Internal balance assessment: Financial and monetary conditions

Macroeconomic Analysis Course

Prepared for Capital Alliance, Sri Lanka

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Macroeconomic assessment roadmap

Objectives

- Understand why central banks monitor financial (monetary) conditions
- Understand where the monitoring sits in terms of overall macroeconomic assessment
- Strengthen essential skills for experts monitoring these sectors
- Learn basic tools for monitoring the financial and money markets

Outline

1. Setting the scene
2. Key data
3. Key economic concepts
4. Key measurement techniques

Setting the scene

Why do central banks employ experts to monitor developments in financial markets conditions?

What information are the sector experts expected to provide to policymakers?

What signals should they look for in the data?

Why do central banks employ experts to monitor money and financial markets conditions?

Central banks need to monitor

- health of the financial sector (long term)
- health of the transmission mechanism (short, medium term)
- are the financial conditions supportive of macroeconomic stability? (now, short term)

What information are the sector experts expected to provide to policymakers?

- How are the conditions tracking relative to central bank's previous expectations?
- How are the conditions tracking relative to a benchmark? Are they loose, tight, or just right?
- What are the drivers of the misalignments, and the medium-term outlook for them?
- What are the implications for the monetary policy stance?

What signals should they look for in the data?

- Changes in the long-term trends in nominal and real interest rates
- Changes in the size of the real interest rates gap
- Changes in interest rate spreads (risk premia)

- Why? Where does the monitoring sit in the overall macroeconomic assessment?

Key data

Short-term and long-term interest rates on risk-free financial assets, yield curves

Deposit, term-deposit, corporate loan rates

Credit growth and monetary growth

(Interest rate spreads, loan officers survey, credit rating)

Risk-free financial assets

- Financial assets of institutions that have a low probability of defaulting on their financial obligations
- Typically governments
- T-bills – financial assets with maturities shorter than a year – used to finance government short-term cashflow needs (liquidity management)
- Bonds – financial assets with maturities one year and longer – used to finance government debt

- The expectation is that their prices are determined by mainly fundamental factors and less by risk and other considerations

Questions

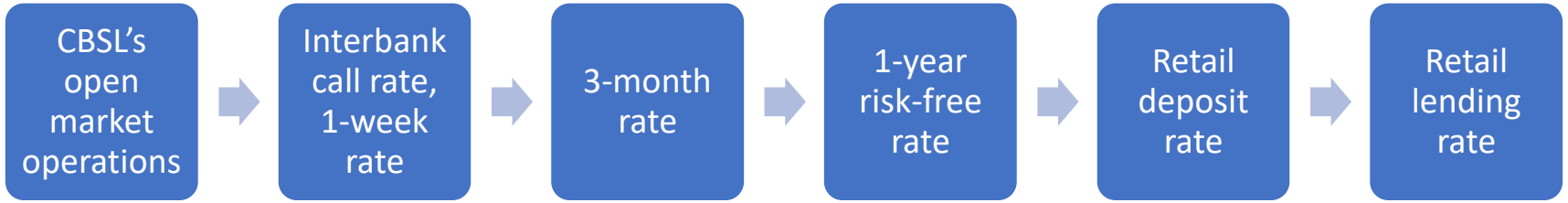
What is the term structure and liquidity of bills and bonds that the Sri Lankan government issues?

Does the CBSL issue its own papers? What is their maturity?

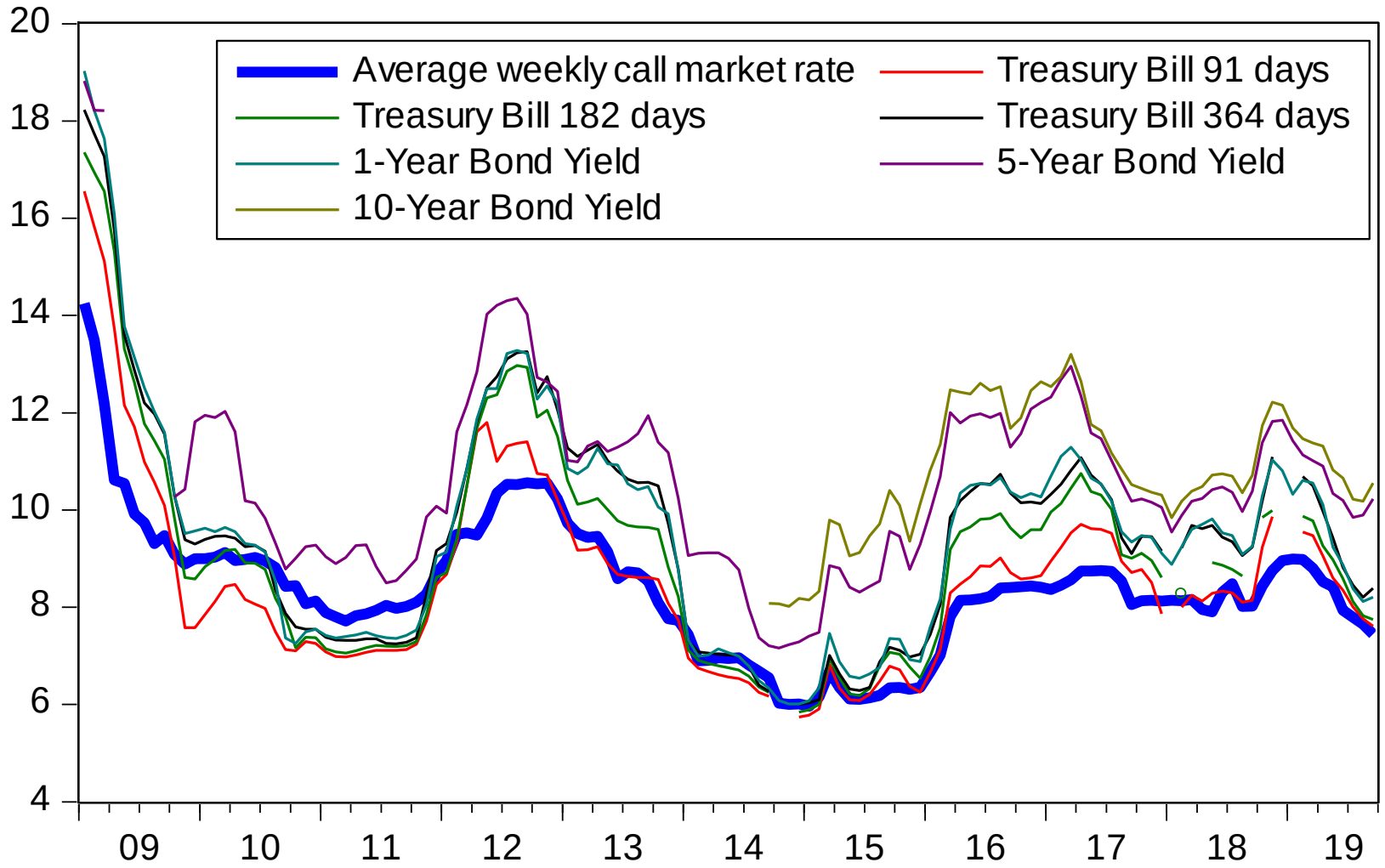
What is the frequency of CBSL's OMOs?

