Overnight interest rates and liquidity of the Russian money market: the impact of financial turmoil

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Structure of presentation

- Motivation
- Model set-up
- Description of variables
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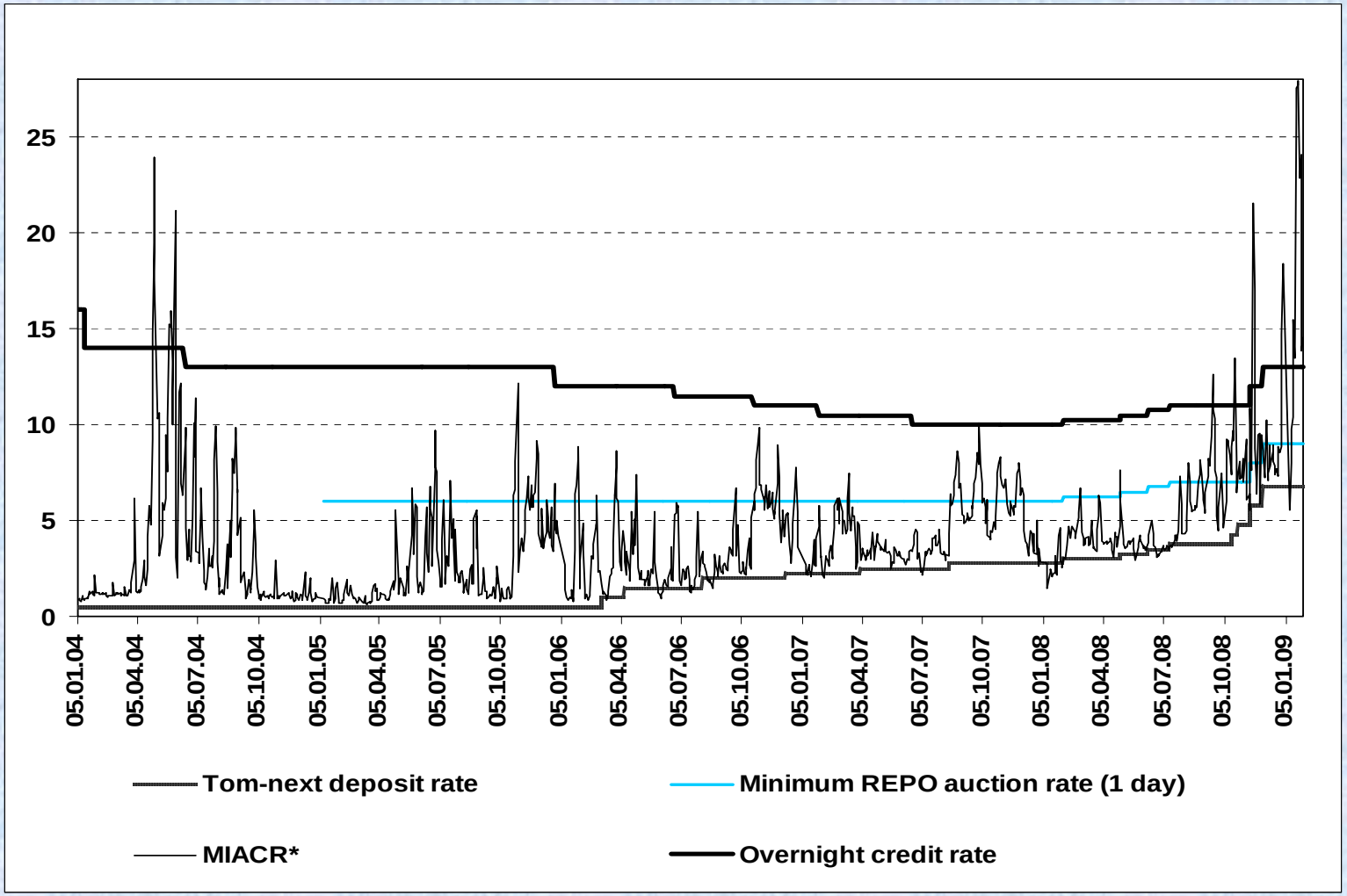
Motivation

BoR's interest rates corridor and overnight market rate (MIACR*), p.p.



