



**TÜRKİYE CUMHURİYET  
MERKEZ BANKASI**

# **Volatile Capital Flows: A (or The ?) Policy Challenge for Emerging Economies**

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**HKMA-FRBNY Joint Conference  
20-21 March 2014, Hong Kong**

# Outline

1. Volatile Capital Flows and Consequences for Emerging Economies
2. Reserve Option Mechanism: A New Tool to Deal with Excess Capital Flow Volatility
3. Some Results and Conclusion

# Volatile Capital Flows and Its Consequences for EMEs

# Capital flows: why bother now?

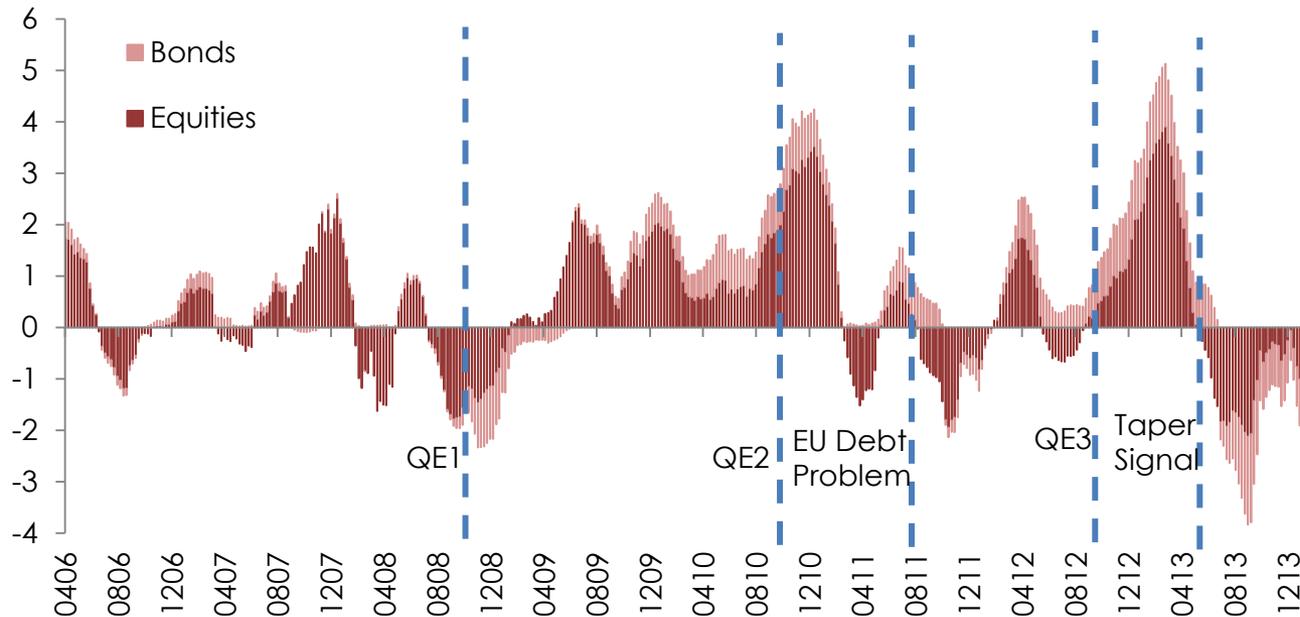
Historically the main source of volatility in Turkey has been cross border capital flows, why bother now?

- Size and volatility of capital flows have significantly increased during the post-crisis period.
- **More importantly, it is mainly driven by global factors.**
  - Less related to domestic fundamentals
  - Inefficient and distortionary

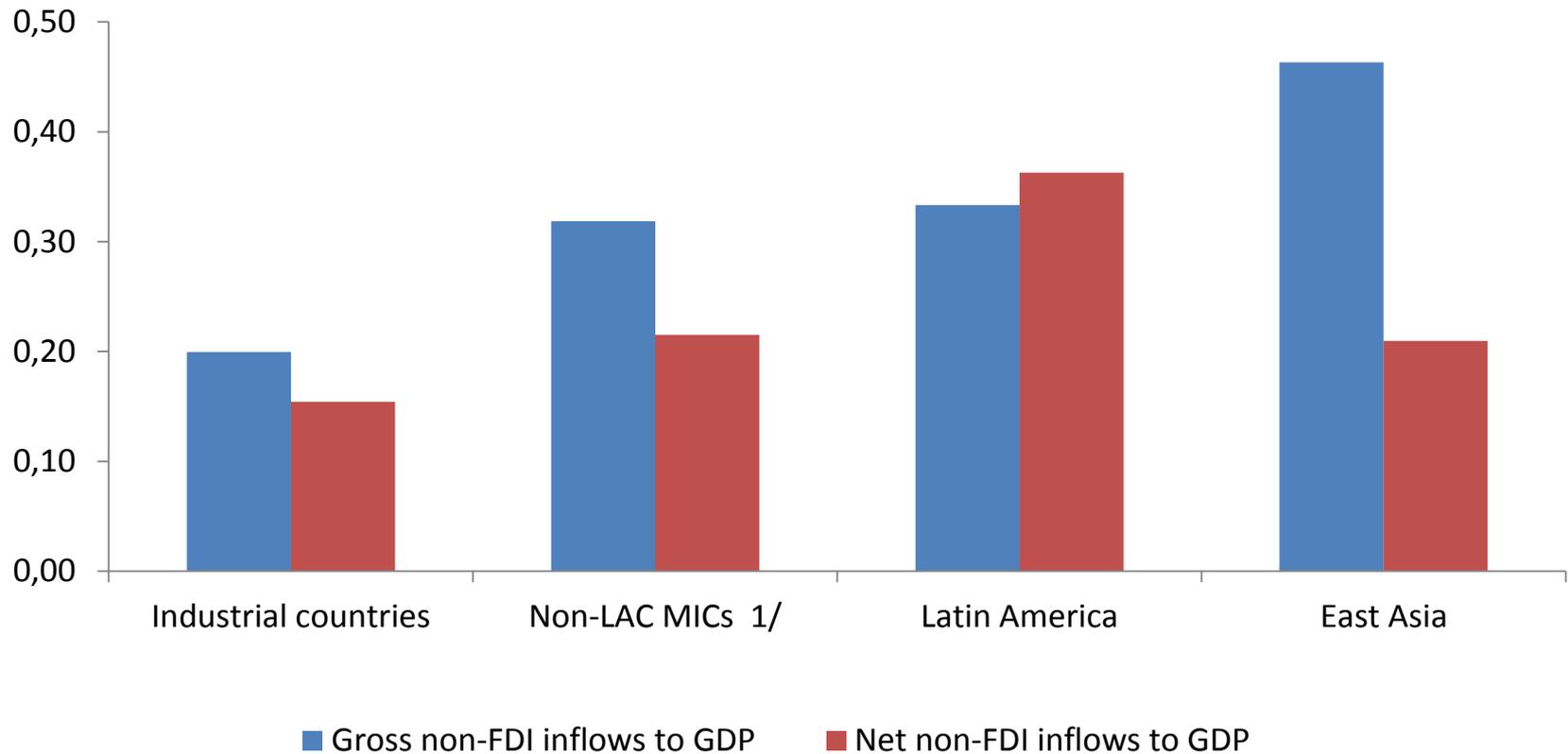
# Need for Capital Flow Management..

➤ Private portfolio flows to emerging countries have hiked following the quantitative easings, and have been excessively volatile in the post-crisis period.