Interest rate "cascade": Monetary policy transmission mechanism through market interest rates

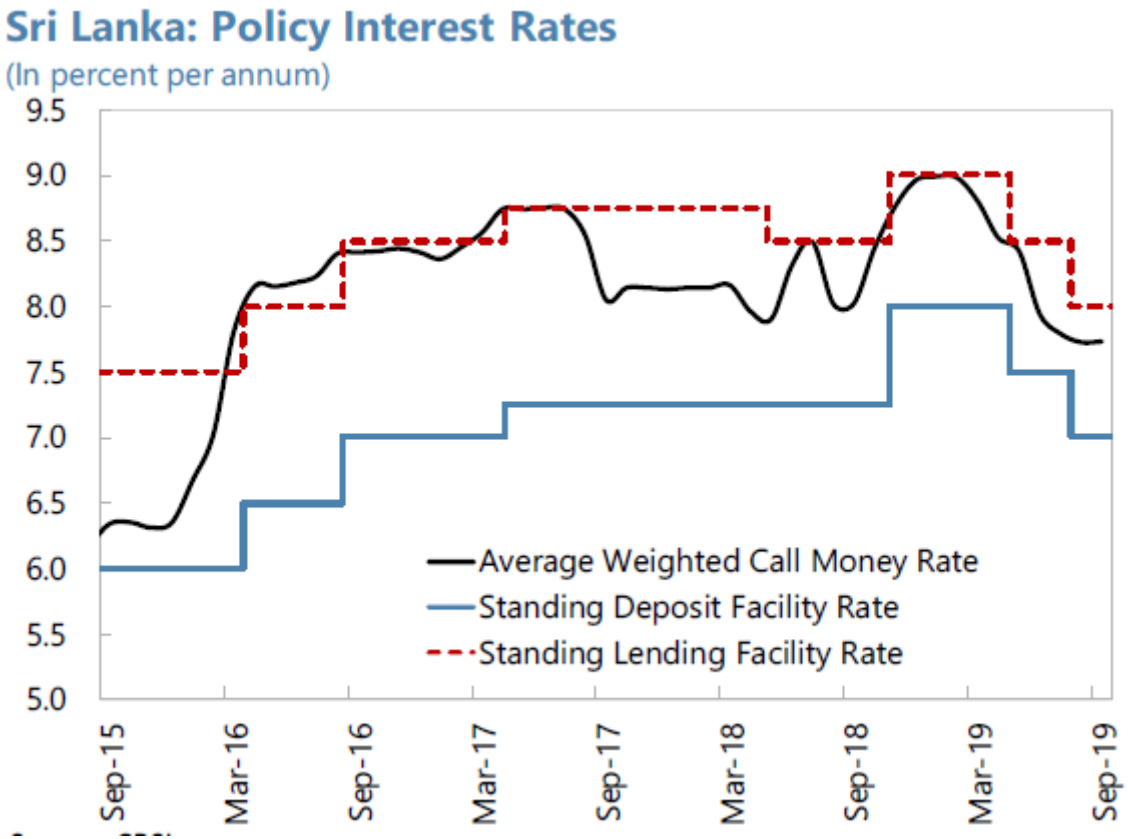
- If financial markets are liquid, and well connected, then financial arbitrage will lead to transmission of monetary policy signals all the way through to firms and households
- The following causal relationship will holds



