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Presentation to  
**“Dual-track Interest Rates and the Conduct of  
Monetary Policy in China”**

# **Dual-track Interest Rates and the Conduct of Monetary Policy in China**

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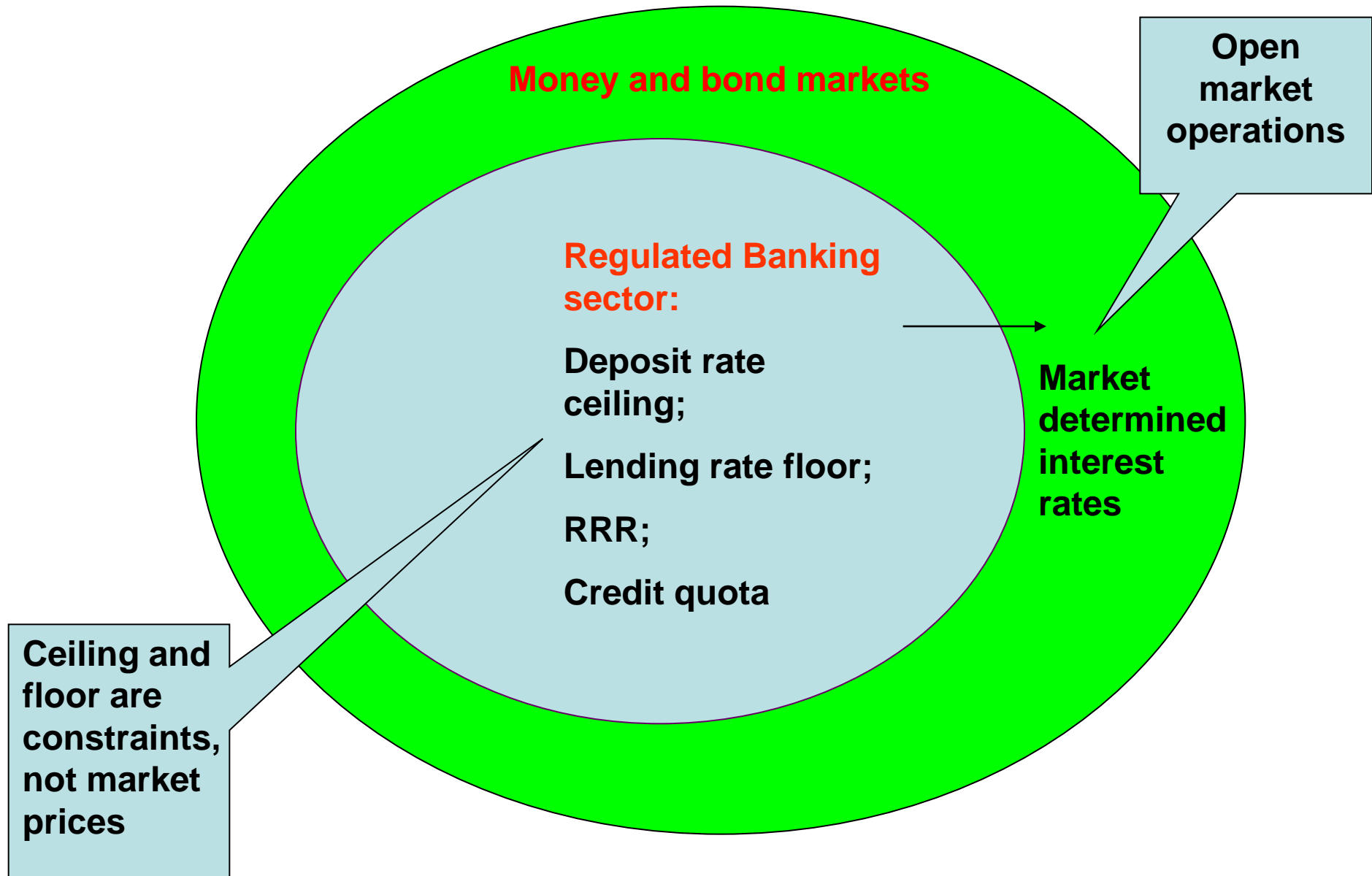
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# Background