➤ **Emerging Market Annual Fund Flows (13-week moving average, billion USD)**

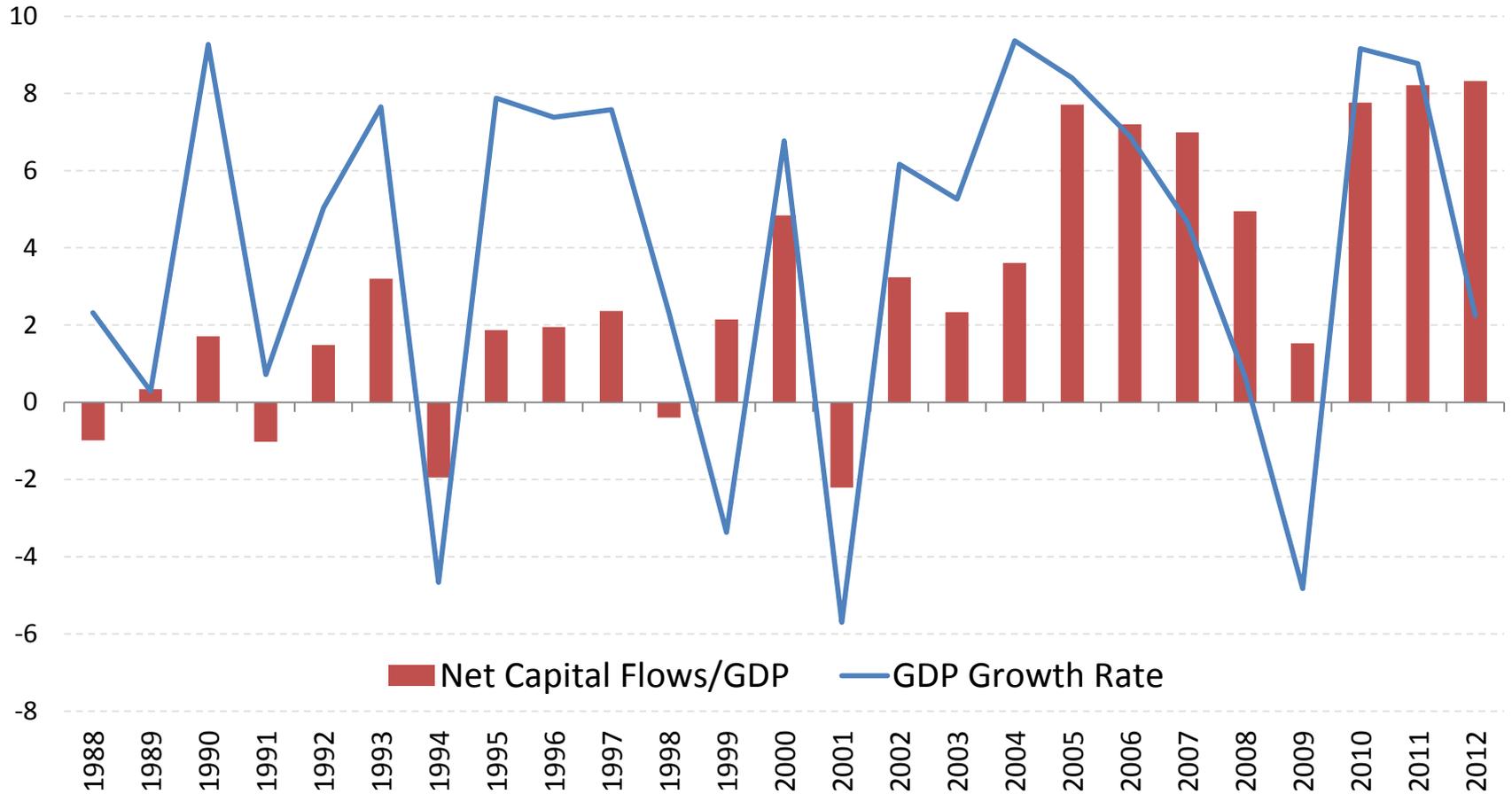


# Correlations between Capital Flows and GDP Growth



Source: Calderon and Servén 2013

# Capital Flows and GDP Growth in Turkey



Source: CBRT

# Capital flows: challenges

- Capital flows may have important benefits, but they pose big challenges for macroeconomic policy as well.
- Sudden reversals (stops) can have very large adverse effects on real and/or financial sector.
- Procyclical flows amplify macro-financial fluctuations, rather than dampening them.

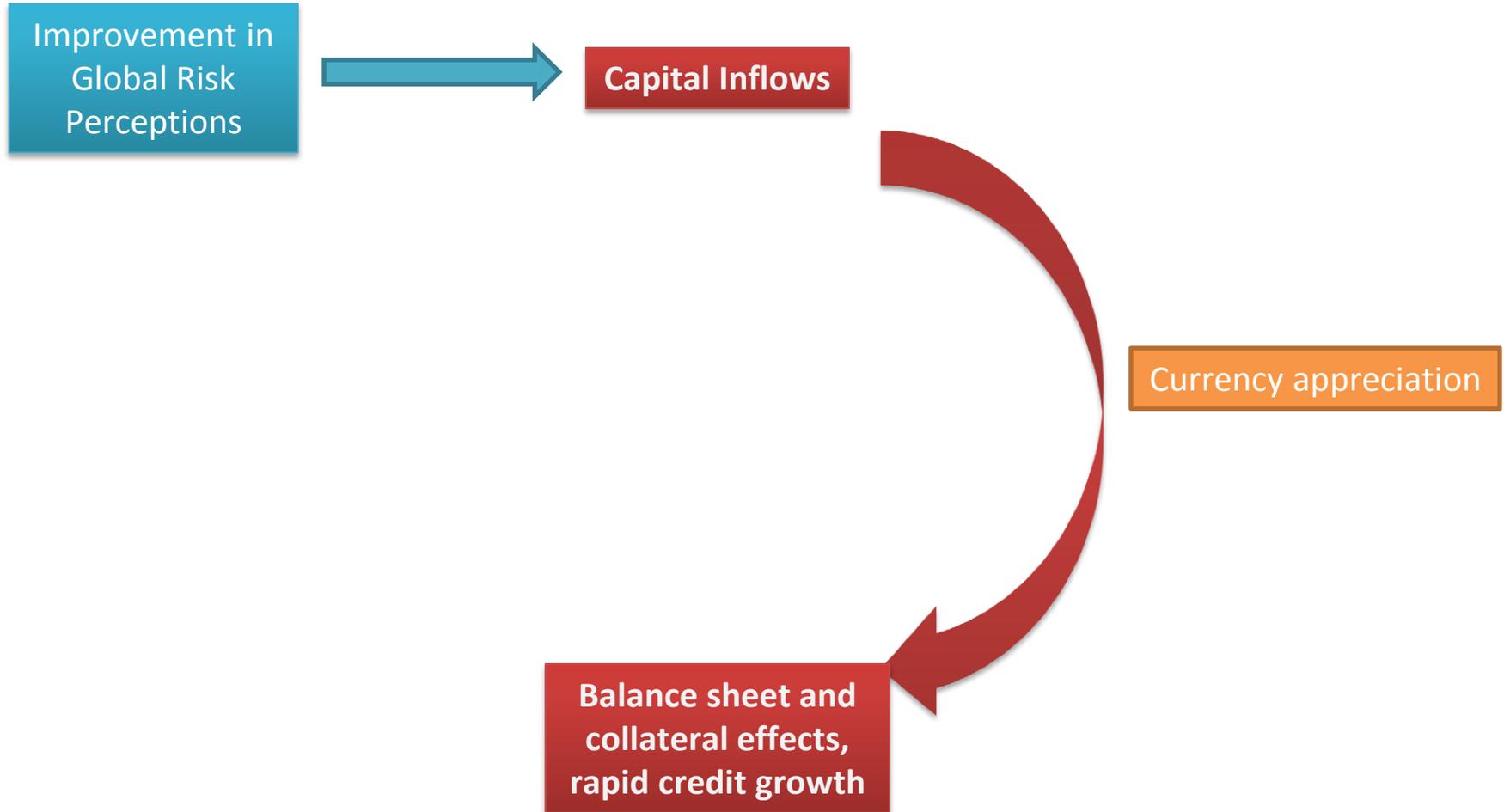
# Amplifying Role of Cross Border Capital Flows

- Capital flows lead to an appreciation in currency, which improves the balance sheets of firms and increase collateral values.
- This leads to more credit growth, higher demand for nontradable goods and thus further appreciation.
- Rapid credit growth is financed by external borrowing, leading to further inflows.
- Pecuniary externalities: Overborrowing and overvaluation of currency
- Caballero and Krishnamurthy (2004), Lorenzoni (2008), Bianchi (2011), Bruno and Shin (2013).