Interest rate “cascade” in Sri Lanka

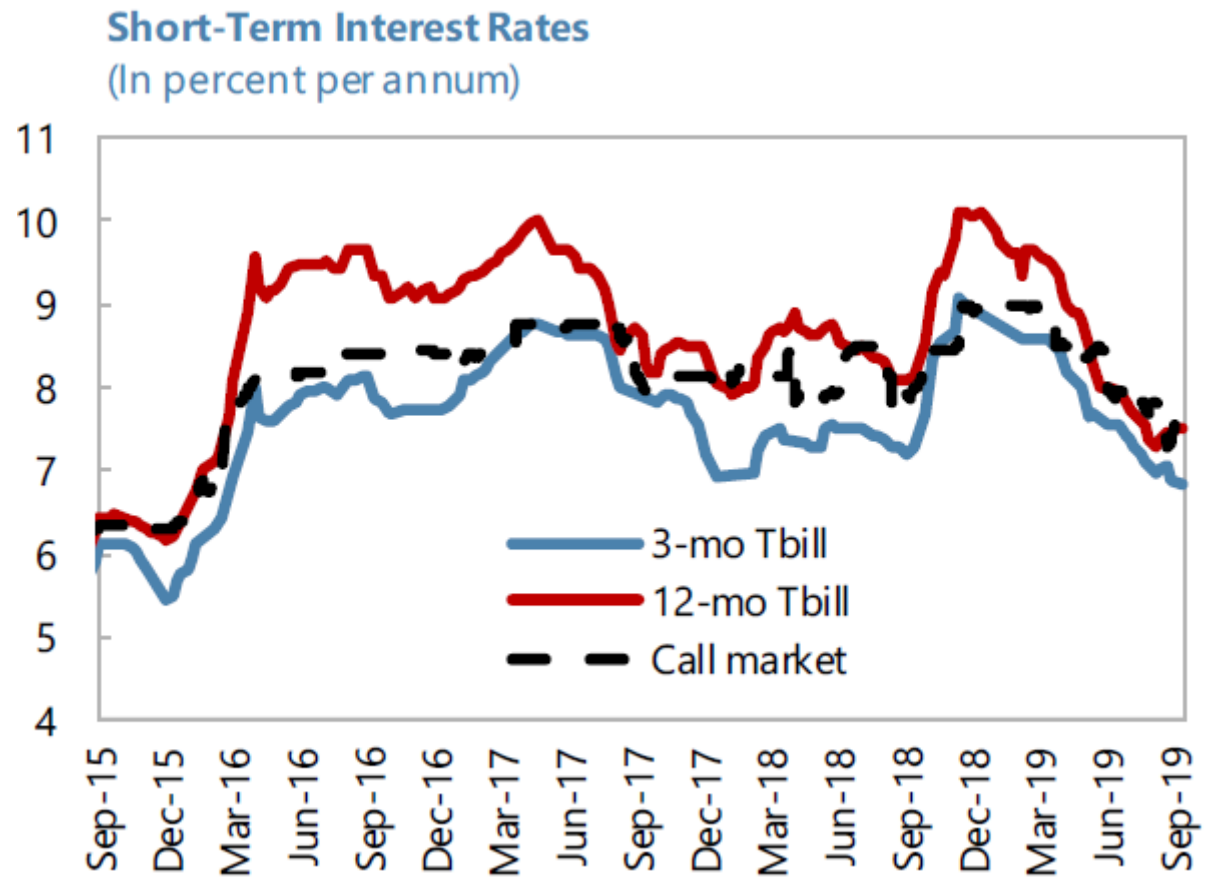


Interbank rates are anchored by the CBSL's interest rate corridor



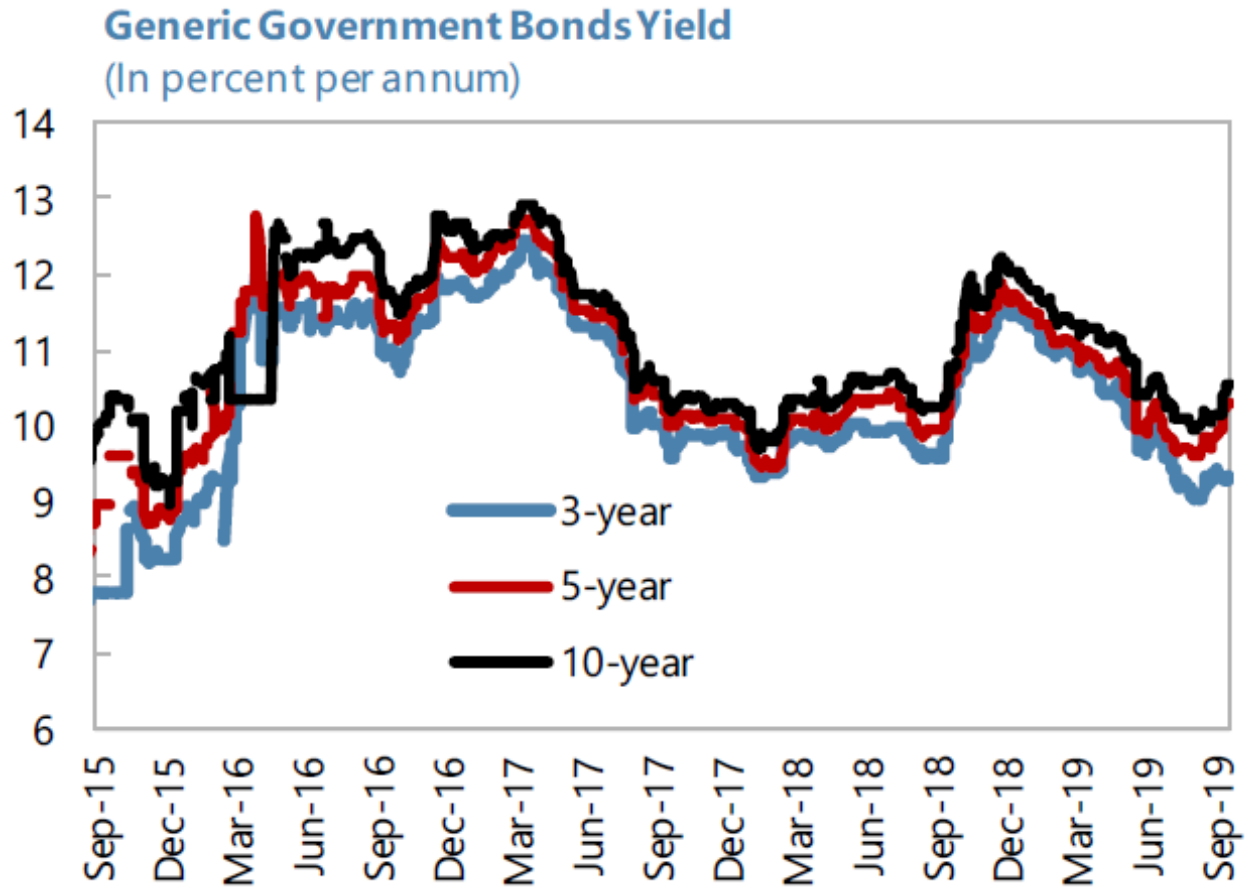
Source: CBSL

Short-term (risk-free) interest rates follow money market rates…



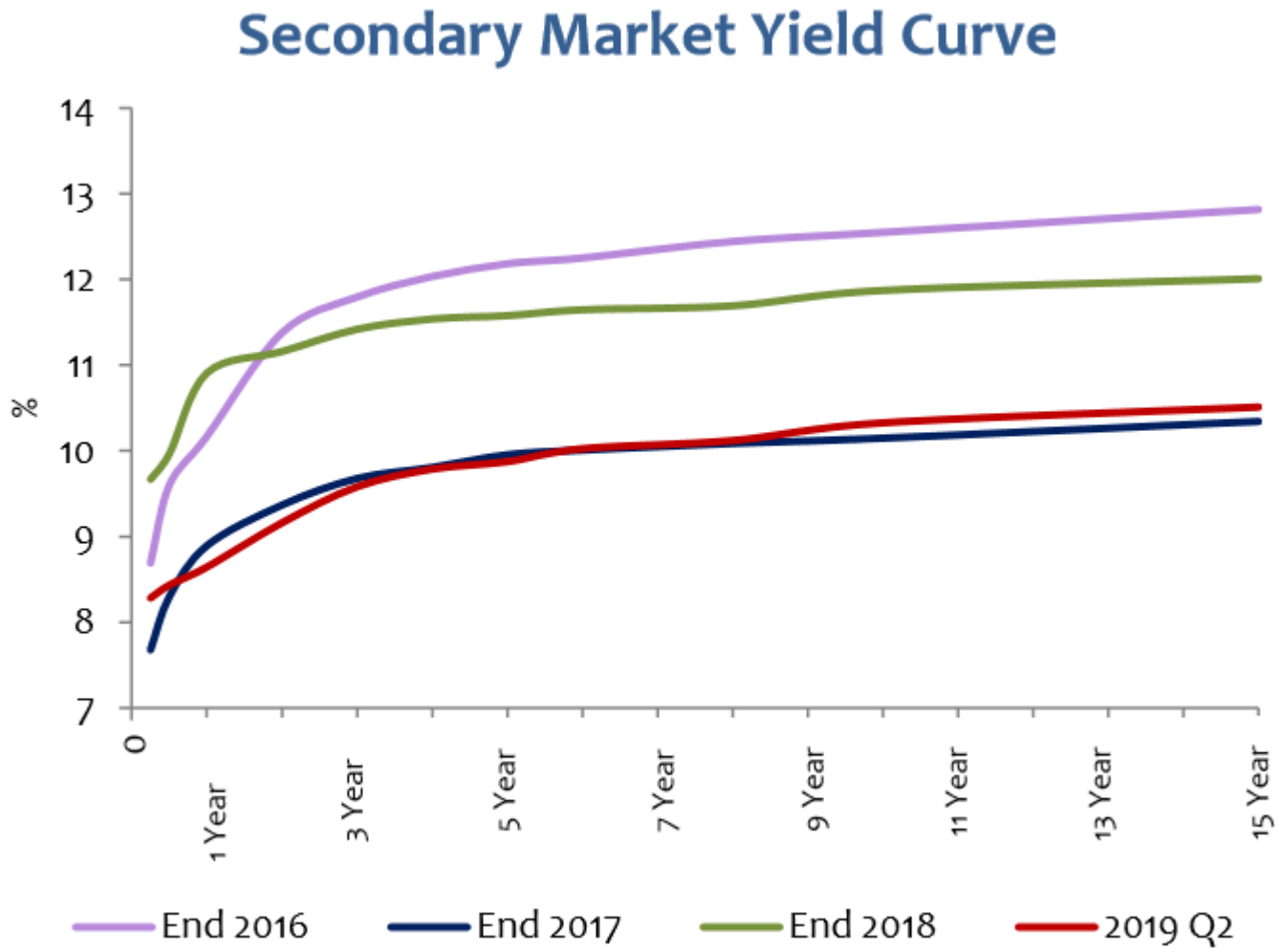
Source: CBSL

… long-term rates follow the short rates and expectations about the future path of short rates (and term premia)