- Why we chose dual-track interest rates as the starting point?
- Dual-track price system is at the heart of Chinese gradualist reform.
- The key idea of dual-track price system: *“prices at the margin are allowed to be set by market forces (in a new market) while a large segment of the demand and supply system continues to function based on controlled prices (in the old market)”* (Qian, 2007)
- Follow this idea, dual-track price system applied in agricultural reform in 1980s and industrial reform in 1990s. In 1996, a new money and bond market was created in China; development accelerated after 2005.

# Dual-track interest rates system in China

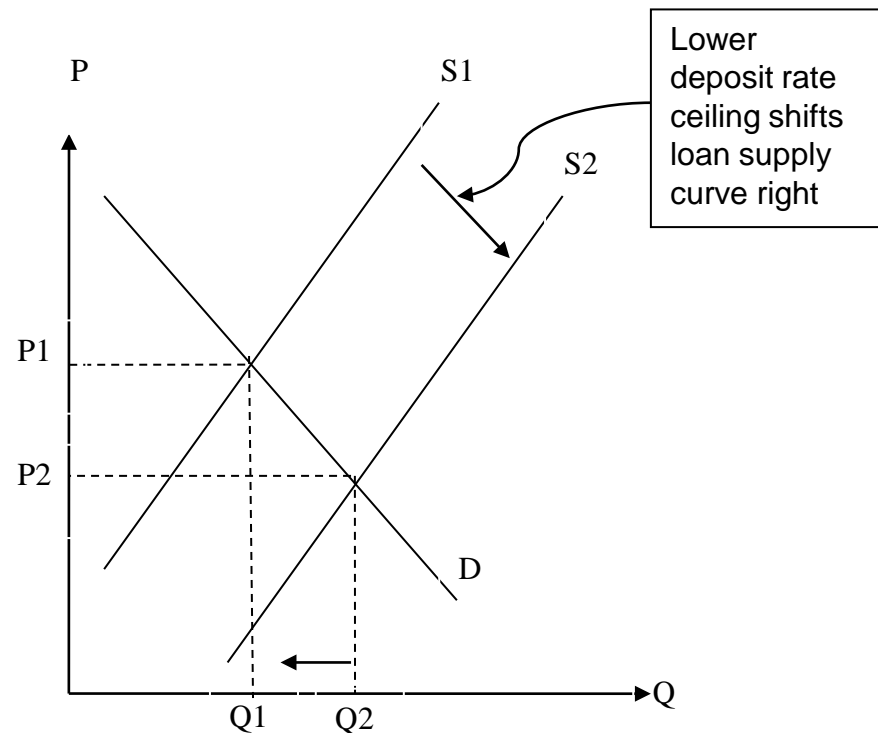


# Targets and instruments in China's monetary framework

- Targets: inflation, economic growth, employment and balance of international payments (Zhou,2009).
- Policy instruments
  - (a) price-based instruments: benchmark interest rates, excess reserve interest rates, rediscount rates etc.
  - (b) quantity-based instruments: reserve requirement ratio (RRR), open market operations, credit quota etc.
- In banking system, PBC cares about both price and quantity of bank credits (benchmark interest rates, RRR and credit quota).
- In money and bond markets, PBC also uses open market operations to influence price and quantity of credits.
- The monetary policy framework looks complicated, and it is not clear what shapes this complicated framework.

# How dual-track interest rates system shapes China's monetary policy framework?

- Low deposit rate ceiling reduces funding costs for banks.
- Lower funding costs → loan supply curve shifts to right → excess loan demand and supply → too much liquidity in the market → high inflation → against PBC's target → use various quantity-based instruments to curb loan supply.
- Distortions caused by price-based instruments have to be corrected by quantity-based instruments under this dual-track system.