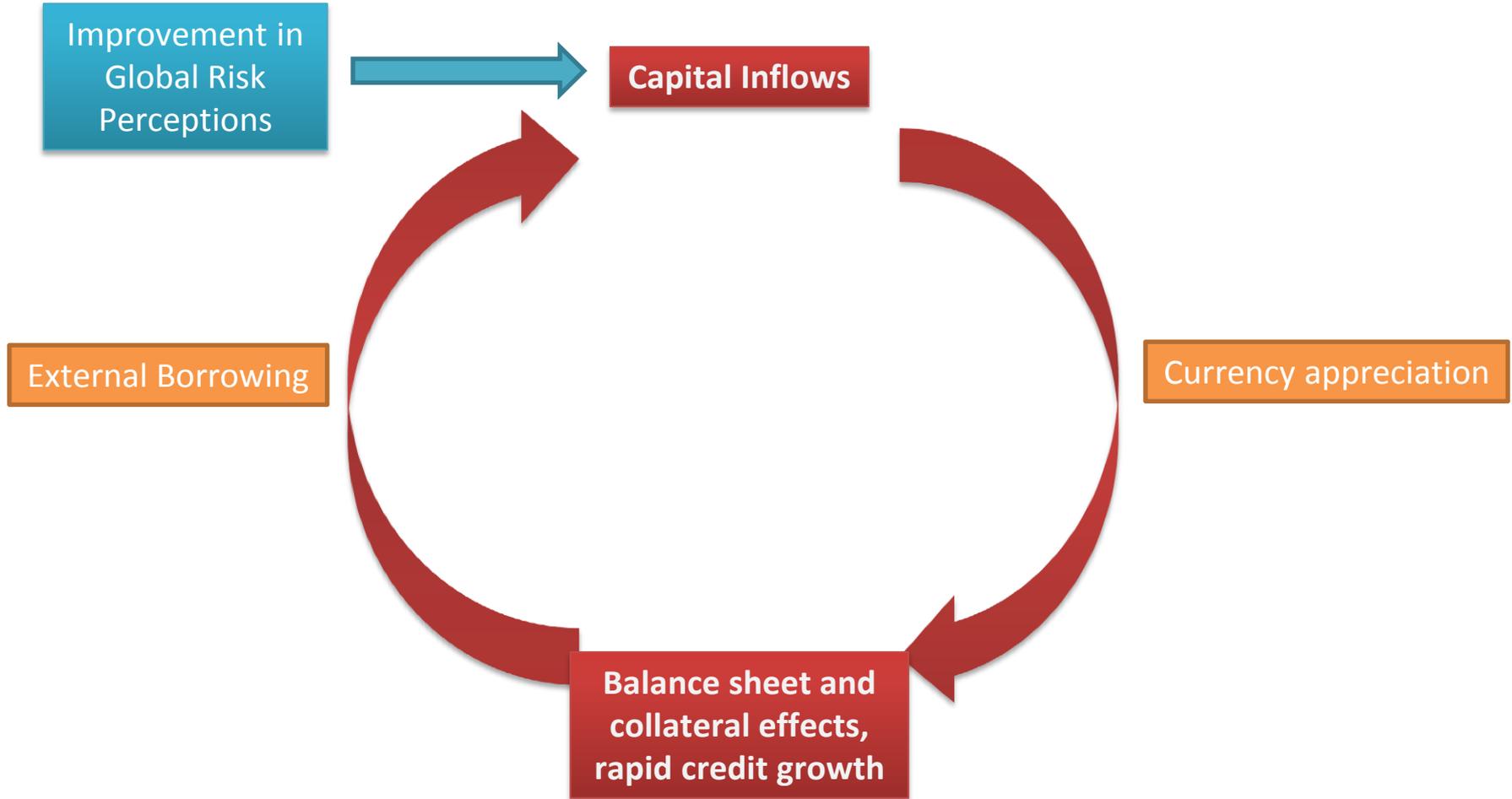
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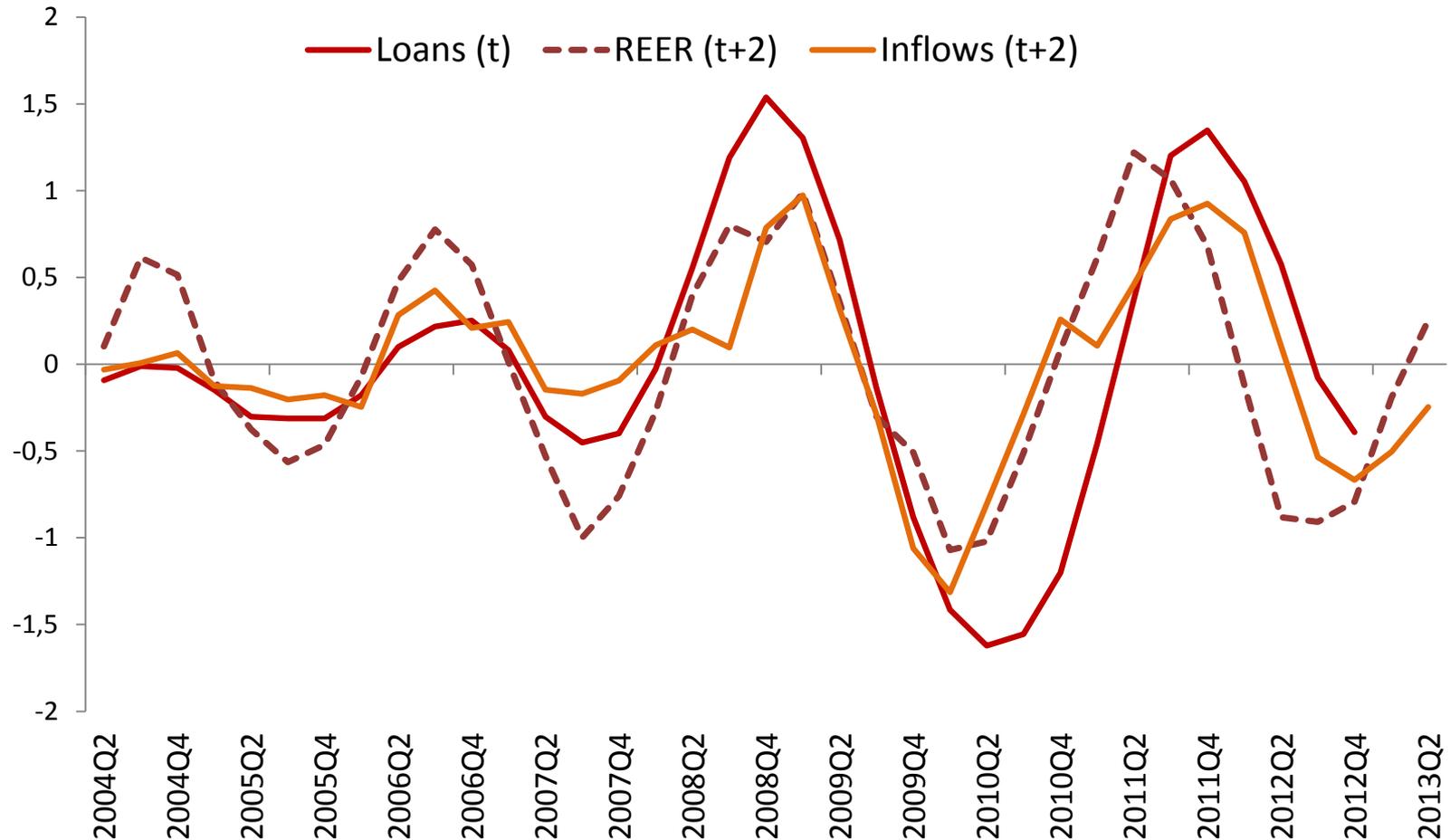


# Amplifying Role of Cross Border Capital Flows



# Capital Flows, Credit , and Exchange Rate Cycles

(HP filtered, standardized)

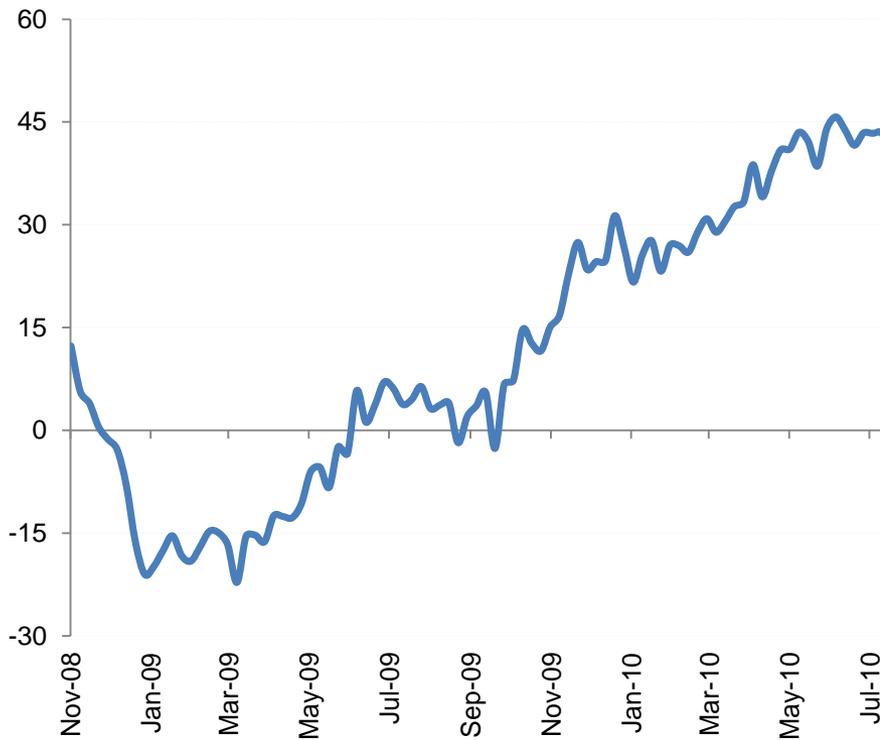


Source: CBRT.