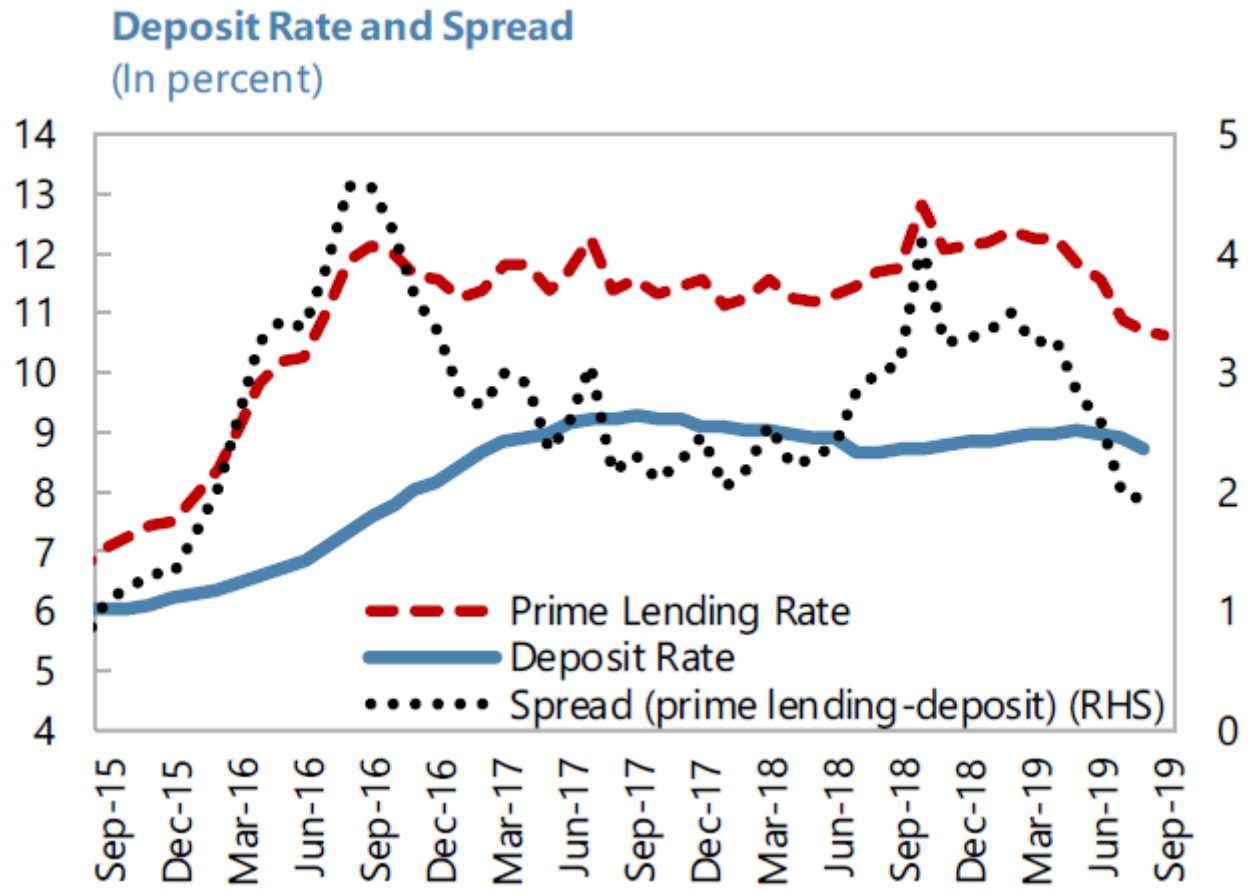
Source: CBSL

Without CBSL's clear forward guidance on future policy stance, market tend to price in increasing interest rates



Source: CBSL

Passthrough of money market rates to deposit and lending rates



Source: CBSL

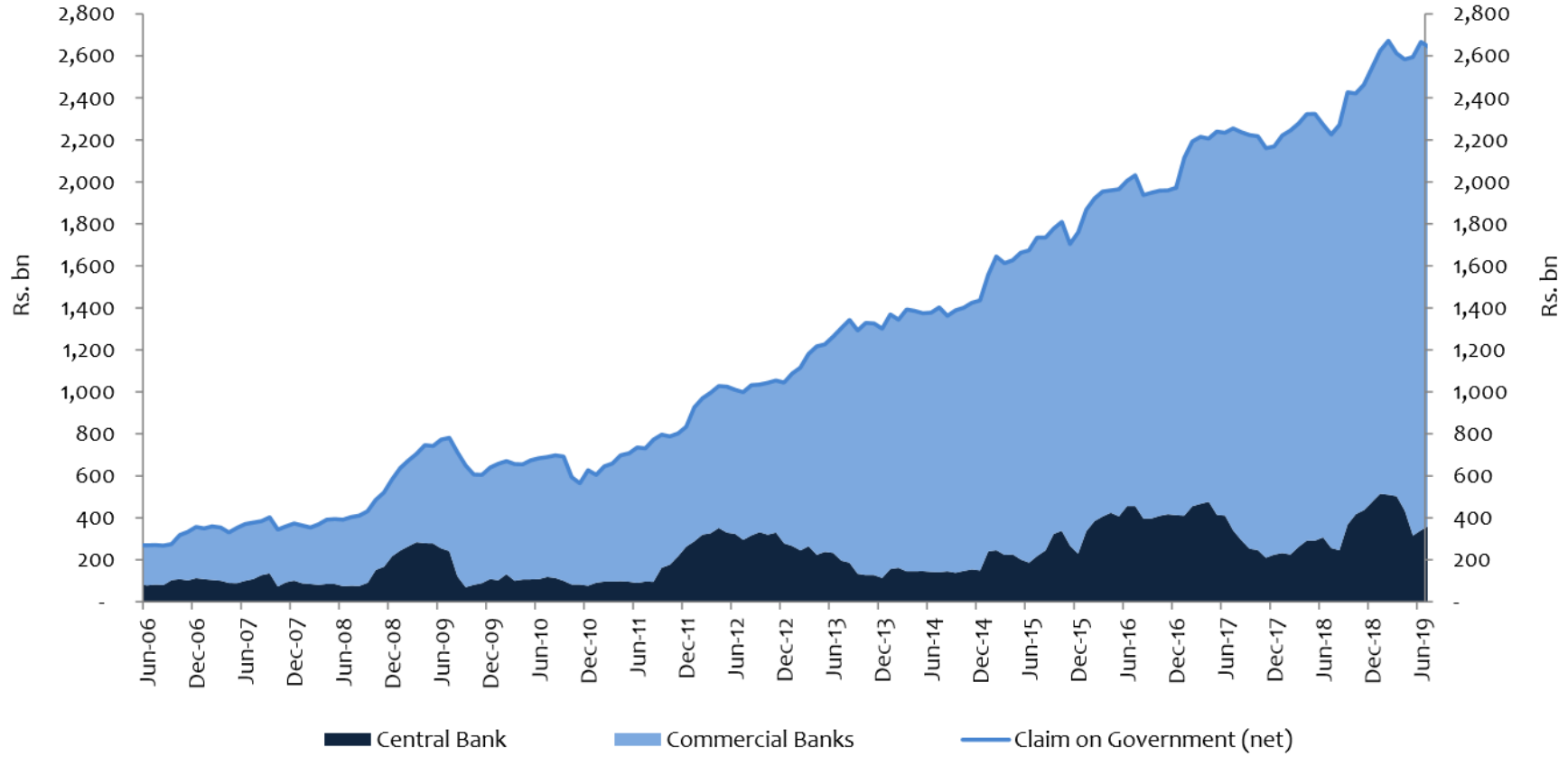
Note on market liquidity

- Through its OMO, CBSL has all it needs to steer the market liquidity in such a way that the call rates stay at policy targets set by the MPC

- CBSL can affect the interbank market liquidity in undesirable way (complicate its OMOs, and costs of monetary policy implementation) if