*** MIACR – actual average weighted interest rate on overnight interbank ruble credit on the Moscow market.**

Motivation

- Analyze the process of interest rate determination on the money market and identify the main drivers behind it
- Estimate the magnitude of the effects stemming from different factors to facilitate the process of interest rate steering
- Assess the impact of the financial turmoil

Model set-up: related literature

The theory of money market and liquidity management

Bindseil 2004

Valimaki 1998, 2001

Empirical modeling of liquidity effect

Wurtz 2003

Bindseil, Seitz 2001

Jurgilas 2006

Macro-analysis of excess liquidity

Agenor et al. 2004

Saxegaard 2006

Model set-up

- Econometric Techniques: non-linear EGARCH model

- Dependent Variable:

  deviation of actual overnight market interest rate from the middle of the BoR's interest rate corridor

- Explanatory Variables:
  I. Liquidity
  II. BoR's interest rates
  III. Foreign interest rates
  IV. Exchange rate expectations
  V. Adaptive expectations
  VI. Calendar effect
  VII. Time series components

- Sample period: January 2006 – January 2009

Liquidity

Simple forecast

$$SF = \text{Ln}\left(\sum_{i=1}^{t-1} CA_i + CA_{t-1} * (T-t) - RR*T \right) - \text{Ln}\left(AccER^N\right)$$

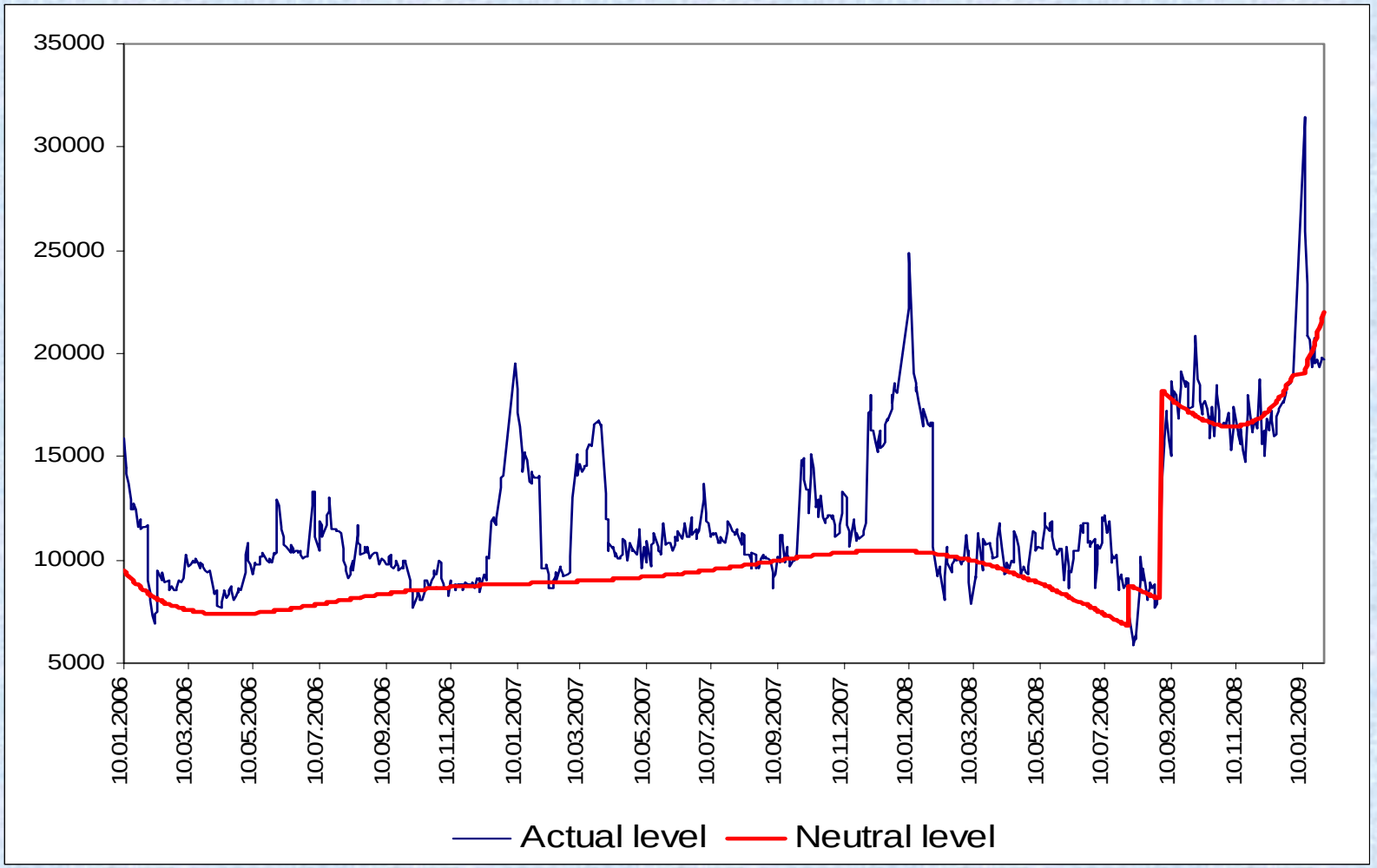
Perfect forecast

$$PF = \text{Ln}\left(\frac{\sum_{i=t}^{T} (DEP_i - REF_i)}{(T-t)} \right)$$

CA – banks' current accounts; *RR* – reserve requirements; $AccER^N$ –neutral level of accumulated excess reserves (non-linear trend which forms the lower boundary of the excess reserves fluctuations until August 2008); *DEP* –BoR's overnight deposits, *REF* –BoR's overnight credit; *T* –end of RMP; *t* – current period