# Capital Flows and Macroeconomic Risks: Turkish economy as of late 2010

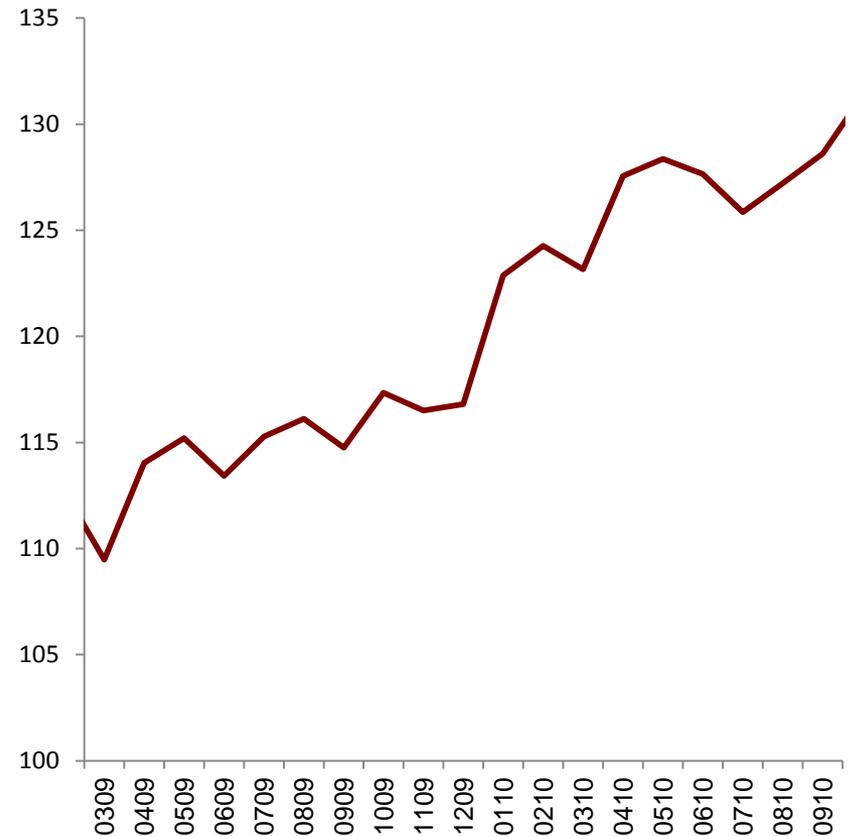
# Turkish Economy as of late-2010: Rapid Credit Growth, and Sharp Appreciation of Domestic Currency

**Total Loan Growth Rates**  
(13 Weeks Moving Average,  
Annualized, FX Adjusted, Percent)



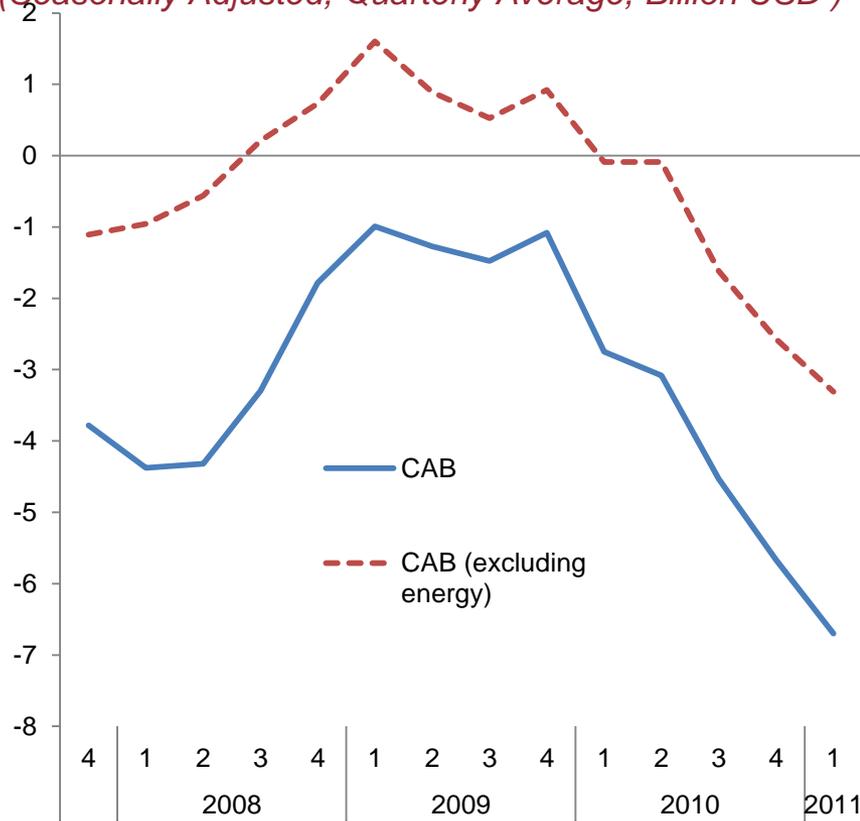
Source: CBRT

**Real Exchange Rate (2003=100)**

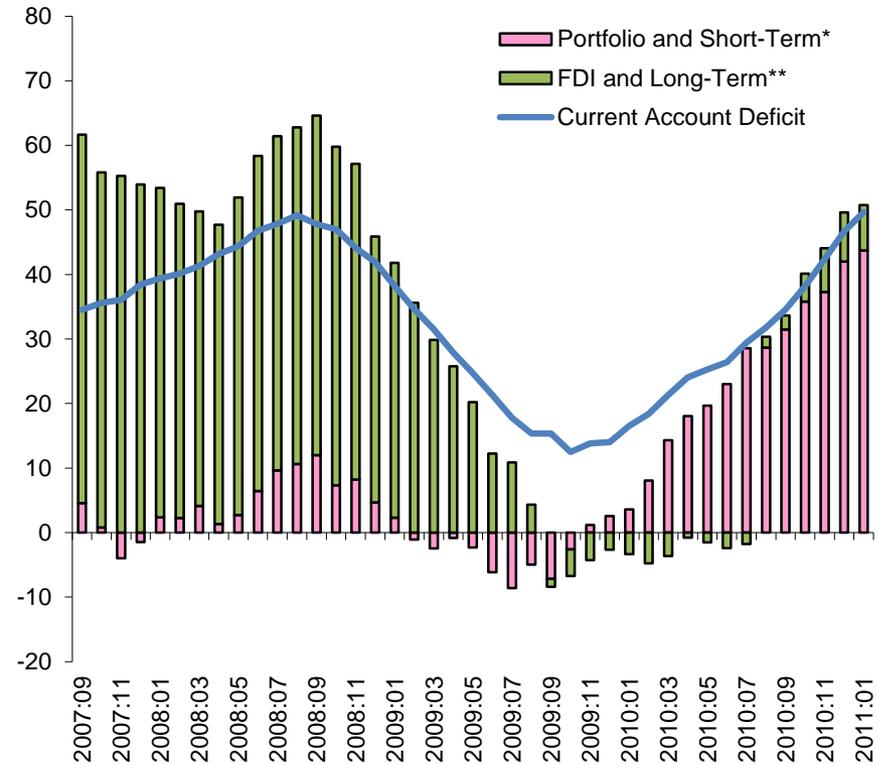


# Turkish Economy as of late 2010: Sharp Increase in the Current Account Deficit, Financed with Short-term Inflows

**Current Account Balance**  
(Seasonally Adjusted, Quarterly Average, Billion USD)



**Main Sources of External Financing\***  
(12-months Cumulative, Billion USD)



Source: TURKSTAT, CBRT.

\*Short-term capital movements are sum of banking and real sectors' short term net credit and deposits in banks. Long-term capital movements are sum of banking and real sectors' long term net credit and bonds issued by banks and the Treasury.

Source: CBRT.

# Can we do it with conventional Inflation Targeting?

- When global liquidity shocks dominate, using single instrument under IT may exacerbate the trade-offs
- For example, during intense capital inflows there are two options:
  - $i \uparrow \Rightarrow$  further appreciation  $\Rightarrow$  wider CA deficit, sudden stop risks increase
  - $i \downarrow \Rightarrow$  overheating  $\Rightarrow$  higher inflation
- Multiple objectives, multiple instruments are needed.

# Searching for a new policy framework

## MAIN GOAL:

Design a new framework to

- alleviate the impact of excessive volatility in capital flows on the domestic economy,
- correct the cyclical part of the current account deficit, by reducing overborrowing and overvaluation,
- reduce the sensitivity of credit and exchange rate cycles to capital flows,
- without jeopardizing price stability objective.

# New Policy Tools

# How to limit the adverse impact of capital flow volatility?

Need to dampen the credit and exchange rate cycles.

Two ways to implement this goal:

1. Reduce the volatility of capital flows

Main Tool: **Asymmetric Interest Rate Corridor**

2. Weaken the link between flows and the economy

Main Tool: **Reserve Options Mechanism**

# Reserve Options Mechanism (ROM)

# Reserve Option Mechanism

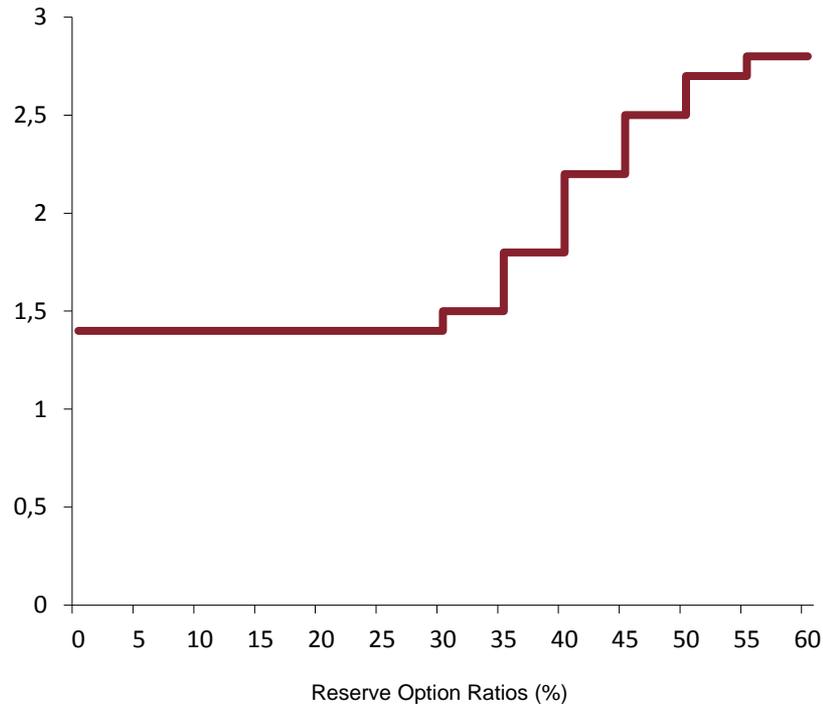
- gives banks the option to hold a certain fraction of their domestic currency RRs in FX and/or gold.
- by providing the banks such a flexibility, the mechanism has the potential to make banks internalize the social benefit of reserve accumulation during capital surges and reserve reduction during outflow times.