  - it directly finances government
  - unsterilized forex market intervention

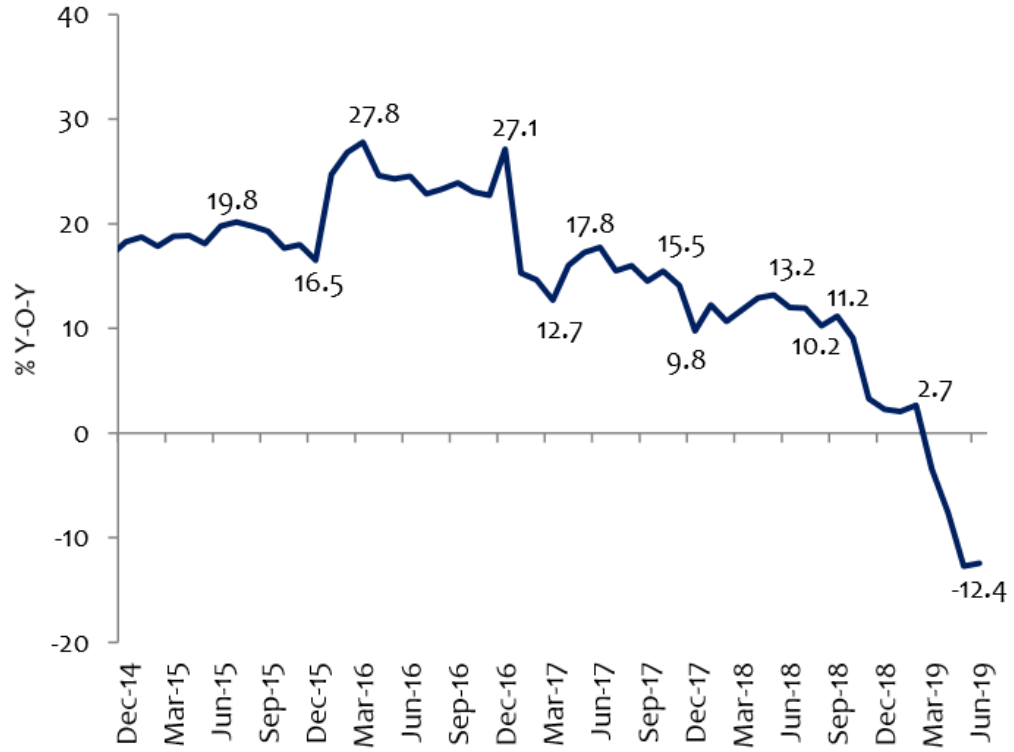
Net lending to the government



Source: CBSL

Monetary growth is another useful indicator of monetary conditions and the transmission of monetary policy

Reserve money

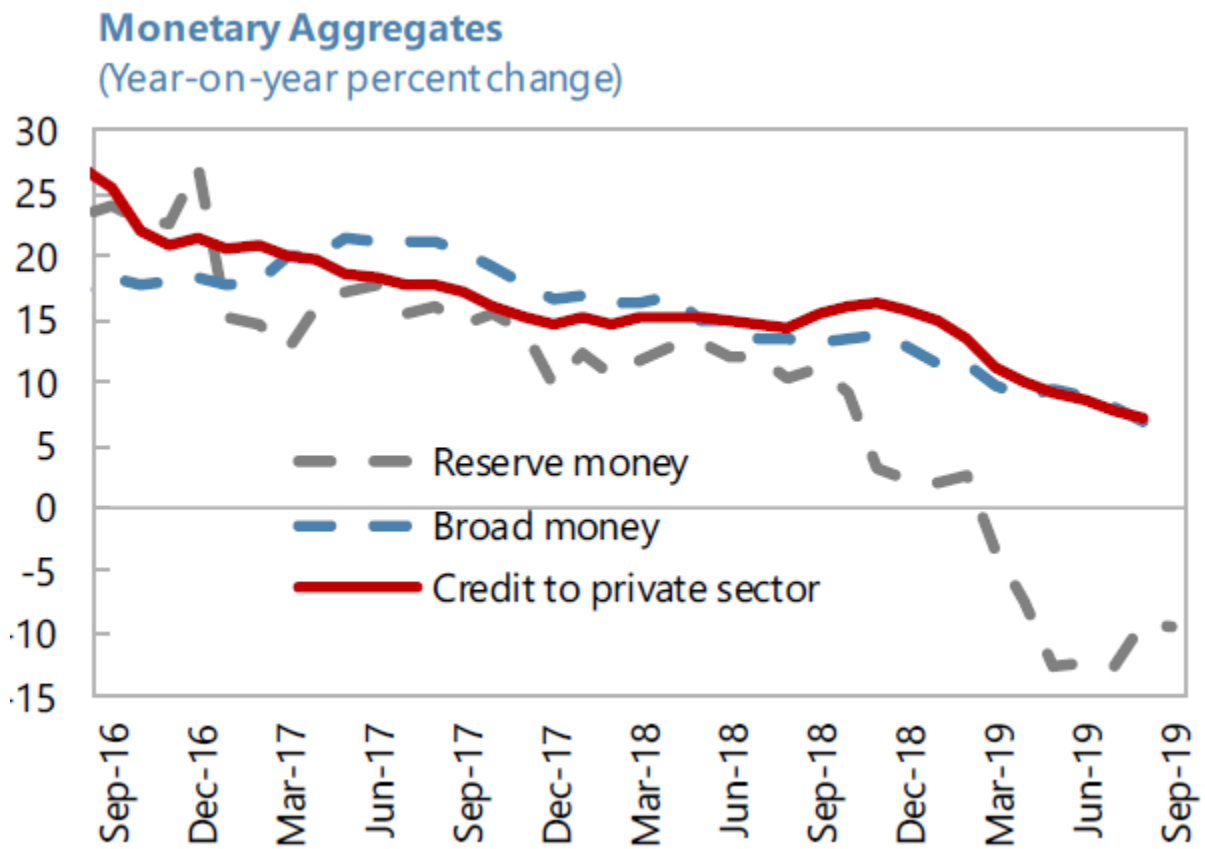


Source: CBSL

Broad money M2b

Source: CBSL

When changing monetary policy stance, central banks like to see that the credit flow to the private sector appropriately responds

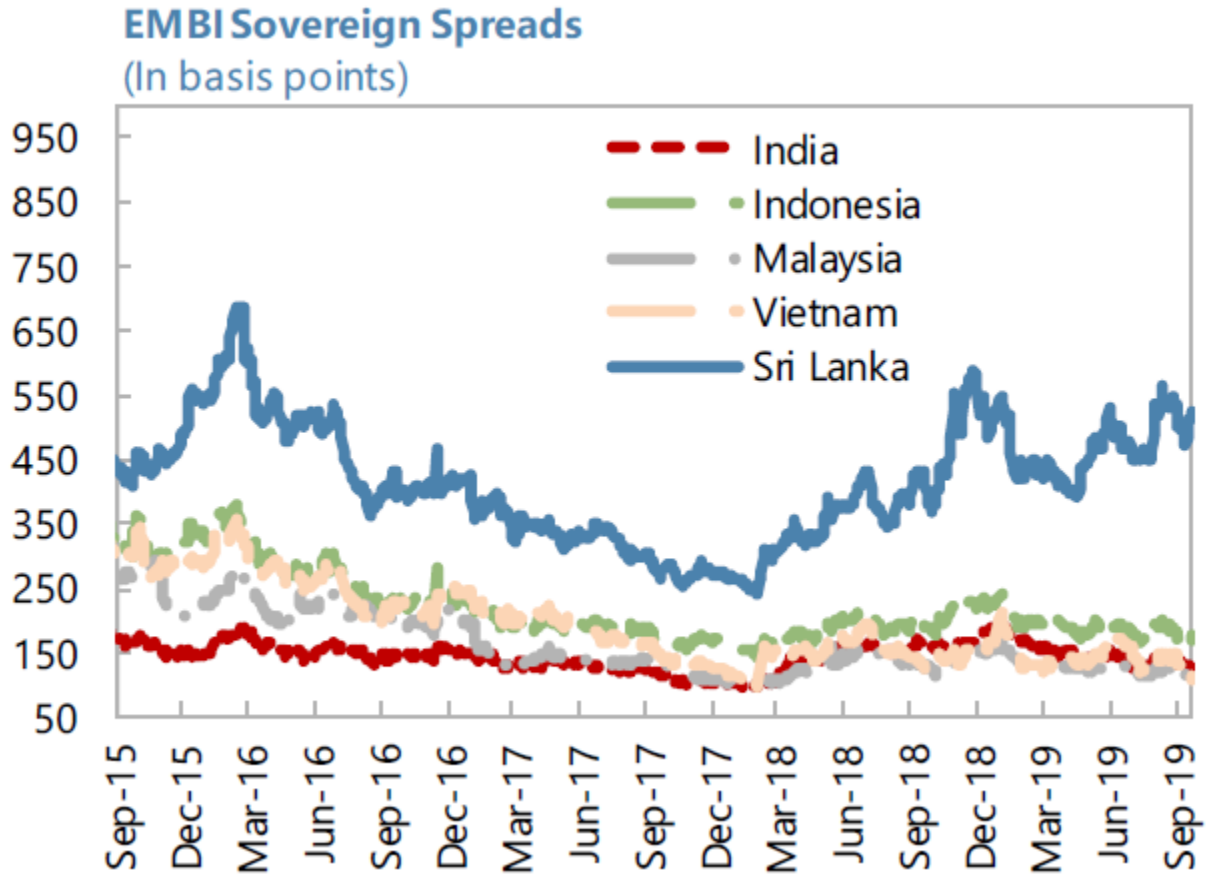


Source: CBSL

Credit rating
(used by sovereign wealth funds, pension funds and other investors to gauge the credit worthiness of Sri Lanka thus having a big impact on the country's borrowing costs)