# Research questions

- The more important question is: how does monetary policy transmission work under the dual-track interest rates system?
- What is the relative potency of various policy instruments?
- From the transmission mechanism, what implications for the incoming interest rate liberalization in China?

# The literature

- Many studies point out regulated interest rates might hamper monetary policy transmission, but most of them treat the transmission mechanism as a black box.

Three exceptions:

- Feyzioglu et al. (2009): deposit rate ceiling is the most binding control and interest rate liberalization will lead to higher interest rates.
- Porter and Xu (2009): interbank rate increases in regulated lending rate but decreases in regulated deposit rate, given the deposit rate ceiling is binding and the lending rate floor is not binding.
- Chen et al. (2011): regulated deposit and lending rates either have a negative impact, or have no impact on the interbank rate.



## What we do in this paper

- We develop a new theoretical model by taking into account fund flows between banking sector and non-banking sector (money and bond market). We also introduce credit quota into the new model.
- We conduct a calibration based on the theoretical model to compare the relative potency of various policy instruments.
- We estimate two empirical models to test theoretical predictions using data from money and bond market.
- Finally, we provide some thoughts about incoming interest rate liberalization in China.

## A theoretical model

- In a competitive banking sector, bank  $i$  maximizes its profit:

$$\Pi_i = \underset{L_i, D_i, E_i, B_i}{\text{Max}} \{ r_l L_i + r_e E_i + r_r \alpha D_i + r_b B_i + r_{nr} NR_i - r_d D_i - C(D_i, L_i, E_i) \}$$

- Net position of bank  $i$  in the non-banking sector

$$NR_i = D_i - L_i - E_i - \alpha D_i - B_i$$

- Market rate  $r_{nr}$  clears the non-banking sector

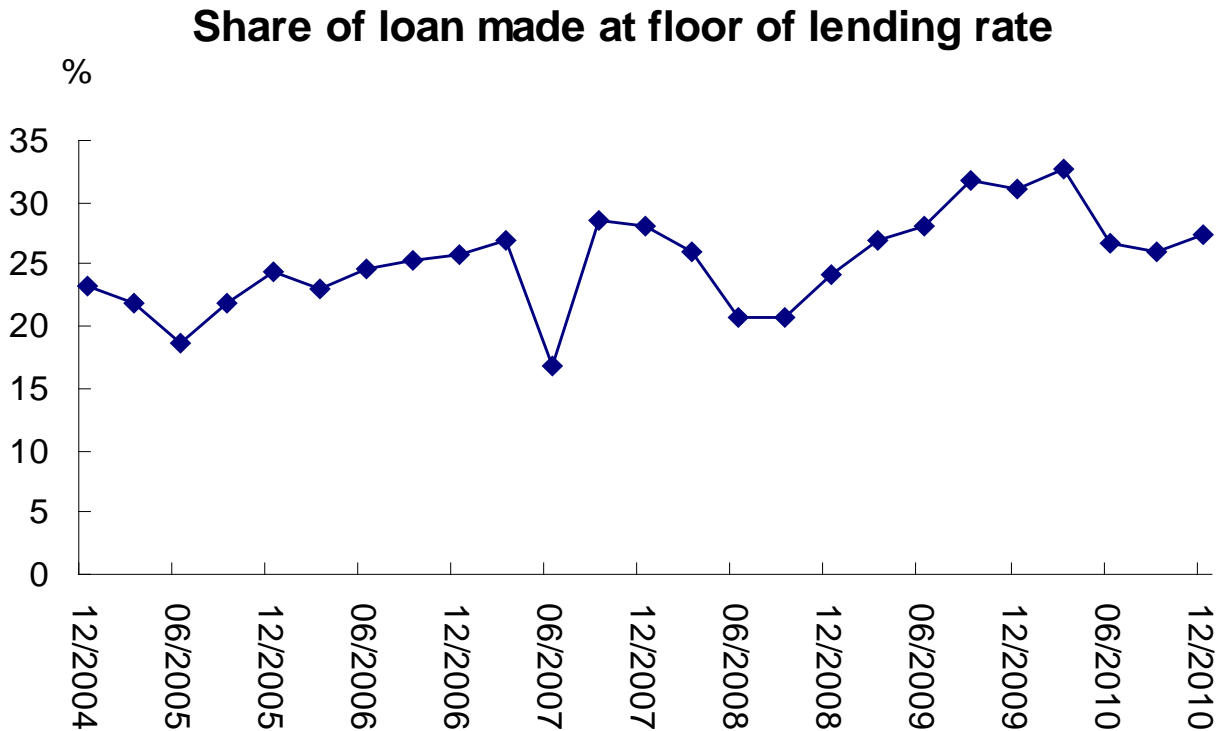
$$\sum_{i=1}^N NR_i + S(r_d, r_{nr}) = T(r_l, r_{nr})$$