## More:

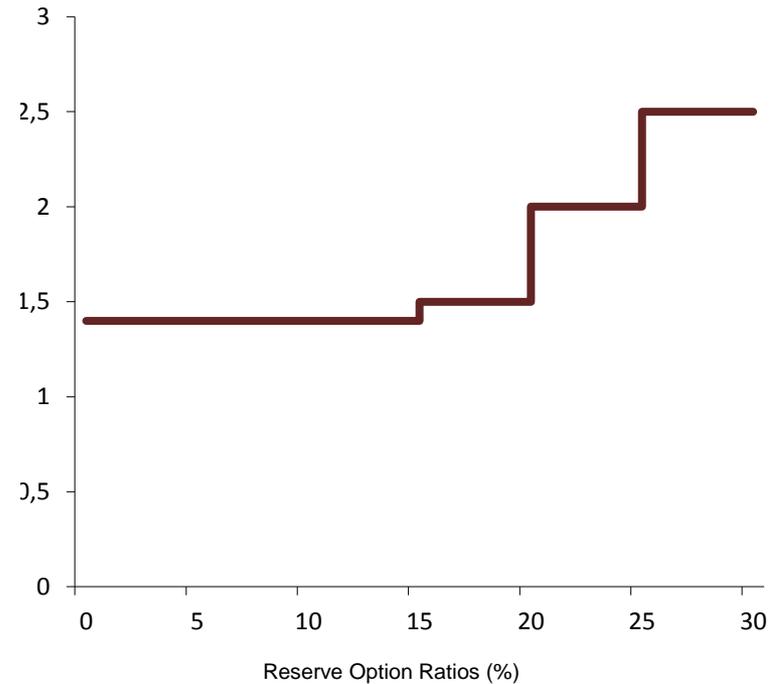
- to what extent the banks will use ROM depends on the relative cost of using the facility. The cost depends on relative price of FX vs. TL funding.
- The CBRT can alter this cost by changing the Reserve Option Coefficients (ROC: the amount of FX/gold per unit of TL required reserves).

# Reserve Options Coefficients (ROC)

## Reserve Option Coefficients for FX



## Reserve Option Coefficients for Gold



Source: CBRT.

Source: CBRT.

# Threshold ROC

For each bank, there is a “threshold ROC” ( $ROC^{tr}$ ) that makes the bank indifferent between using and not using the facility.

This level will depend on the relative cost of FX vs TL funding:

