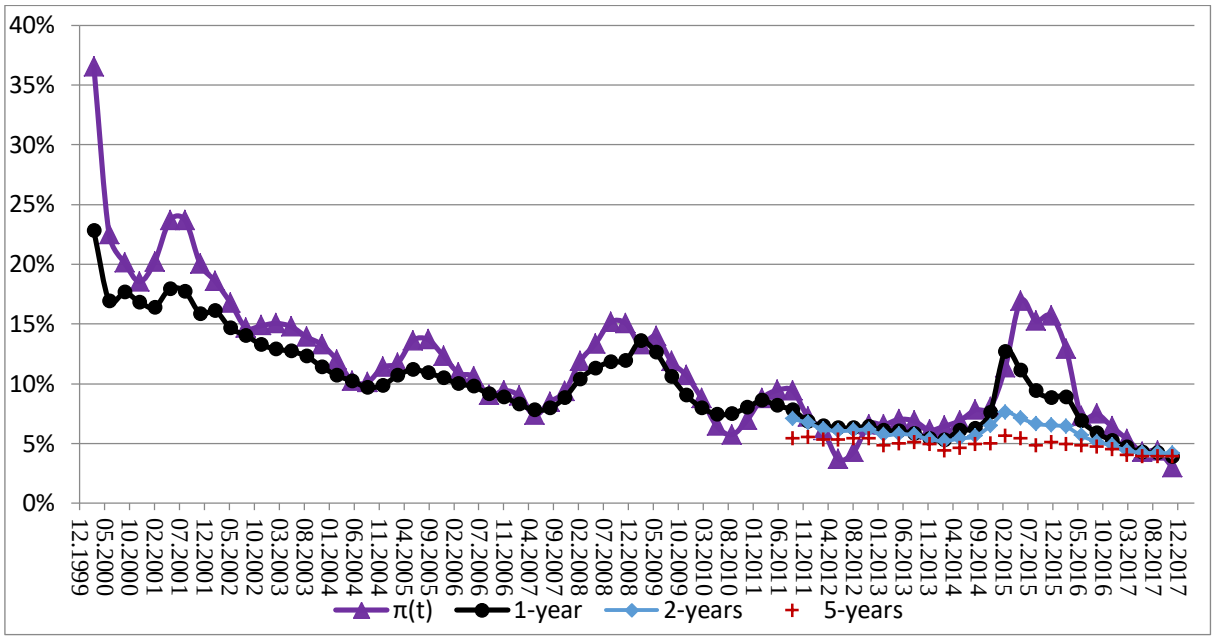

Figure 2 – inflation expectations of Russian professional forecasters 2000:I-2017:IV

In our further analysis we will use data on inflation expectations of experts for 1, 2 and 5 years as a measure of short-, medium- and long-term inflation expectations, as well as inflation expectations of households for 1 year, which we quantified from the POF survey.

Results

Using the constructed series of inflationary expectations and actual inflation, we conducted a test of inflationary expectations of Russian households and experts for anchoring on the basis of Eq. (1).

The results are presented in Table 1. Since practically in all regressions the coefficient before the previous value of inflation is statistically significant. This means that when inflation expectations are formed, Russian economic agents focus mainly on the historical values of inflation, and not on the targets set by the Central Bank. Thus, it can be concluded that the inflationary expectations of households (in 2013-2016) and experts (in 2000-2017) in

the Russian economy were not completely anchored. Comparing the numerical values of the coefficients to the delayed inflation, it follows that the inflation expectations of experts in comparison with the consumer ones are less focused on past inflation.

Table 1 – responses of inflation expectations to actual inflation Eq. (1)

Full sample short-term inflation expectations			
	β	R^2	Period
1-year households	0,817**	0,92	03:2013-12:2016
1-year professional forecasters	0,639**	0,89	I:2000-II:2017
sub-sample 2000:I 2013:II (before E. Nabiullina)			
1-year professional forecasters	0,618**	0,94	I:2000-II:2013
sub-sample 2013:III 2017:II (after E. Nabiullina)			
1-year professional forecasters	0,506**	0,7	II:2013-II:2017
Long-term inflation expectations			
2-years professional forecasters	0,144**	0,39	III:2011-II:2017
5-years professional forecasters	0,034	0,08	III:2011-II:2017

** coefficient is significant at 1% level

Since the monetary policy of the Bank of Russia has undergone changes throughout the period under review, and possibly the results obtained are a consequence of the heterogeneity of the data under consideration, we estimated the Eq. (1) on the sub-period from the third quarter of 2013 (when Elvira Nabiullina was appointed chairman Bank of Russia) for inflationary expectations of experts.