**Table 2: Impact of policy shocks on the market rates**

Policy Shocks	Deposit-rate ceiling is binding				
	Case 1	Case 2.1	Case 2.2	Case 2.3	Case 2.4
	No deposit-rate ceiling nor lending-rate floor	lending-rate floor is not binding (no credit quota)	lending-rate floor is binding (no credit quota)	lending-rate floor is not binding under credit quota	lending-rate floor is binding under credit quota
	Market rates reaction to policy shocks				
Deposit-rate ceiling	N.A.	+	+	+	+
Lending-rate floor	N.A.	No impact	Indeterminate	No impact	Indeterminate
RRR	+	+	+	+	+
Issues of central bank bills	+	+	+	+	+
Credit quota	N.A.	N.A.	N.A.	Indeterminate	No impact

# Is the lending rate floor binding?

- The floor of lending rate is not binding in most cases (why? might due to credit quota).



Source: CEIC

# Is the deposit rate ceiling binding?

- PBC monetary policy report (2009Q2): “in most cases, the ceiling on deposit rate is binding”. Feyioglu et al. (2009): “the deposit rate ceiling , in particular, appears to bind”.
- Follow Laubach and Williams (2001), and taking into account financial repression, the observed real interest rate can be written as

$$r = f(g, \theta, \tau)$$

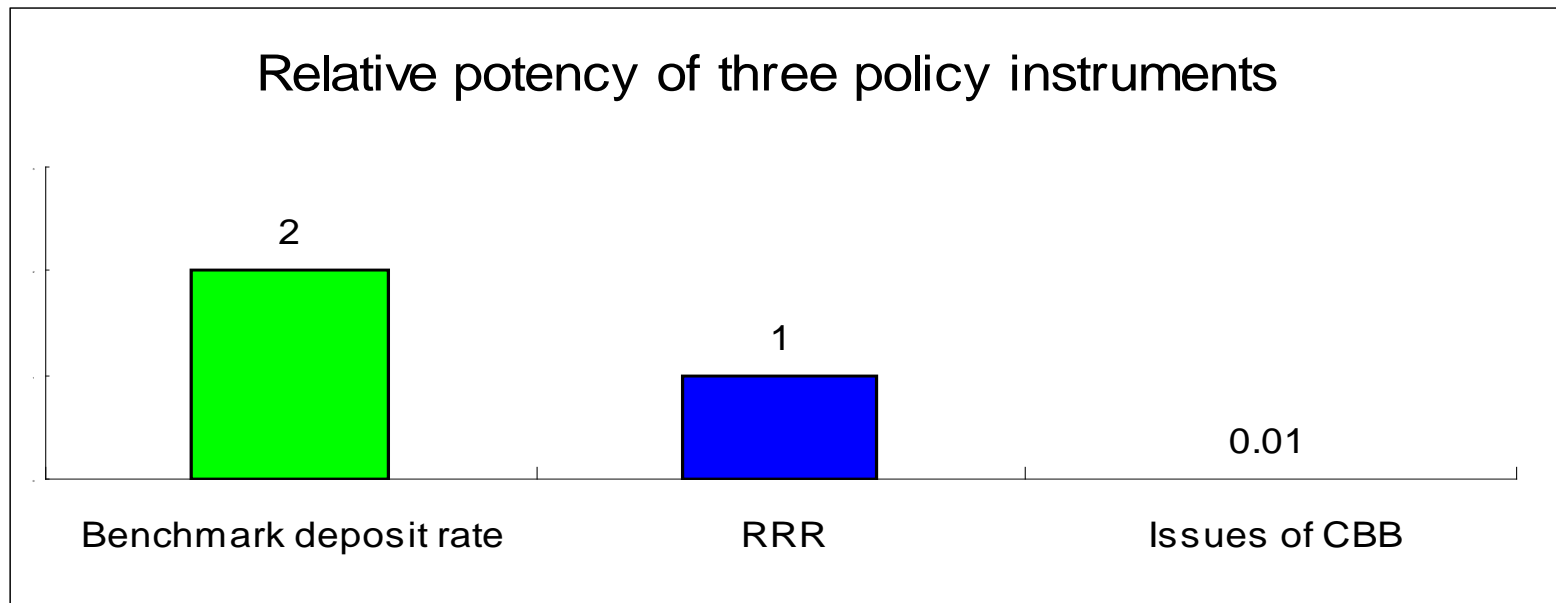
- The key is the financial repression index, which is one minus financial reform index by Abiad et al. (2008).
- By using a panel data with 49 economies from 1973 to 2005, we estimate the equilibrium real interest rate in China is about 4.7% in 2005 (as compared to observed real interest rate 1.6% in 2005).

Dependent variable : real interest rate				
	Fixed effect estimation		Random effect estimation	
	Coefficients	Standard errors	Coefficients	Standard errors
Real GDP	0.692**	0.087	0.700**	0.086
Saving rate	-0.455**	0.077	-0.411**	0.070