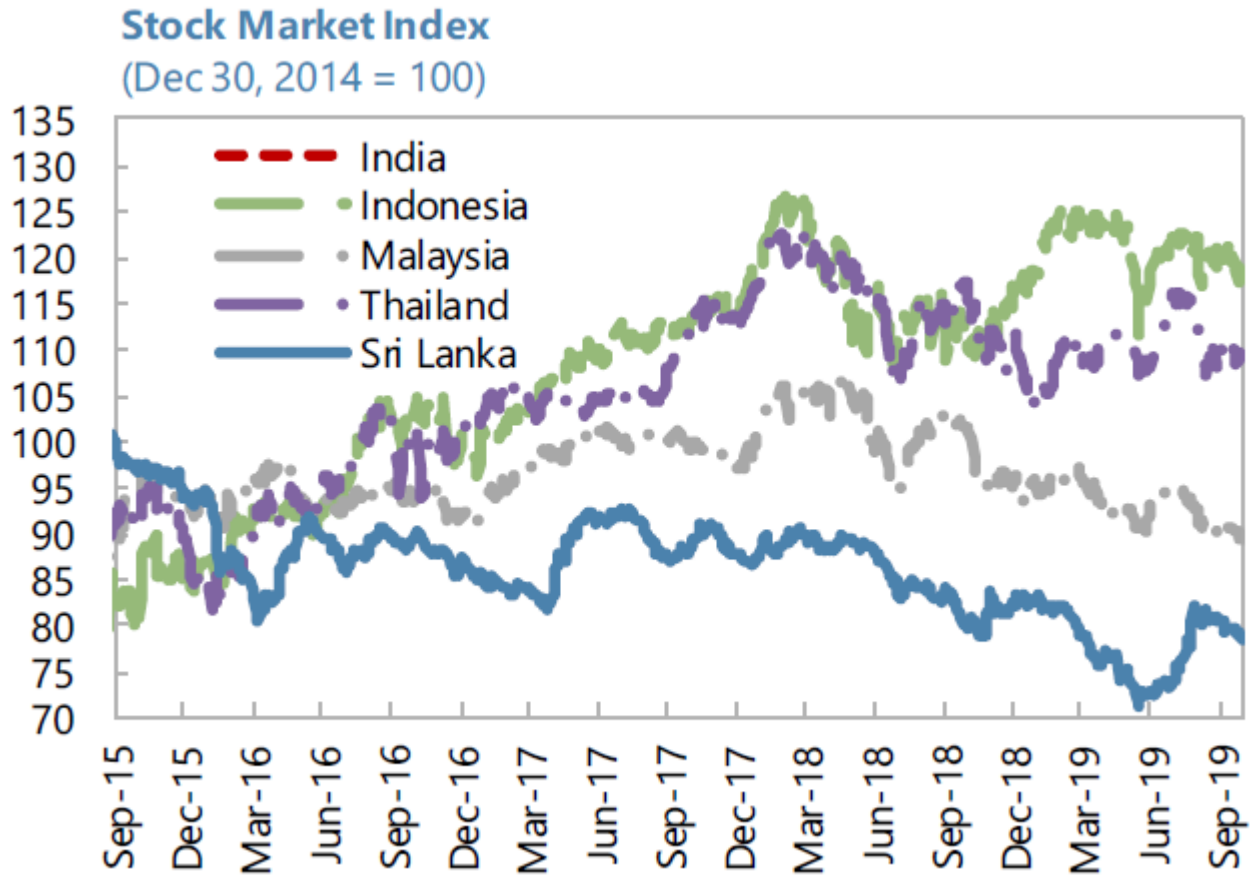
Agency	Rating	Outlook	Date
Fitch	**B**	negative	Dec 18 2019
S&P	**B**	stable	Dec 04 2018
Fitch	**B**	stable	Dec 03 2018
Moody's	**B2**	stable	Nov 20 2018

Sovereign bond spreads



Source: Bloomberg, IMF

Stock market – its relevance for overall financial conditions depends on the size of annual IPOs and its capitalization. It's a useful leading indicator of economic activity.



Source: Bloomberg, IMF

Key economic concepts

Interest rate “cascade” (monetary policy transmission in financial markets), and effective interest rate

Effective interest rate and real activity (aggregate demand)

Real interest rate (level, trend), and real interest rate gap (monetary policy stance)

Interest rate spreads (between domestic and foreign interest rates; UIP)

Effective interest rate

- There are many interest rates we can look at.
- Which one is the most important or relevant?

- Macroeconomists look at the “effective” interest rate
- Effective interest rate is the interest rate that is the closely linked to real economic activity

Real (effective) interest rate and economic activity

In a New Keynesian model of economic cycles, aggregate demand (consumption-investment decisions) is sensitive to real interest rates:

$$\hat{y}_t = c_o E_t \hat{y}_{t+1} + (1 - c_0)\hat{y}_{t-1} - c_1(R_t - E_t\pi_{t+1} - \bar{r}_t) + \varepsilon_t^{AD}$$

where $\hat{y}_t$ is the output gap, R_t is the short-term nominal interest rate, $E_t\pi_{t+1}$ is the expected future inflation rate, $\bar{r}$ is the long-term real interest rate, ε_t^{AD} is the aggregate demand shock.

Real interest rate: level, trend, gap

- Fischer relationship defines the real (*ex ante*) interest rate

$$r_t = R_t - E_t\pi_{t+1}$$

- Real interest rate long-term trend: $\bar{r}_t$
- Real interest rate gap: measures the absolute difference between the level and trend real interest rate: $\hat{r}_t = r_t - \bar{r}_t$

Real interest rate gap

- If the gap is positive that means that financial conditions are tighter than usual, and they accelerate economic activity
- If the gap is negative that means that financial conditions are looser than usual, and they slow down economic activity
- The real interest rate gap is affected by the monetary policy stance (more in lecture and workshop 8)

Interest rate spreads and exchange rate

- Uncovered interest rate parity:

$$E_t \Delta s_{t+1} = i_t - i_t^* - prem_t$$

- Positive interest rate differential ($i_t > i_t^*$), pressures on Dong appreciation in the near term (portfolio investment inflow), and expected depreciation in the future (future portfolio investment outflow)

Forward guidance and yield curves

- Long-term yields are function of expected short–term interest rates

$$1 + R_t^{1Y} \approx (1 + R_t^{3M})(1 + E_t R_{t+1}^{3M})(1 + E_t R_{t+2}^{3M})(1 + E_t R_{t+3}^{3M})$$
$$(1 + prem_t^{term})(1 + prem_t^{risk})$$

- *Yield curve slope* signals market expectations about the direction of future short-term interest rate levels, and implicitly about economic activity
  - Positive slope: interest rates are expected to increase in the future, economy is booming
  - Negative slope: interest rates are expected to decline, economy is slowing

- Short-term rates, R_t^{3M}, are "controlled" by the central bank, thus a possible forward guidance gives the Bank a leverage to control both the short but also the long end of yield curve.

Basics of yield curve (cont.)

