Modelling Monetary Policy of the Bank of Russia

Yulia Vymyatnina
Department of Economics
European University at St.Peterburg

Monetary Policy in central and Eastern Europe
Tutzing, 8-10 July 2009
Outline of Russia’s monetary policy developments


2. June 1995 – August 1998; new Law on Bank of Russia passed in April 1995; crawling band exchange regime; steady decreasing inflation trend; sharp decline of interest rates on the inter-bank market.
Outline of Russia’s monetary policy developments

3. August 1998 – February 1999; dirty floating, depreciation of rouble by 70%, high inflation (increasing trend); monetary expansion in response to fiscal problems.

4. March 1999 – January 2003; stable exchange rate, decreasing inflation trend high rate of monetary expansion due to increase in net foreign assets.

5. January 2003 – December 2007; nominal appreciation of rouble, decreasing trend of inflation, monetary expansion due to increase in net foreign assets and credit to private sector.
Inflation, interbank rate and GKO yield
Basic directions of Russian monetary policy

- Inflation targeting (7.5 – 8.5% in 2005; 5.0-6.5% in 2007)
- Intermediate targeting of monetary aggregates (M0 and M2) under admitted instability of money demand
- Major tools: interventions on foreign exchange market, adjustments of monetary base
- Attempts to make interest rates the major tool of monetary policy (since 1999 till now)
Basic directions of Russian monetary policy

In order for the Bank of Russia to exercise control over M0 and M2 with the aim of reducing inflation a stable money demand function should exist.

The current practice of reliance by the Bank of Russia on the use of monetary aggregates as tools of monetary policy is justified by the weakness of financial system and non-responsiveness of economy to changes in interest rate.
Orthodox monetary theory

- Money supply is controlled by the Central Bank via high-powered money.
- Money multiplier can be regulated by the Central Bank.
- Assumption of stable demand for money function.
- Inflation is the result of excessive money supply.
Orthodox monetary theory

Increase in money supply → Excess supply of money → Fall in the rate of interest → Increase in the quantity of money demanded → Increase in consumption and investment → Increase in aggregate demand

Heterodox monetary theory

- Money supply is determined within the economic system by its need in credit.
- Central Bank can effectively control the interest rate rather than money supply.
- Money demand function is viewed to be unstable and highly volatile.
- Inflation usually is considered to be the cause, not the consequence of increase in money supply.
Heterodox monetary theory

- Official interest rate
- Market interest rates
- Asset prices
- Expectations/confidence
- Exchange rate
- Domestic demand
- Net external demand
- Total aggregate demand

Summary of causality implications

<table>
<thead>
<tr>
<th>Orthodox approach</th>
<th>Accommodationist approach</th>
<th>Structuralist approach</th>
<th>New-Keynesian credit view</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0 → Credit</td>
<td>Credit → M0</td>
<td>Credit ↔ M0</td>
<td>Credit ↔ M0</td>
</tr>
<tr>
<td>M3 → Credit</td>
<td>Credit ↔ M3</td>
<td>M3 ↔ M3</td>
<td>M3 ↔ M3</td>
</tr>
<tr>
<td>M3 → money income</td>
<td>M3 ↔ money income</td>
<td>M3 ↔ money income</td>
<td>M3 ↔ money income</td>
</tr>
<tr>
<td>M3 → inflation</td>
<td>Inflation → M3</td>
<td>Inflation → M3</td>
<td>M3 → inflation</td>
</tr>
</tbody>
</table>
Sources of money endogeneity in transition economies

- “New sector” of economy – private, developing according to the market economy rules. Corresponds to the structuralist approach views.

- “Old sector” of economy – state-owned, working due to support of (local) authorities. Corresponds to accommodationist approach view.
Credit to private non-financial sector, mln. RUB
Econometric methodology

- By studying causality links between monetary aggregates, credit and money income one can make an indirect inquiry into the nature of transmission mechanism of monetary policy.
- Granger causality tests for the appropriate VAR-models were used.
Data
(July 1995 – December 2007)

- Money base (Bank of Russia)
- Credit to non-financial private sector (Bank of Russia)
- Credit to state non-financial enterprises (Bank of Russia)
- Money mass, M3 definition (Bank of Russia)
- Monthly real GDP (estimation of the Ministry of Finance)
- CPI (State Statistical Committee)
Empirical results

<table>
<thead>
<tr>
<th>Credit indicator</th>
<th>Accepted theory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Credit indicator</strong></td>
<td><strong>Accepted theory</strong></td>
</tr>
<tr>
<td><strong>Credit to state enterprises</strong></td>
<td>Accommodative approach</td>
</tr>
<tr>
<td>Accommodative approach</td>
<td>Conclusions cannot be drawn</td>
</tr>
<tr>
<td>Conclusions cannot be drawn</td>
<td>Accommodative approach</td>
</tr>
<tr>
<td><strong>Credit to private non-financial sector</strong></td>
<td>Structuralist approach</td>
</tr>
<tr>
<td>Structuralist approach</td>
<td>Conclusions cannot be drawn</td>
</tr>
<tr>
<td>Conclusions cannot be drawn</td>
<td>Conclusions cannot be drawn</td>
</tr>
<tr>
<td><strong>Total credit to non-financial sector</strong></td>
<td>Structuralist approach</td>
</tr>
<tr>
<td>Structuralist approach</td>
<td>Structuralist approach</td>
</tr>
<tr>
<td>Structuralist approach</td>
<td>Structuralist approach</td>
</tr>
</tbody>
</table>
Policy implications