$$ROC^{tr} = \frac{r_t^{TL}}{r_t^{FX} * \frac{E(e_{t+1})}{e_t}}$$

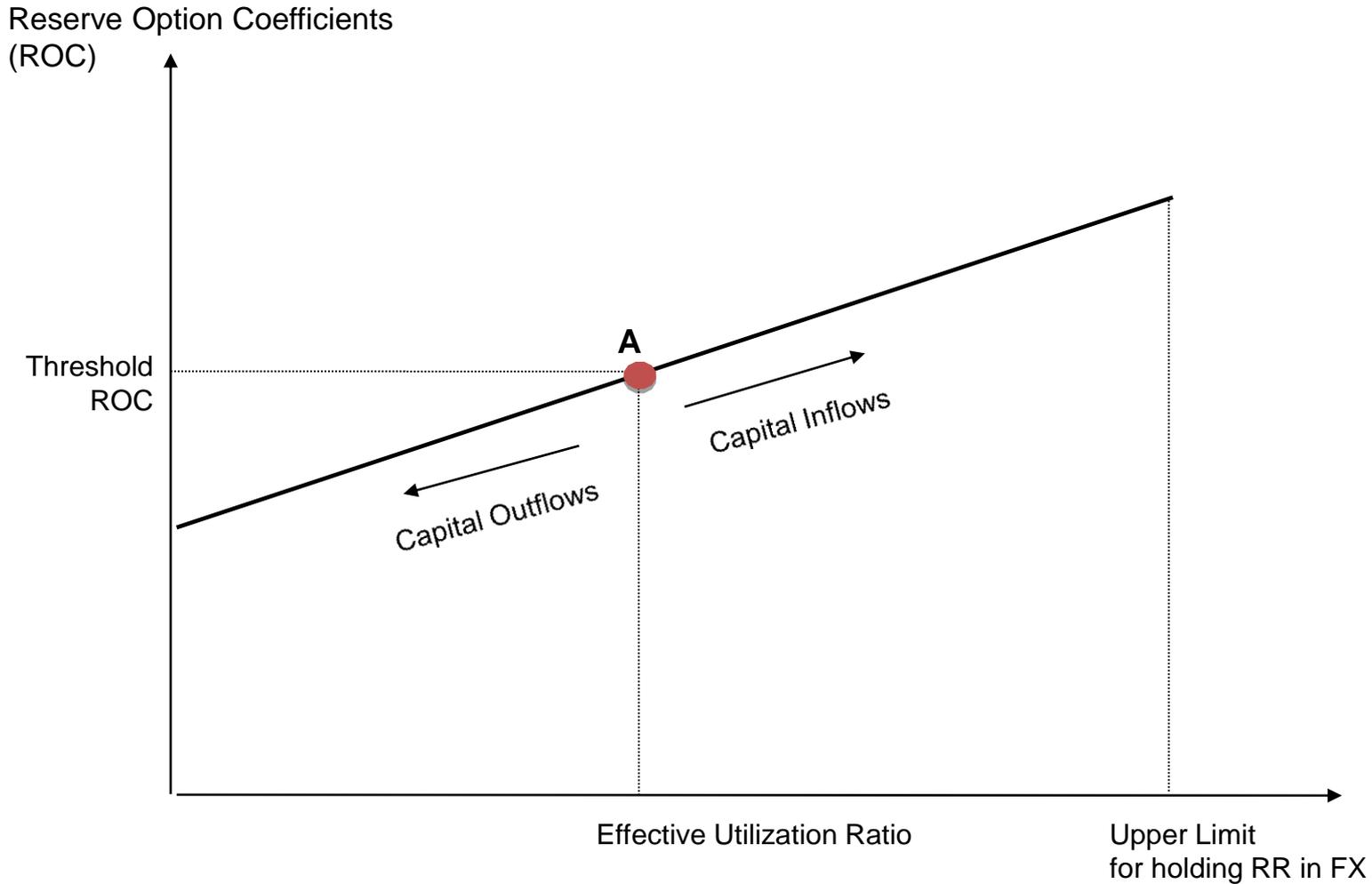
where,

$r_t^{TL}$ : cost of TL funding,  $r_t^{FX}$ : cost of FX funding

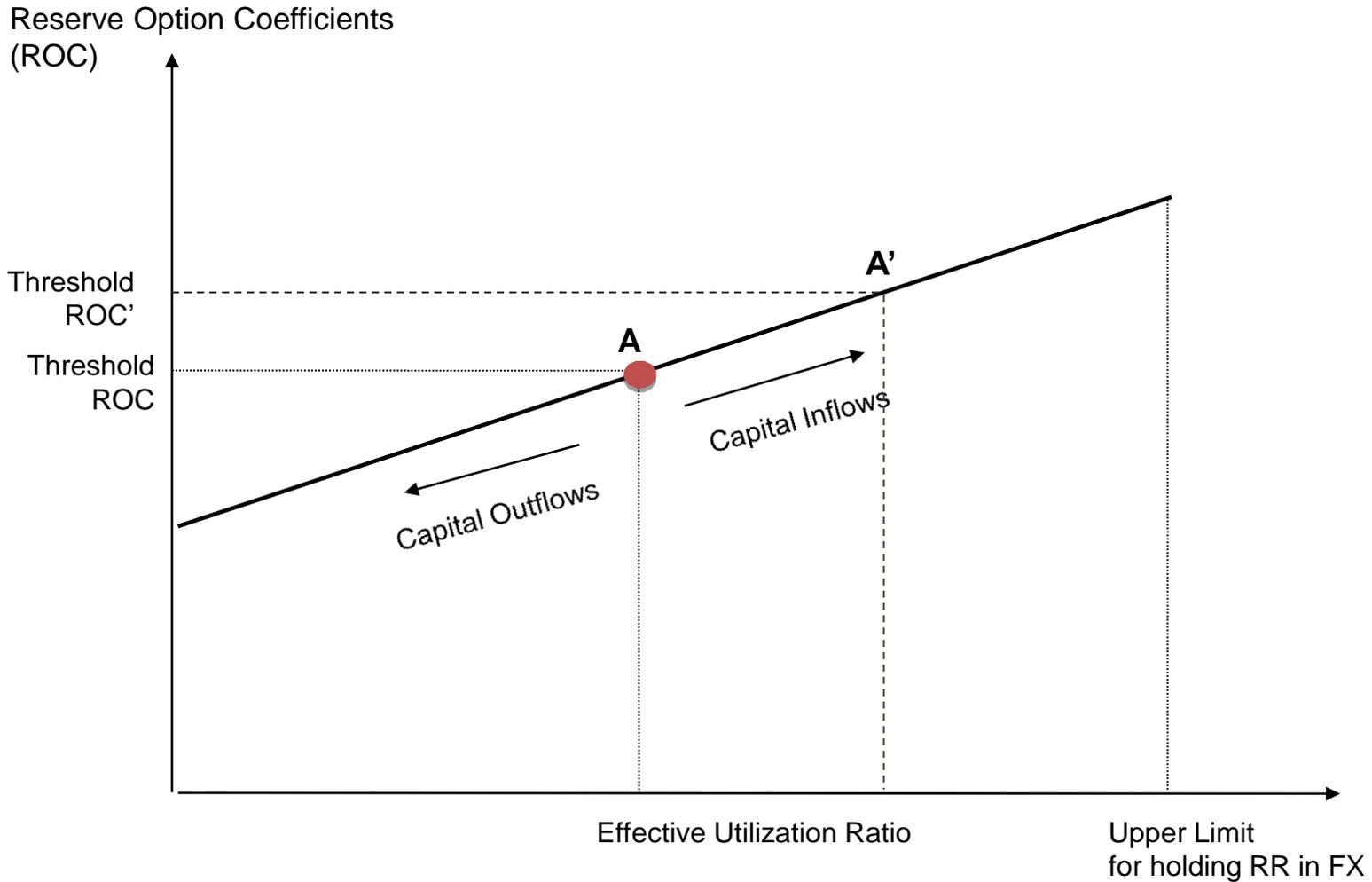
$e_t$ : spot exchange rate at the beginning of the maintenance period

$E(e_{t+1})$ : expected exchange rate for the end of the maint. period.

# Reserve Option Mechanism: Automatic Stabilizer

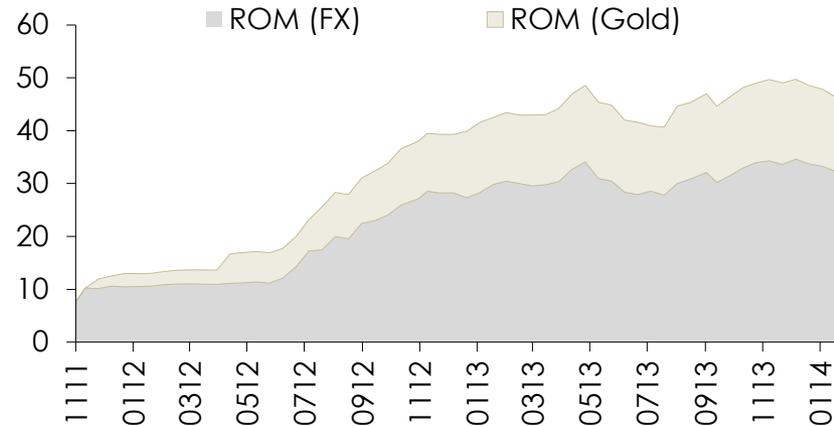
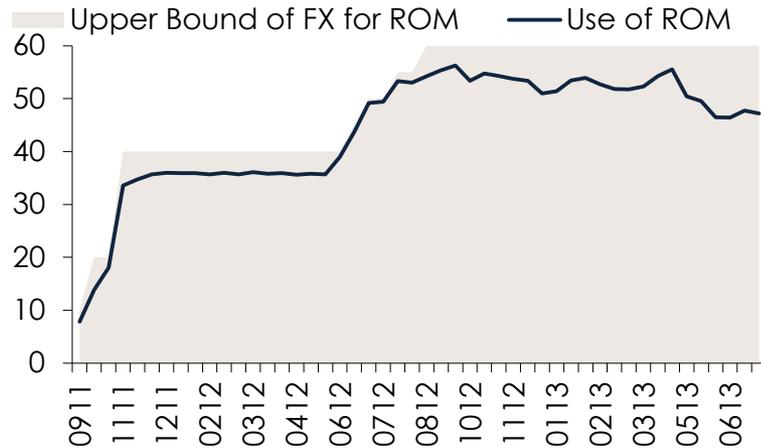


# Reserve Option Mechanism: Automatic Stabilizer

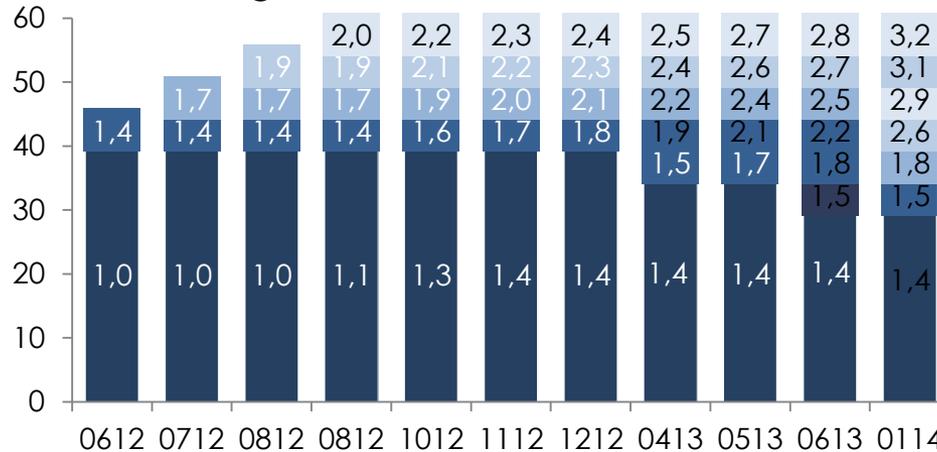


# Reserve Option Mechanism

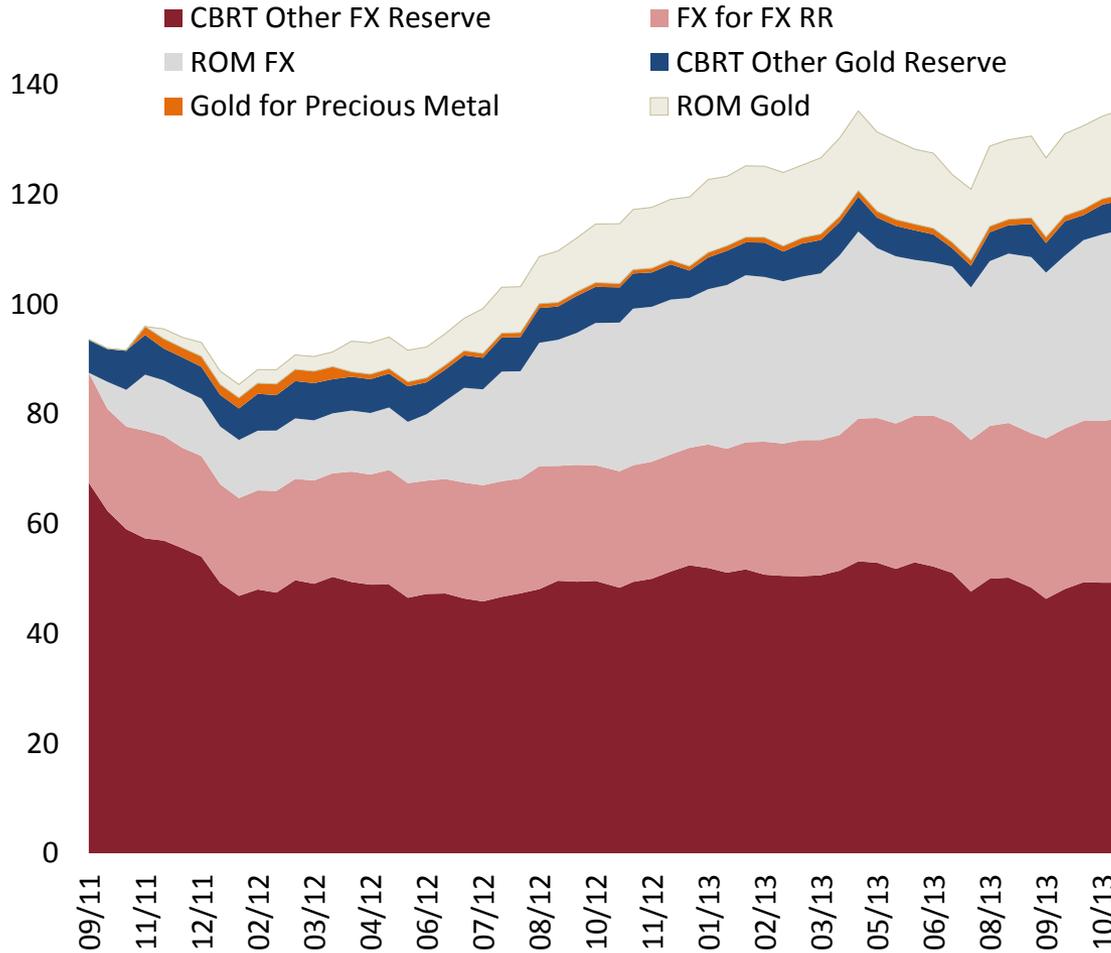
- Banks have used the mechanism intensively.