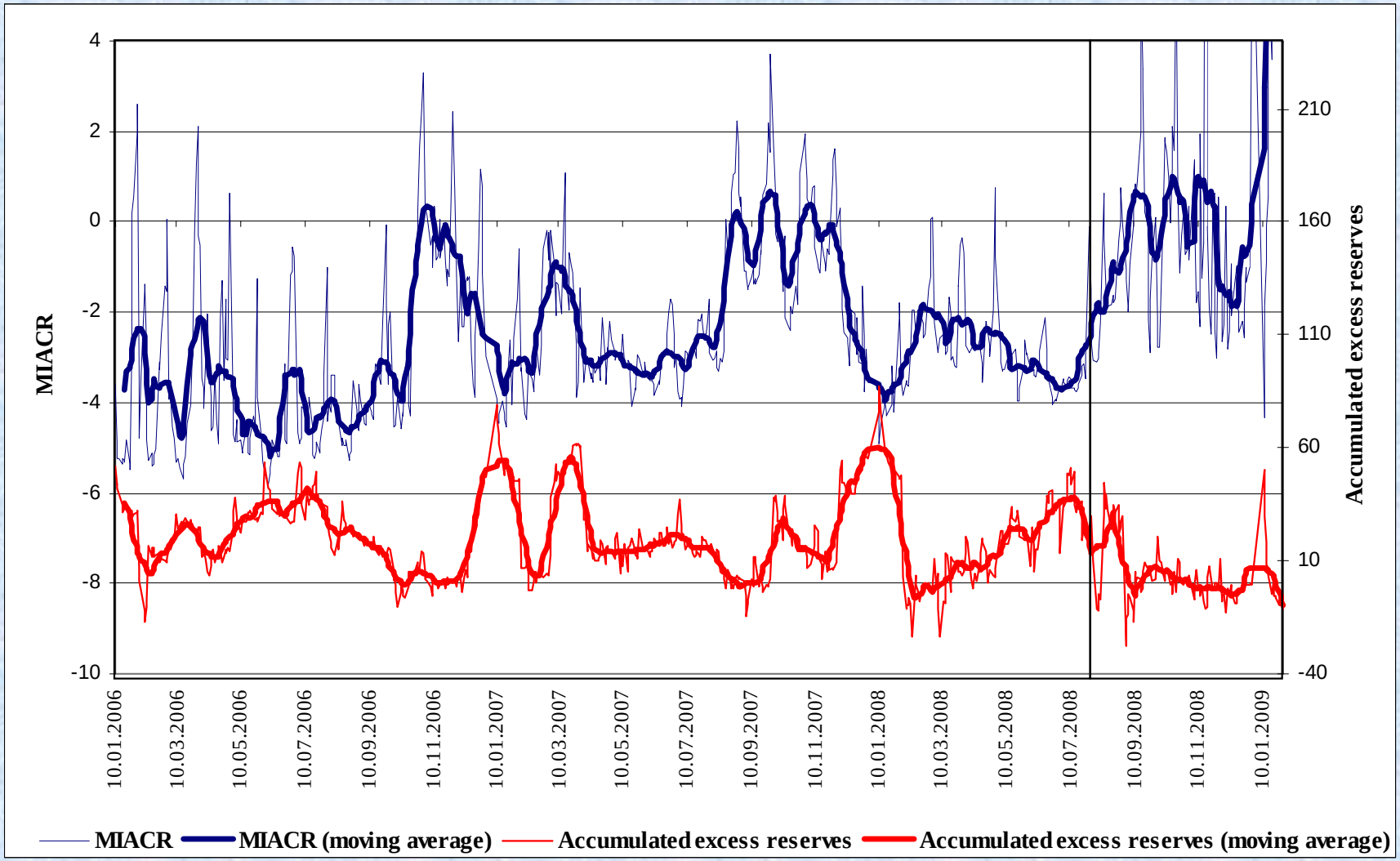
Liquidity

Actual and neutral level of accumulated excess reserves (bn. rubles)



Liquidity

MIACR (deviation from the mid-point of the interest rates band, p.p.) and accumulated excess reserves (deviation from the neutral level, %)