- Results received support endogenous money supply view, which implies that interest rate is a more efficient policy instrument.
- Bank of Russia might gain better results by concentrating on interest rate control, indirect regulation of credit activities of commercial banks (e.g. using norms on reserves for losses on loans in the same fashion as obligatory reservation ratios on deposits) and introducing more control over credits to state enterprises.
Comparison of different instruments of monetary policy effectiveness

- Five-equation VECM estimation in the form:

  \[ \Gamma_0 \Delta x_t = \alpha \beta' x_{t-1} + \Gamma_1 \Delta x_{t-1} + \ldots + \Gamma_4 \Delta x_{t-4} + \Psi D_t + \varepsilon_t \]

- Estimation of structural constraints imposed on VECM

- Comparison between effectiveness of different tools of monetary policy
Data
(July 1995 – December 2007)

Monthly data in logarithms:
- M3 monetary aggregate \( (m3) \),
- Price level \( (p) \),
- Monthly real GDP \( (y) \),
- Average monthly exchange rate \( (e) \)
  - Ruble-USD exchange rate
  - Effective exchange rate (with USD and Euro),
- interest rate on the inter-bank market \( (i) \).
Description of VECMs

Tested for misspecification (normality, heteroscedasticity, residual autocorrelation)

1995-2007, RUB/USD: 3 lags
1995-2007, eff.exch.rate: 4 lags
1999-2007, RUB/USD: 4 lags
1999-2007, eff.exch.rate: 5 lags
Cointegrating relations

<table>
<thead>
<tr>
<th>Sample, exchange rate type</th>
<th>Cointegration equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-2007; RUB/USD</td>
<td>( m_3_t - p_t = 1.74 y_t - 3.48 i_t - 0.06 e_t )</td>
</tr>
<tr>
<td>1995-2007; Eff. exch. rate</td>
<td>( m_3_t - p_t = 1.73 y_t - 2.33 i_t - 0.07 e_t )</td>
</tr>
<tr>
<td>1999-2007; RUB/USD</td>
<td>( m_3_t - p_t = 1.99 y_t - 2.73 i_t + 0.69 e_t )</td>
</tr>
<tr>
<td>1999-2007; Eff. exch. rate</td>
<td>( m_3_t - p_t = 1.83 y_t - 1.67 i_t + 0.98 e_t )</td>
</tr>
</tbody>
</table>
Structural model

The structural matrix corresponding to the innovations was constructed on the basis of:

- Bank of Russia reaction rule,
- aggregate demand equation,
- augmented Phillips curve,
- term structure of interest rates,
- and balance of payments.
### Structural model

Resulting matrix of links between innovations and structural shocks was the following:

\[
\begin{pmatrix}
1 & 0 & 0 & \gamma_{14} & \gamma_{15} \\
\gamma_{21} & 1 & \gamma_{23} & 0 & \gamma_{25} \\
0 & \gamma_{32} & 1 & \gamma_{34} & \gamma_{35} \\
0 & \gamma_{42} & 0 & 1 & \gamma_{45} \\
\gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} & 1
\end{pmatrix}
\begin{pmatrix}
\xi_{m2} \\
\xi_{p} \\
\xi_{y} \\
\xi_{i} \\
\xi_{e}
\end{pmatrix}
= 
\begin{pmatrix}
\varepsilon^{MS} \\
\varepsilon^{AD} \\
\varepsilon^{AS} \\
\varepsilon^{TS} \\
\varepsilon^{BP}
\end{pmatrix}
\]

Hypothesis of over-identification imposed by this matrix was not rejected.
Impulse response functions: innovations in money mass, 1999-2007
Impulse response functions: innovations in interest rate, 1999-2007

Response to Structural One S.D. Innovations

Response of DP to Shock4

Response of DY to Shock4
Impulse response functions: innovations in exchange rate, 1999-2007

Response to Structural One S.D. Innovations

Response of DP to Shock5

Response of DY to Shock5
Analysis

- Managing money mass and exchange rate produces similar results.
- Inflation reacts more to changes in the interest rates, but the period of stabilisation is shorter, and there’s some period of lower inflation.
- GDP also stabilises quicker with the use of interest rates as monetary policy instrument.
Conclusions

- Bank of Russia has limited control over money supply
- To achieve better results in terms of inflation targeting credit activity of banks has to be regulated more
- Interest rate management might give better results in terms of desired changes in inflation and GDP compared with exchange rate targeting or money supply control