- CBRT has changed the ROC schedule and modified the trenches to ensure that the mechanism is flexible enough to work as an automatic stabilizer.



# Central Bank Reserves (Billion \$)



Source: CBRT.

	FX Sales (Billion \$)
June 2013	1.70
July 2013	5.15
August 2013	1.95
September 2013	1.86
October 2013	0.84
November 2013*	0.94

	Amount (Billion \$)
ROM FX	34.3
FX Required Reserves	29.9
<b>Total</b>	<b>64.2</b>

\*Last Observations: For Reserves November 08, 2013  
and for FX Sales November 18, 2013.

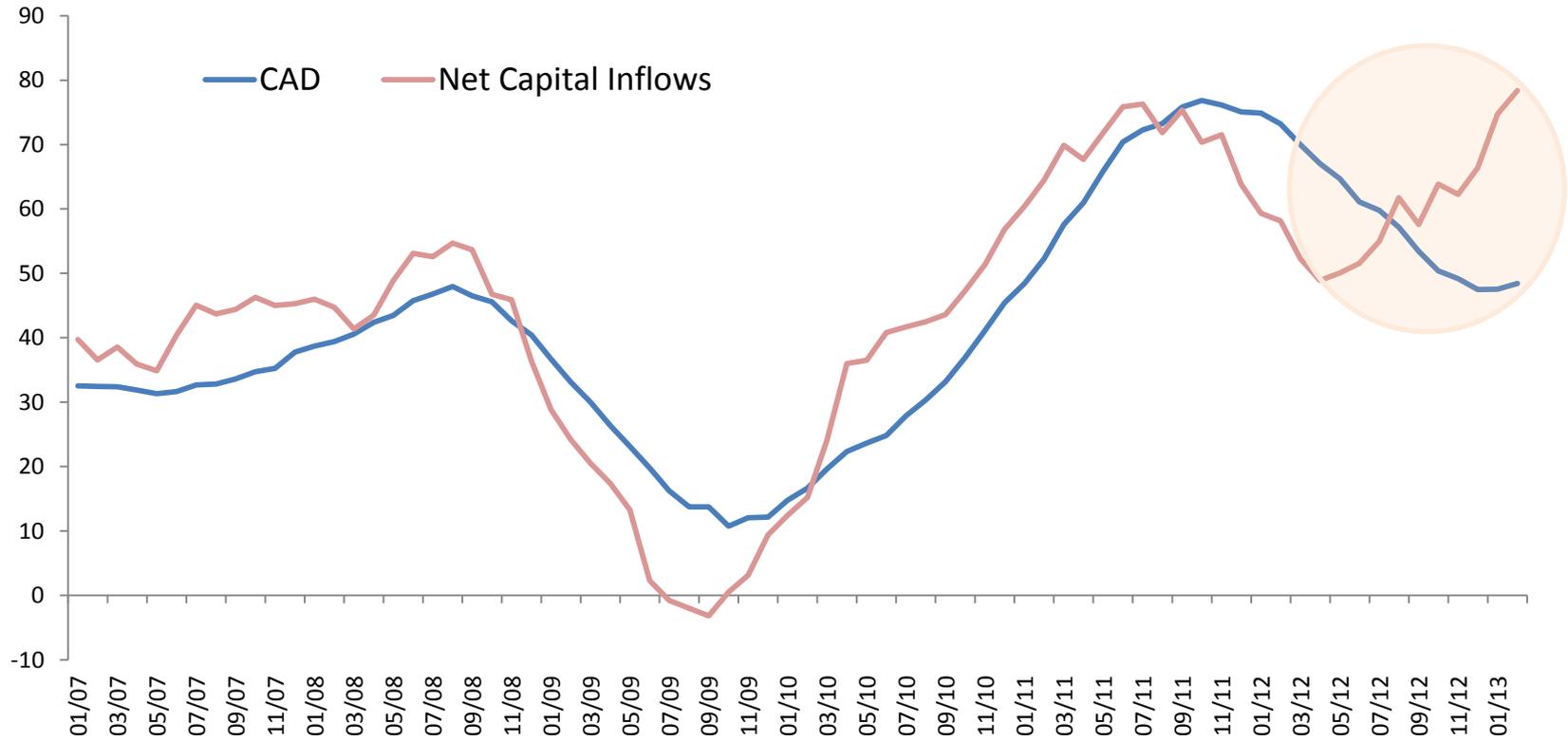
# Benefits of ROM

- Automatic stabilizer: dampens the impact of capital flow volatility on domestic macroeconomic variables
- Weakens the adverse feedback loop between capital flows, exchange rate, and bank lending
- Helps to build up reserves
- Less sterilization costs than FX intervention
- Market friendly and efficient mechanism

**Have new instruments weakened the impact of capital flows to domestic macroeconomic variables?**

# Current Account and Capital Flows

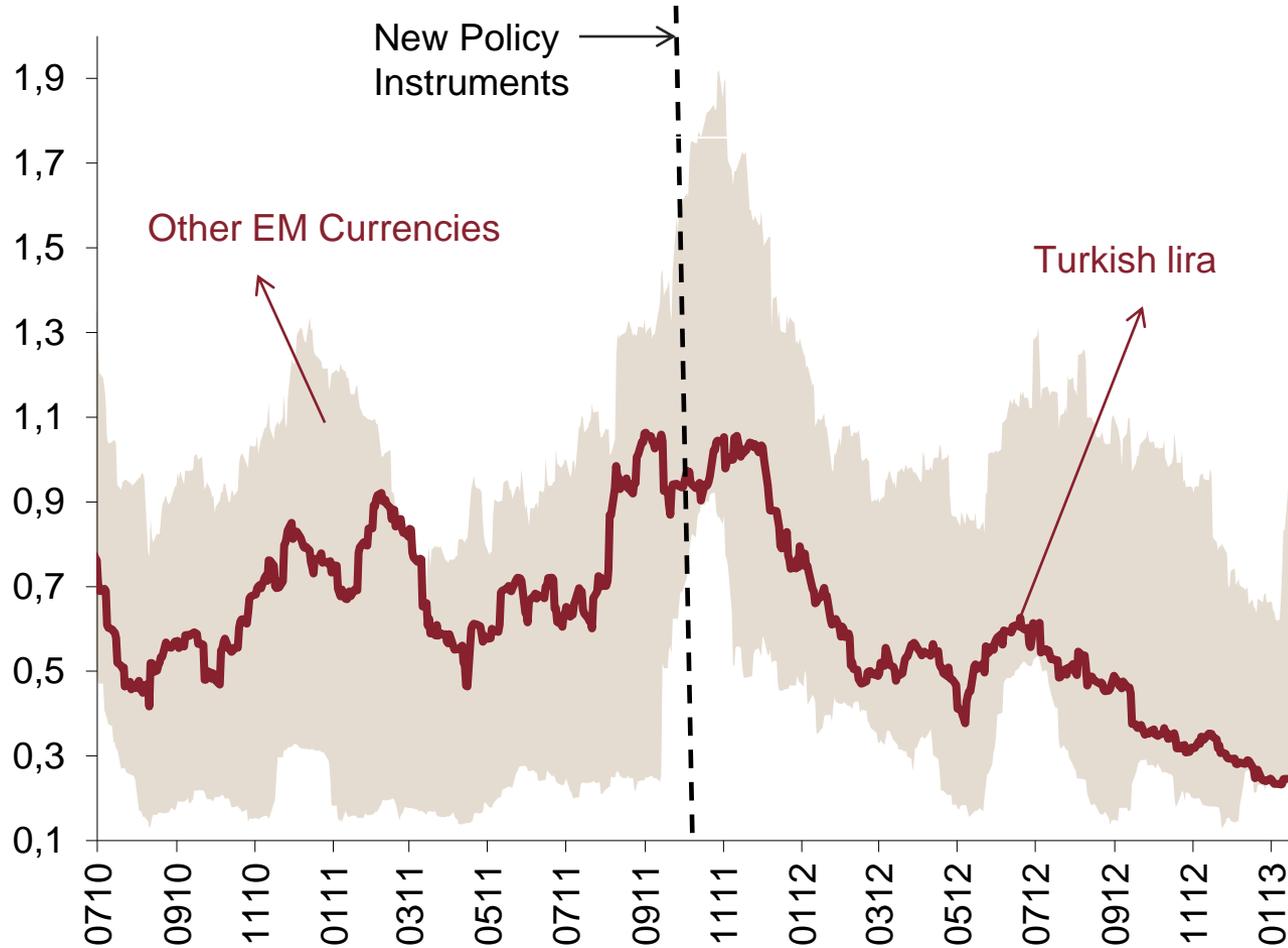
## Current Account Deficit and Net Capital Inflows (12 Month Cumulative, Billion USD)



Source: CBRT.