Foreign Interest Rates and Exchange Rate Expectations

Foreign interest rates variable:

- Interest rate parity concept (under fixed exchange rate regime)

- High level of dependence of Russian banks on the international money markets

Composite foreign interest rate indicator:

0.8*USD money market interest rate + 0.2* EURO money market interest rate

Exchange rate expectations variable:

- Persistent expectations of ruble's depreciation (during the period of gradual controlled depreciation conducted by BoR)

Exchange rate expectations indicator:

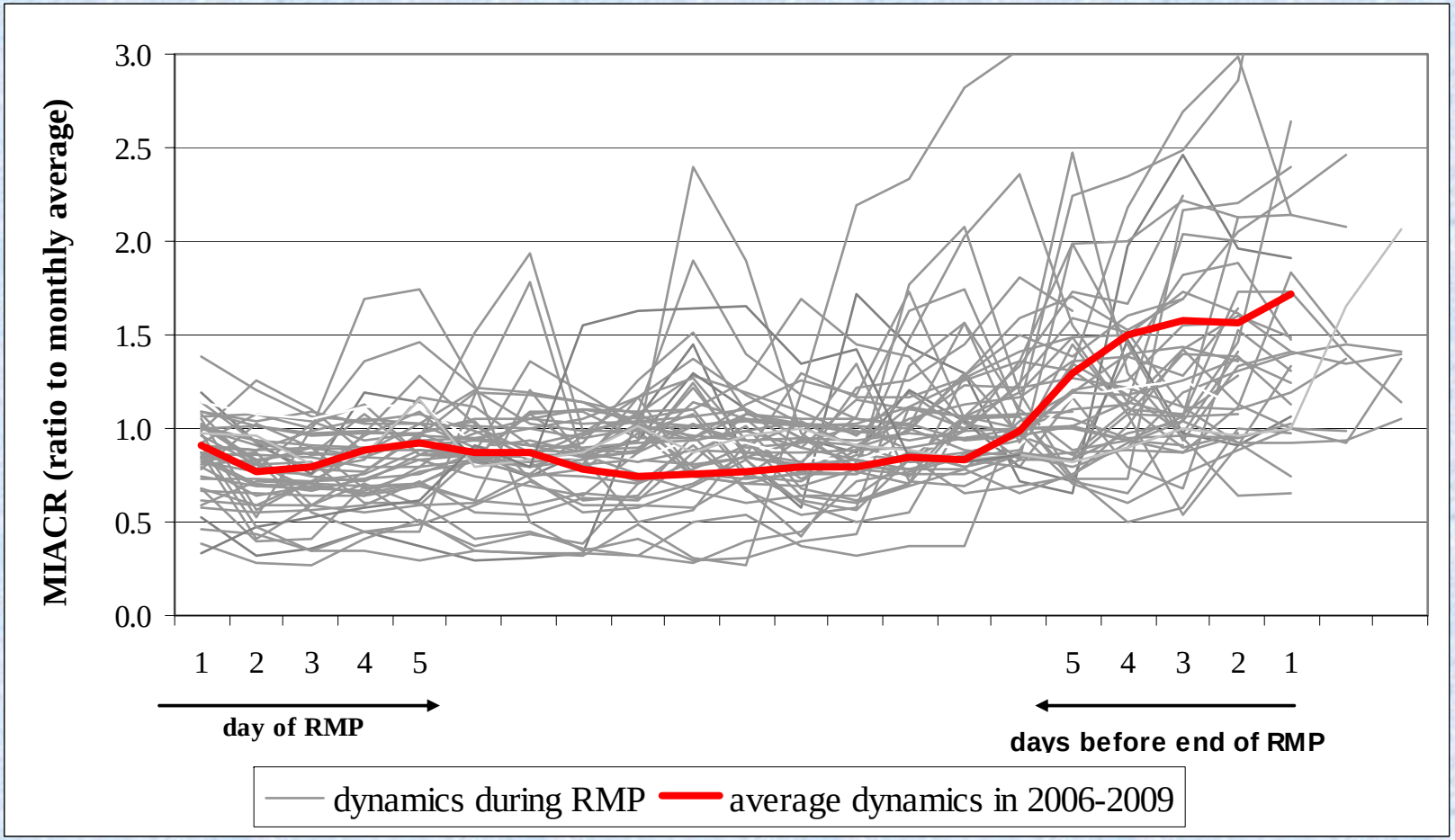
January 2006 – September 2008: adaptive expectations (the average rate of bi-currency basket appreciation over last 5 days)

October 2008 – November 2008: 0.5*adaptive expectation + 0.5*forward-looking expectations

December 2008 – January 2009: forward-looking expectations (based on 1-month forward rates)