The results of the assessment (see the second part of Table 1) suggest that after the second quarter of 2013, the inflation expectations of experts were less dependent on past inflation than in the previous period, as evidenced by the value of the factor before lagging inflation is not insignificant).

Finally, attention is drawn to the fact that the long-term inflation expectations of experts (for 5 years, see the last part of Table 1) do not depend on the actual past inflation value, therefore, according to the formal test, they are anchoring.

Since the third quarter of 2011, the HSE is conducting a survey of experts on the expected inflation in 2 years and in 5 years. Therefore, it becomes possible to conduct a test for anchoring inflation expectations on the basis of Eq. (2). As a dependent variable (medium-term and long-term inflation expectations), this equation uses a two-year, and then a five-year, expected inflation, and as explanatory variables (short-term and medium-term inflation expectations) the expected inflation after 12 months and 2 years, respectively.

The results of estimating Eq. (2) are presented in Table 2.

Table 2 – response of longer-term inflation expectations to the change in shorter-term

	γ	R^2	Period
2-years professional forecasters expectations from 1-year	0,362**	0,75	III:2011-II:2017
5-years professional forecasters expectations from 1-year	0,131**	0,35	III:2011-II:2017
5-years professional forecasters expectations from 2-years	0,462**	0,75	III:2011-II:2017

** coefficient is significant at 1% level

From Table 2 it follows that in all regression equations coefficients before short-term inflation expectations were statistically significant. Therefore, it can be concluded that the long-term inflation expectations of experts are not completely anchored, since they are influenced by information that is different from the target inflation of the Bank of Russia. The values of the coefficients indicate that the long-term inflation expectations of experts (for 5 years) in comparison with the medium-term (for 2 years) depend less on the change in short-term inflation expectations (for 12 months).

Summing up, we can say that by the present moment the inflation expectations of Russian economic agents can not be considered completely "anchored". An interesting question is whether the information disseminated by monetary authorities on future actions in the field of monetary policy and the dynamics of prices for inflation expectations of Russian firms and households.

The results indicate that the short-term and medium-term inflation expectations of Russian economic agents are not yet fully "anchored". Consequently, the disinflationary policy of the Bank of Russia, according to theoretical models, is associated with losses of output. A positive signal for the monetary authorities is the lack of influence of current inflation on the long-term inflation expectations of professional forecasters who are close to the target for inflation.

If the CBR succeeds (a) by consistently implementing monetary policy measures, b) increasing transparency and predictability of its actions, c) gaining confidence in them, d) informational policy, e) increasing the financial literacy of economic agents) to increase the degree of influence their actions on the inflation expectations of the population and firms, it will allow to achieve the desired level of inflation in future with less losses of output and unemployment.

Conclusion

We have constructed time series of inflationary expectations of Russian households with a monthly frequency, starting from 2013 to mid-2017 on the basis of surveys conducted by the Public Opinion Foundation commissioned by the Bank of Russia.

We compared some characteristics of inflation expectations of the population and professional forecasters. It turned out that the inflation expectations of households are more inertial than the expectations of professional forecasters. This means that, due to the temporary price growth factor (for example, the growth of prices for cereals due to poor harvest), will contribute to the formation of increased inflationary expectations for a long time. Under these conditions, the task of stabilizing inflation for the Bank of Russia is becoming more complicated.

We checked whether inflation expectations for different periods are resistant to changes in current inflation. The results indicate that short- and medium-term inflation expectations are still largely responsive to changes in current inflation, and long-term expectations are not dependent on current inflation. This shows that the monetary authorities are not yet in a position to fully control the inflation expectations of economic agents, which, according to generally accepted theoretical concepts, will lead to costs when conducting anti-inflationary policies.

To increase the impact of their actions and statements on the inflation expectations of economic agents, the Bank of Russia have to pursue a consistent and predictable monetary policy, explaining its decisions to the general public, raising the level of financial literacy of the population. All this can lead to stabilization of inflation expectations and reduction of costs for the economy that arise during the implementation of anti-inflationary policy.

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