

# Monetary Policy and the Yield Curve

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The transmission of monetary policy to various interest rates in the economy has been actively studied in modern economic articles. Different studies have used different approaches to identify the effects of monetary policy on interest rates. Understanding the transmission mechanism is essential because the Bank of Russia, as a majority of other banks, uses various tools to manage not only short-term money market rates but also expectations about future interest rates to provide favourable financing conditions in all markets.

In this paper, we analyze monetary policy transmission into the entire maturity spectrum of interest rates. The economic logic of our work is as follows: monetary policy is a multidimensional object: as a result of the central bank's actions, there is not a single effect, but rather many distinct by their nature shocks arise. In this paper, we investigate the effects arising not only because of changes in short rates ("classical" monetary shock) but the effects occurring during press conferences of the Governor of the Bank of Russia, the information contained in the press releases and other actions of the authorities on the day of the announcement of the interest rate decisions ("informational" monetary shock).

The transmission of monetary policy to the entire interest rate curve has not yet been studied for the Russian economy. This motivates us to employ the multi-dimensionality of monetary policy to identify the transmission mechanism. For the Russian monetary policy, such data on "classical" and "informational" monetary shocks are unique data. This study helps to understand how the traditional transmission mechanism works and sheds more light on the effects of the Central Bank's information disclosure and communication policy.

In this paper, we use high-frequency data to identify a monetary surprise – a change in the prices of traded instruments (for example, stocks, bonds, and currency instruments) that occurred due to changes in monetary policy. Unfortunately, the Russian market directly related to interest rates is not very liquid. Therefore, we use over-the-counter market data related to interest rates (e.g., interest rate swaps), as well as liquid markets instruments that are not directly related to interest rates which also react to monetary policy decisions (futures on the ruble/dollar exchange rate and stock index futures) to estimate monetary surprises.

Next, we use the principal components analysis to reduce the dimension of the surprises sample to two - equal to our assumption about the number of monetary shocks in the economy, but at the same time including information from a much larger number of traded instruments. After obtaining the two principal components, we rotate them to an angle to find that the first

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principal component reflects a classic monetary shock that mainly affects short-term rates in the economy. The second principal component reflects a monetary shock that affects medium and long-term rates in the economy.

As a result, we show that an increase in the “classic” monetary shock by one percentage point leads to a rise in short-term rates (from 3 months to 1 year) by roughly one percentage point. However, in line with interest rate expectation theory, the effect monotonically decreases: it pushes yields of 5-year OFZ by 0.5-0.75 p.p. while having a more moderate impact (0.25-0.5 p.p.) on the long-term 10-15-year OFZ yields. That is said, the “classic” monetary shock affects short-term interest rates to a greater extent and may be related to unexpected changes in the key policy rate. Contrary, “informational” monetary shock increases interest rates along long and medium parts of the yield curve on 0,5-0,6 p.p. and may be related to the forward guidance on interest rates and information revealed at the monetary policy events.

In addition, we discovered a puzzle related to the exchange rate and the stock market index. In response to a positive “classic” monetary shock, the ruble-dollar exchange rate strengthens, and the index grows. In contrast, the exchange rate weakens in response to a positive “informational” monetary shock, and the index falls. A correct explanation of this phenomenon requires further research since, for example, the growth of the index in response to the tightening of rates looks counterintuitive. Due to this, there may be different explanations, for example, market sentiment about the future state of the economy given the same monetary policy shock. The tightening of monetary policy may indicate the expansion of the economy, so the market participants may expect higher future expected cash flows of companies, and the stock index may also grow for that reason.

Thus, our work supports the view that monetary policy is indeed multidimensional in Russia. One decision on the key rate contains information about the current assessment of the economic state, about some future forecasts for the economy, and so on. We show that this information can be divided into at least two different shocks, each leading to different responses of the interest rate curve, the exchange rate, and the stock index.