Calendar Effect

Monthly dynamics of overnight MIACR



Calendar Effect Modeling: dummies for the first day and last 5 days of the RMP

Other Variables

Adaptive expectations - the average of the spread on the last week of the previous RMP

Time series component – 1-day lag of the spread (taking away those observations, which correspond to the last day of the previous RMP)

Dummy-variables used for the observations when MIACR was fluctuating beyond the BoR's interest rate band

Results: Equation for the mean

Category	*Variable*	*ML Estimate*
Liquidity	"Simple" forecast of excess reserves before the last week of the RMP	-0.401**
	"Simple" forecast of excess reserves at the last week of the RMP	-0.672**
	"Perfect" forecast of net deposits until the end of each RMP	-0.051**
Adaptive expectations	Average spread for the last 5 days of the previous RMP	0.047**
Foreign interest rates	Spread between short-term foreign interest rate and the middle of the BoR's interest rate band (January 2006 – September 2008)	0.071**
	Spread between short-term foreign interest rate and the middle of BoR's interest rate band (September 2008 – January 2009)	0.025*
Exchange rate expectations	Devaluation expectations (August 2008 – January 2009)	0.004**
Calendar effect	Dummy variable (first banking day of the RMP)	-0.478**
	Dummy variable (last banking day of the RMP)	0.247**
	Dummy variable (5 banking days until the end of the RMP)	0.345**
	Dummy variable (4 banking days until the end of the RMP)	0.303**
	Dummy variable (3 banking days until the end of the RMP)	0.205**
	Dummy variable (2 banking days until the end of the RMP)	0.246**
Time series component	1-day lag of actual spread (corrected for spillover effects)	0.230**
Autonomous factor	Constant	0.242

** - significance at 5%-level.
* - significance at 10%-level.

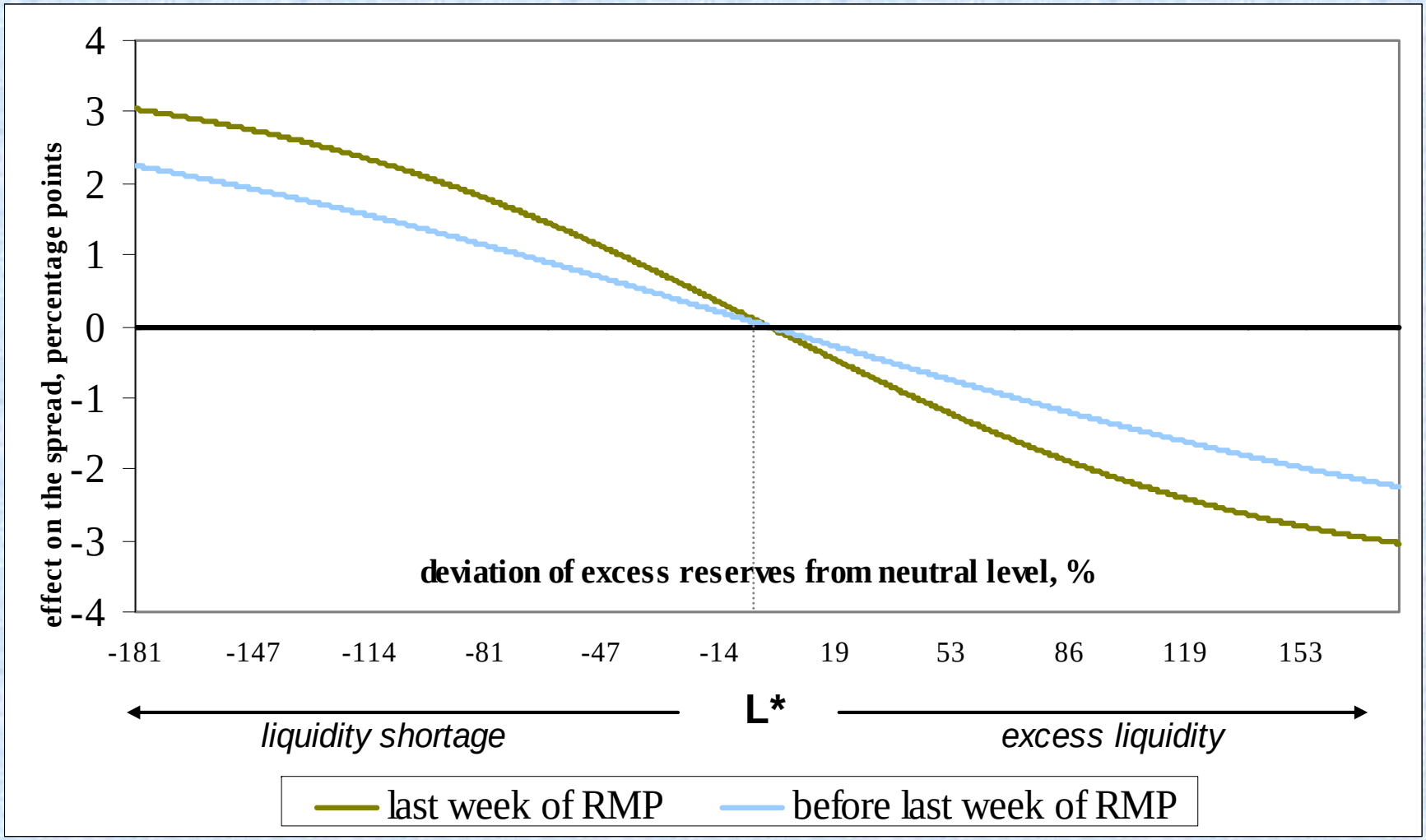
Results: Equation for the conditional variance