Last Observation: February 2013.

# Volatility of the Turkish lira and other EM currencies against USD (30 days moving average)



\* Countries with current account deficits are Brazil, Chile, Columbia, Czech Republic, Hungary, Indonesia, Mexico, Poland, Romania, South Africa, and Turkey.

# Cross-Country Empirical Evidence

**Question:** Does gross private portfolio flows to Turkey have become less sensitive to global factors after the new policy framework?

Kilinc, Fendoglu, Yorukoglu (2014)

➤ **Methodology:**

- Panel fixed-effects regression.
- 46 countries, 2004Q1- 2012Q4.
- Data Source: IMF, WB, BIS, Fed Board.

➤ **Panel Regression**

$$\begin{aligned} \Delta \text{Gross Portfolio Inflows}_{it} = & \\ & \alpha_i + \gamma * (\text{VIX}_{t-1}, \Delta \text{VIX}_t, \text{control variables}_{it-1}) + \\ & + \beta_1 (\Delta \text{VIX}_t) \\ & + \beta_2 (\Delta \text{VIX}_t) * D_{2010} \\ & + \beta_3 (\Delta \text{VIX}_t) * \text{Turkey} \\ & + \beta_4 (\Delta \text{VIX}_t) * \text{Turkey} * D_{2010} + \varepsilon_{it} \end{aligned}$$

where  $D_{2010} = 1$ ; 2010Q4 onwards, and 0 else.

# Cross-Country Empirical Evidence

## Determinants of Portfolio Flows and Effectiveness of Macroprudential Policies in Turkey

### Dependent Variable: Portfolio flows/GDP

Coef.	Independent Variables	(1)	(2)	(3)	(4)
$\beta_1$	$VIX_{t-1}$	0.0035	0.004	0.004	0.004
$\beta_2$	$\Delta VIX_{t-1}$	<b>-0.014*</b>	<b>-0.016**</b>	<b>-0.016**</b>	<b>-0.016**</b>
$\beta_3$	$\Delta US M2_t$	0.0457	0.143	0.144	0.146
$\beta_4$	$\Delta RER_{it}$	-0.017	-0.016	-0.015	-0.014
$\beta_5$	$\Delta GDP_{it}$	0.053	0.065	0.066	0.066
$\beta_6$	$\Delta Debt/GDP_{it-1}$	<b>-0.390**</b>	<b>-0.375**</b>	<b>-0.374**</b>	<b>-0.374**</b>
$\delta_1$	$VIX_{t-1} * 2010$		<b>-0.002**</b>	<b>-0.002**</b>	<b>-0.002**</b>
$\delta_2$	$\Delta VIX_t * 2010$		-0.004	-0.004	-0.005
$\delta_3$	$VIX_{t-1} * TR$			<b>0.015**</b>	<b>0.012*</b>
$\delta_4$	$\Delta VIX_t * TR$			<b>-0.018**</b>	<b>-0.030**</b>
$\delta_5$	$VIX_{t-1} * 2010 * TR$				<b>0.025**</b>
$\delta_6$	$\Delta VIX_t * 2010 * TR$				<b>0.013**</b>
$\delta_0$	$2010 * TR$				<b>-0.072**</b>
$\beta_0$	Constant	0.012	0.008	0.008	0.008
	Number of Obs.	1425	1425	1425	1425
	Within R <sup>2</sup>	0.115	0.118	0.119	0.119
	Number of Countries	44	44	44	44
	Fixed Effects	Yes	Yes	Yes	Yes

**1- Higher  $\Delta VIX$  or Higher  $\Delta Debt/GDP$**

**lower portfolio flows (%GDP)**

# Cross-Country Empirical Evidence

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2- After 2010Q4, the flows are more sensitive to fluctuations in int'l risk appetite.

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$\delta_5$	$VIX_{t-1} * 2010 * TR$		<b>3- While portfolio flows to other economies, on average, are affected negatively after 2010Q4 due to fluctuations in int'l risk appetite, flows to Turkey have been affected positively.</b>		<b>0.025**</b>
$\delta_6$	$\Delta VIX_{t-1} * 2010 * TR$				<b>0.013**</b>
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$\delta_5$	$VIX_{t-1} * 2010 * TR$		<b>4- After 2010Q4, portfolio flows to Turkey has become, on average, less sensitive to fluctuations in int'l risk appetite compared to other economies.</b>		<b>0.025**</b>
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	Number of Countries	44	44	44	44
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- The global financial crisis has highlighted the need for augmenting existing policy frameworks, incorporating tools that aim to support/restore financial stability.
- CBRT's new policy framework includes cyclical (e.g. interest rate corridor) and structural tools (e.g. reserve option mechanism) for capital flow management.
- Cross-country empirical evidence suggests that portfolio flows to Turkey has become, on average, less sensitive to int'l risk factors after 2010Q4 compared to other economies.



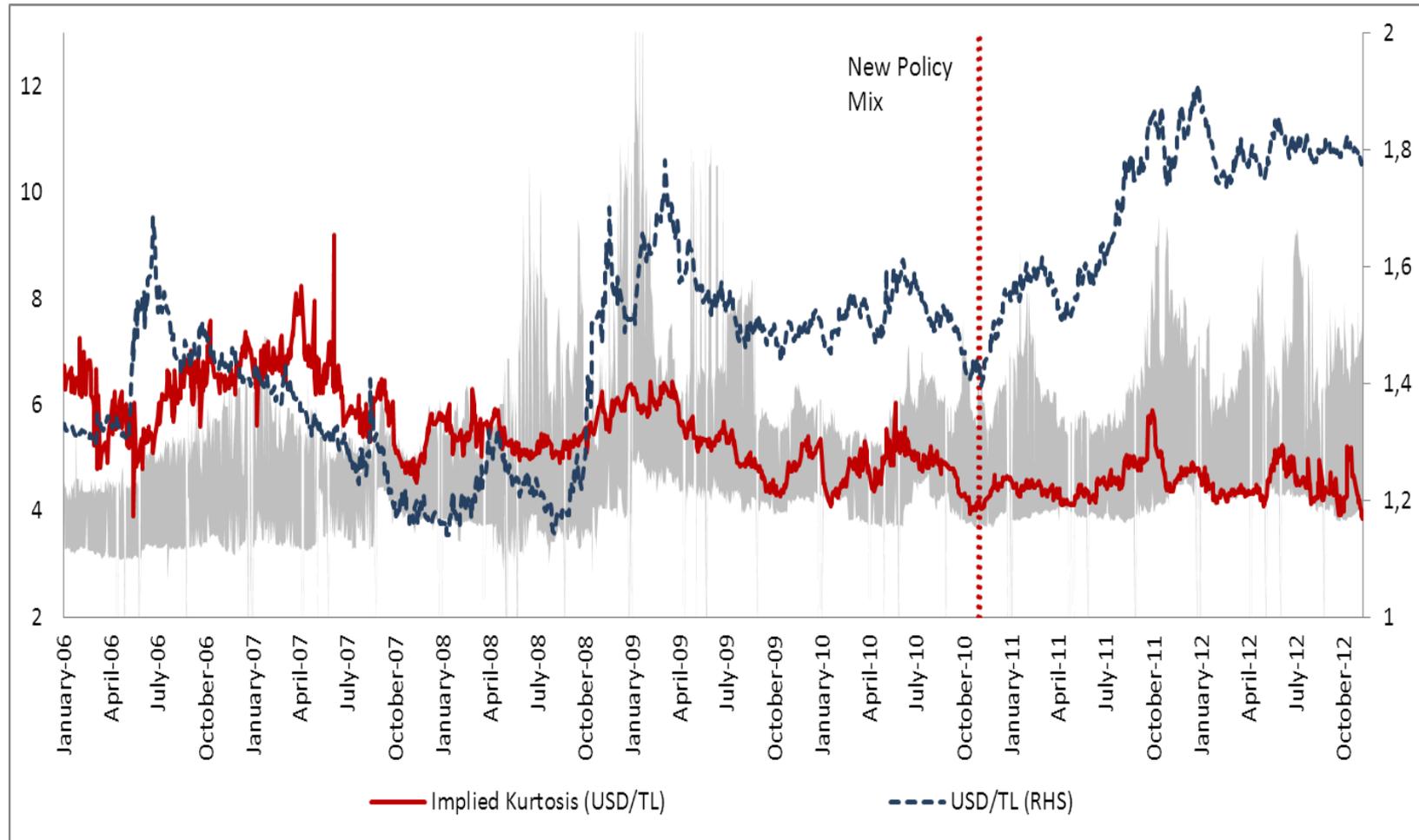
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**Thank you.**

**Mehmet Yörükođlu  
Central Bank of Turkey**

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# Curtosis of the Implied Distribution of Turkish lira and other EM Currencies against USD (30 days moving average)



\* The shaded area denotes the maximum and minimum of the Kurtosis of FX expectations for 10 emerging economies with current account deficits. Source: Değerli and Fendoğlu (2013)