	Residual Maturity	Yield			ZC Price			Fx
		Last	Chg 1M	Chg 6M	Last	Chg 1M	Chg 6M	
	3 months	7.500%	+5.0 bp	-75.0 bp				
	6 months	8.100%	+45.0 bp	-35.0 bp				
	1 year	8.598%	+17.8 bp	+14.8 bp	92.08	-0.16 %	-0.14 %	
	2 years	8.838%	-5.2 bp	-21.2 bp	84.42	+0.09 %	+0.39 %	
	3 years	9.151%	-8.8 bp	-39.9 bp	76.90	+0.25 %	+1.10 %	
	4 years	9.482%	-27.6 bp	-21.8 bp	69.60	+1.00 %	+0.80 %	
	5 years	9.791%	-29.9 bp	-5.9 bp	62.69	+1.37 %	+0.27 %	
	6 years	9.861%	-34.0 bp	-28.9 bp	56.88	+1.88 %	+1.59 %	
	7 years	9.939%	-44.5 bp	-26.1 bp	51.52	+2.88 %	+1.68 %	
	8 years	9.988%	-34.1 bp	-23.2 bp	46.69	+2.50 %	+1.70 %	
	9 years	10.091%	-26.3 bp	-20.9 bp	42.10	+2.18 %	+1.74 %	
	10 years	10.253%	-31.5 bp	-9.7 bp	37.68	+2.89 %	+0.88 %	
	15 years	10.433%	-13.2 bp	-6.7 bp	22.57	+1.80 %	+0.94 %	

Source: Bloomberg

Note on finance and macroeconomics view on interest rate determinants

Finance tends to be agnostic about the fundamental value behind interest rates

For example, Vasicek model of interest rates is a single factor model:

$$r_t = (1-\rho)\bar{r} + \rho r_{t-1} + \epsilon_t$$

where r_t is the 3M risk-free nominal interest rate, $\bar{r}$>0 is the long-term mean of interest rate, ρ=(0,1) is the autoregressive parameter, and ϵ_t is the idiosyncratic innovation with zero mean and finite variance σ^2

Note on finance and macroeconomics view on interest rate determinants (cont.)

- Central banks "control" the short-term (3M) interest rate; it is it's operational target
- she sets its level to meet monetary policy objectives, given macroeconomic fundamentals
- the fundamental value is "prescribed" by a Taylor-type rule (see the lecture on monetary policy stance)

$$r_t = \rho r_{t-1} + (1-\rho)\left[\bar{r} + \omega_\pi (E_t \pi_{t+4} - \pi^{Target}) + \omega_y \hat{y}_t\right] + \epsilon_t$$

where r_t is the 3M risk-free nominal interest rate, $\bar{r}$>0 is the policy neutral nominal interest rate ($\bar{r} = \overline{rr} + \pi^{Target}$), $E_t \pi_{t+4}$ is the one-year-ahead inflation forecast, π^{Target} is the policy objective, $\hat{y}_t$ is the output gap, ρ=(0,1) is the policy autoregressive parameter, $\omega_\pi > 1$ is the policy response to expected inflation deviation from the objective, $\omega_y \geq 0$ is the policy response to business cycle, and ϵ_t is the idiosyncratic innovation with zero mean and finite variance σ^2

Key measurement techniques

Long-term real interest rate

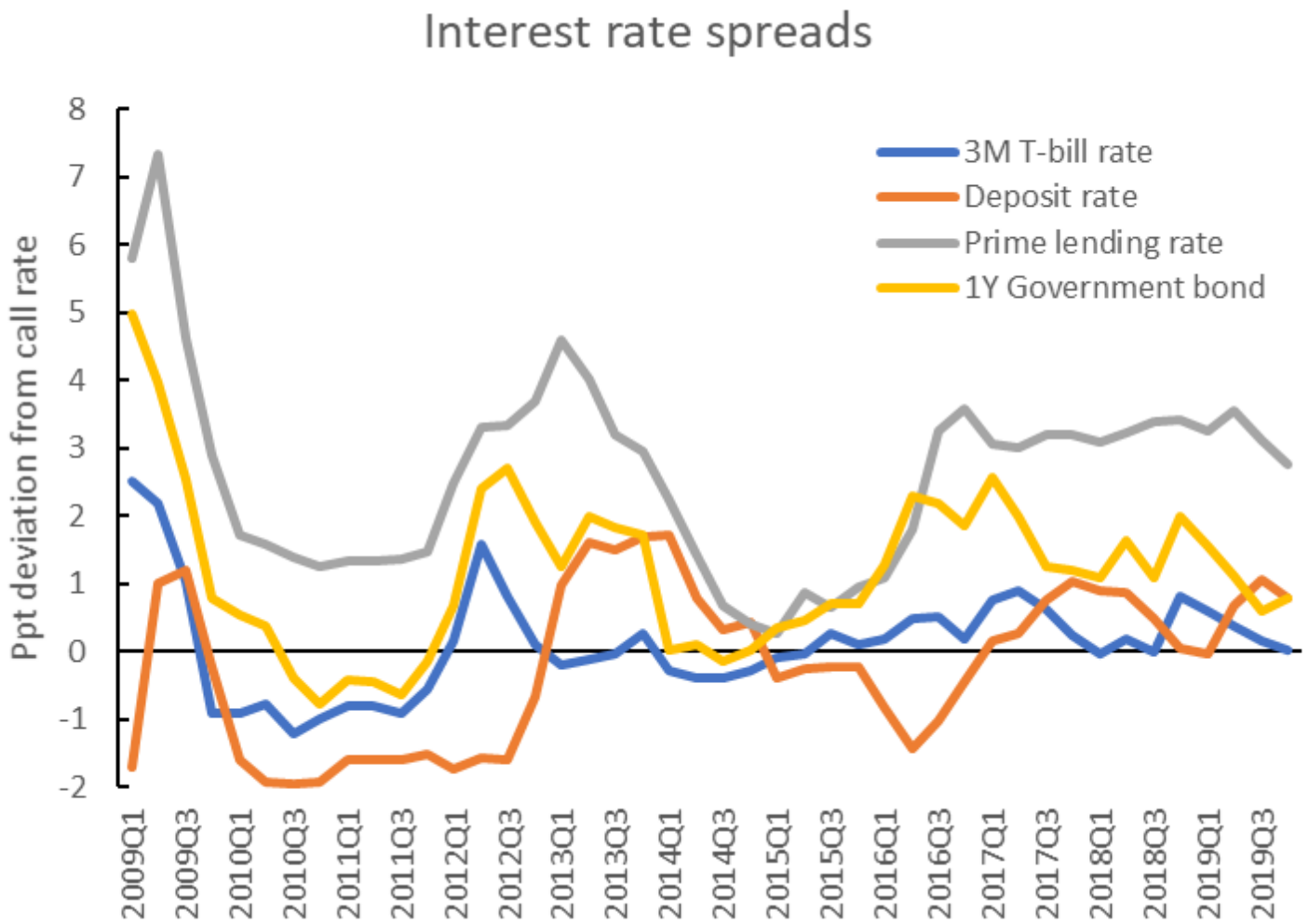
Stability of interest rate transmission mechanism (interest rate cascade)

- We need to regularly monitor the stability of the link between the policy rates and the effective interest rate (or market interest rates in general)

$$R_t^{effective} = R_t^{Policy} + spread_t$$

- For stability, it is important that spreads are constant, or predictable
- Spread can be function of market structure (competitiveness or concentration), business cycle, or risk perception (this is monitored on high frequency/weekly)

Example: Spread between call rate and 3M T-bill, 1Y bond, deposit, and lending rate



Long-term real interest rate

1) Get the following data: 3M (T-Bill) interest rate, CPI, and inflation expectations (e.g. financial market or surveyed expectations if available; or use ARIMA to forecast)