Variable	*ML Estimate*
Dummy variable (last week of the RMP)	**0.486****
Dummy variable (August 2008 – January 2009)	**0.298****
GARCH-component – lag 1 day	**0.721****
Normalized disturbance (lag 1 day)	**0.343****
Normalized disturbance (lag 2 days)	**-0.247****
Absolute value of normalized disturbance (lag 1 day)	**0.308****
Constant	**-0.571**

** - significance at 5%-level.

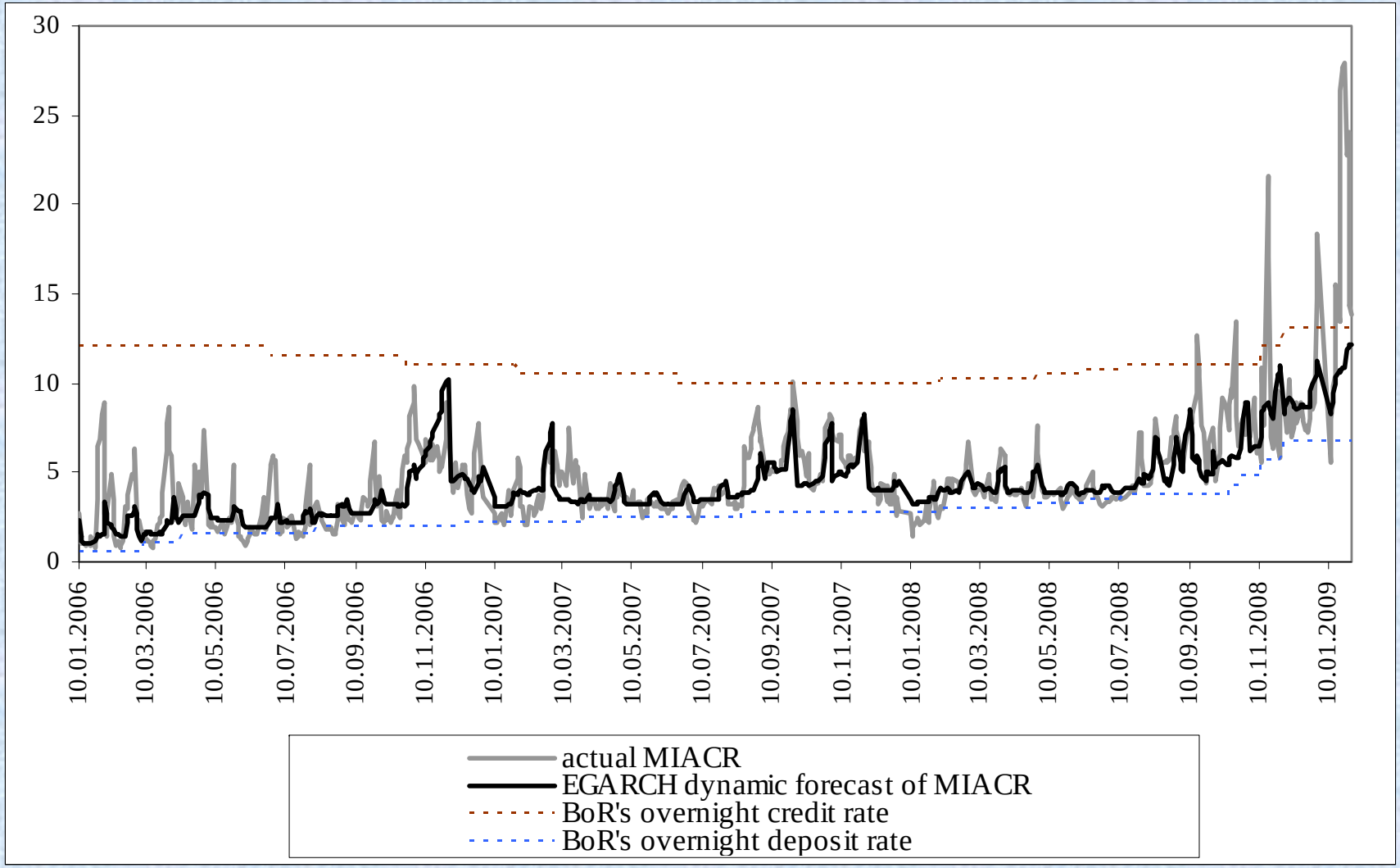
Results

Demand for liquidity during RMP



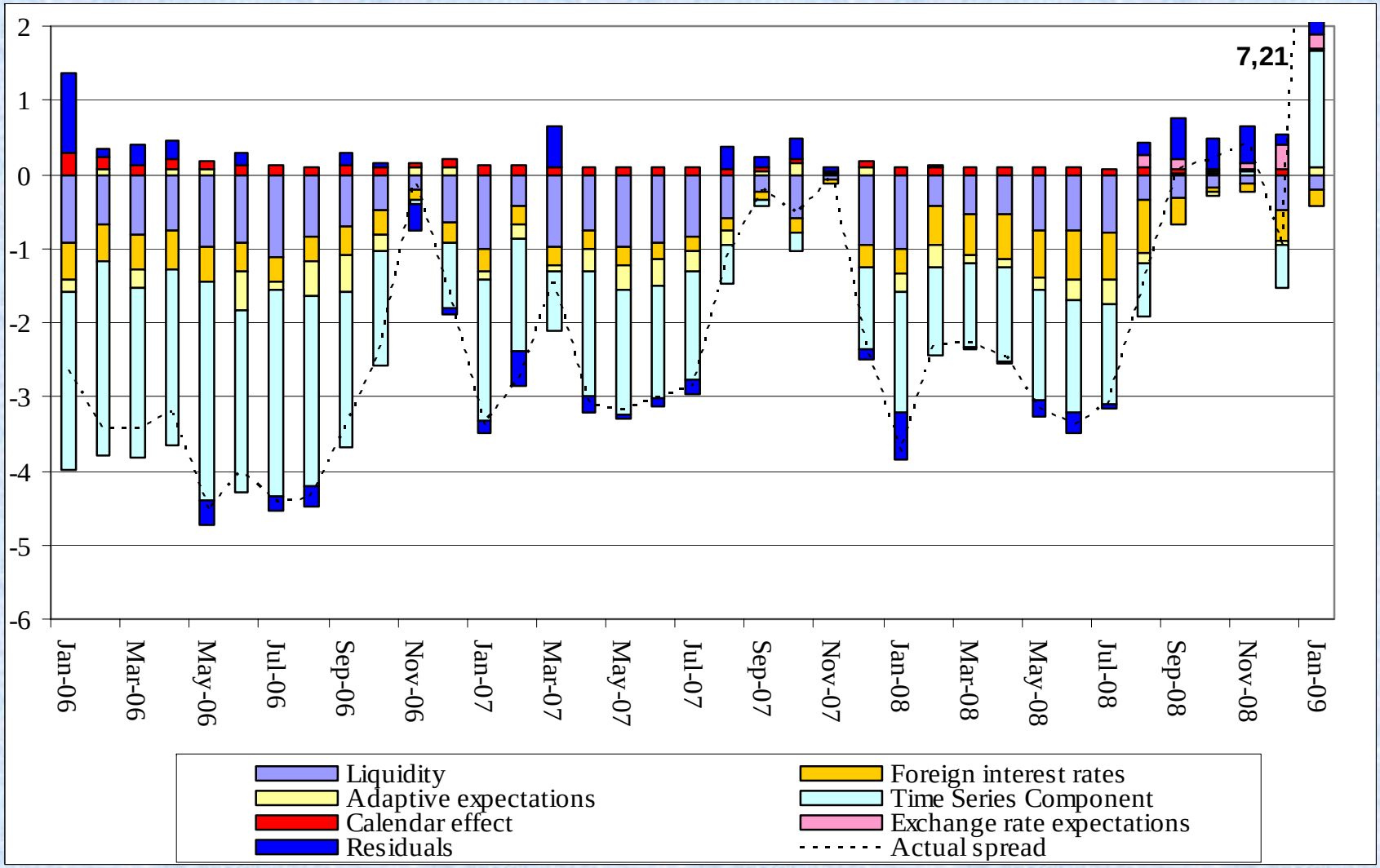
Results

Actual dynamics of the MIACR and the dynamic forecast from the EGARCH (percentage points)



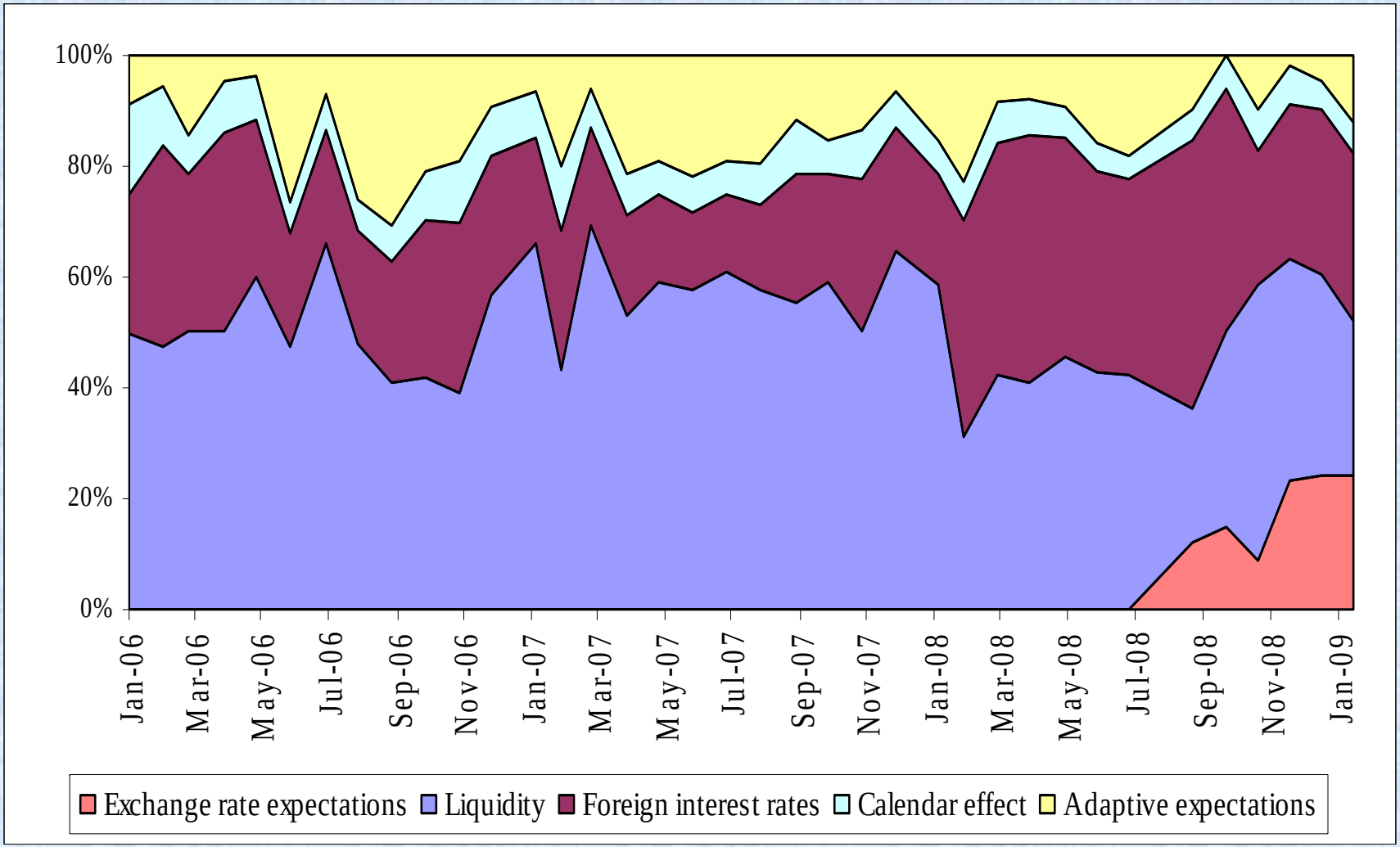
Results

Monthly averages of absolute contributions of different factor categories to the spread (percentage points)



Results

Monthly averages of relative contributions of different factor categories to the spread (excluding time series component and residuals, %)



Conclusion

- The estimation of the model of the short-term interbank rate in Russia basically confirmed the relative ineffectiveness of the country's money market. Nevertheless, our model provides empirical backup for the martingale hypothesis as a crucial tool for analyzing the dynamics of the money market.

- Over the last several years, abrupt changes of the liquidity conditions, which were to some extent driven by the managed floating exchange rate regime in Russia, provoked substantial fluctuations of interbank rates.

- In the second half of 2008 general tightening of liquidity conditions occurred. In addition, tighter conditions of borrowing abroad and persistent depreciation expectations both contributed to sharp growth of the interbank rate.