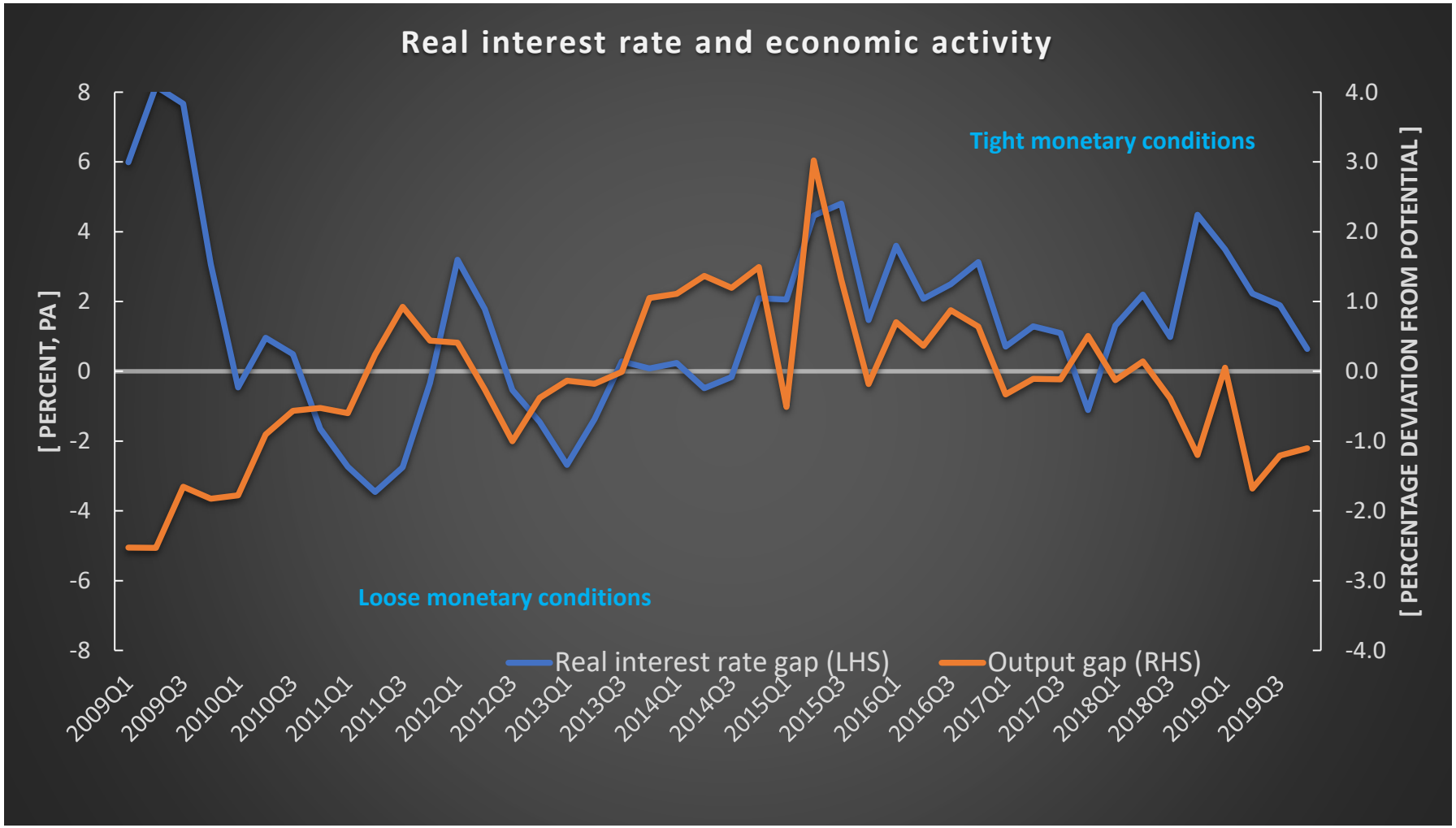
2) Use the Fischer equation to compute the real interest rate (ex post)

3) Use the Hodrick-Prescott filter to estimate the long-term trend

4) Compute the real interest rate gap as a difference between the level and trend

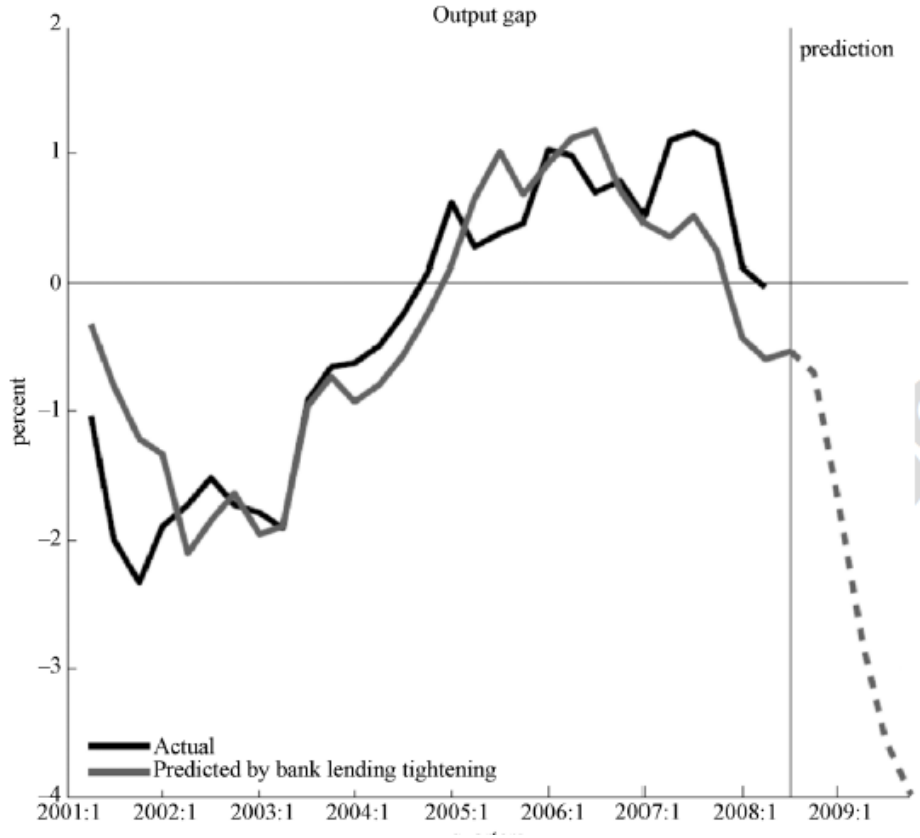
5) Display the results and think about the economics

Real interest rate gap



Besides interest rates, we want to monitor lending conditions as part of the overall monetary conditions. Lending conditions trim credit supply, which may constraint investment activity and through weaker aggregate demand lead to deflation and downward pressures in short-term nominal interest rates.

Figure 3 Historical Relationship Between Bank Lending Tightening and Output Gap Helped to Predict the Depth of Recession



Source: Fukac (AERE, 2018)

Proposed monetary conditions index

- Narrow definition:

$$MCI_t = \widehat{rr}_t$$

- Broader definition:

$$MCI_t = \omega_1 \widehat{rr}_t + \omega_2 cc_{t-\tau}$$

where $\omega_1 + \omega_2 = 1$, $\widehat{rr}_t$ is the standardised real interest rate gap (zero mean and unitary variance), $cc_{t-\tau}$ is the measure of credit conditions at time $t - \tau$, $\tau = 0, 1, \ldots, n$

- Later we also include the real (effective) exchange rate gap as part of the MCI

Conclusion

Key takeaways

- Central banks monitor financial conditions because they are part of the monetary policy transmission mechanism – stability of the transmission mechanism is crucial for policy effectiveness

- Real interest rate gap is an important summary statistics of financial conditions relevant for macroeconomic activity

- Monetary (interest rate) policy aims to align monetary conditions (effective real interest rates) with the policy objective of price stability