Financial repression index	-6.180**	1.474	-6.210**	1.416
Observations	1062		1062	
R-square	0.07		0.07	

\*\* denotes significant at 1% level.

## A simple calibration

- Based on the following scenario: deposit rate ceiling is binding and lending rate floor is not binding.
- Follow assumptions from Feyzioglu et al. (2009) to show relative potency of three policy instruments by comparing ratio of elasticities.
- The impact on market rate from the deposit rate is about twice as RRR, which is much larger than issues of CBB.



# Empirical analysis

- Aim to test above theoretical predictions using data from real world.
- Data: daily data from money market and bond market covering from 30 October 2004 to 15 November 2010.
- Money market: overnight, seven-day and one-month repo rates.
- Bond market: one-year, two-year, five-year and ten-year treasury bond yields; and financial bonds and corporate bonds of similar maturities.



# The linear model estimated by OLS

$$\Delta Y_t = \beta_0 + \beta_1 \Delta IR_t + \beta_2 \Delta RRR_t + \beta_3 \Delta CBR_t + \beta_4 NEWS_t + \beta_5 CBI + \beta_6 IPO_t + \beta_{7,8} Dummies + u_t$$

- $\Delta Y$ : log-difference of interest rates (yields).
- $\Delta IR$ : log-difference of benchmark deposit interest rate
- $\Delta RRR$ : log-difference of RRR
- $\Delta CBR$ : log-difference of benchmark central bank bill issuing rate.
- News: differences between market consensus and actual data on real GDP, M2, CPI, PPI, export, import, and retail sale.
- CBI: net issues of central bank bills
- IPO: funds frozen due to IPOs
- Dummies: month-end dummy and Chinese lunar New Year dummy.

# The GARCH model estimated by MLE

$$\Delta Y_t = \mu_t + \varepsilon_t \quad \varepsilon_t | F_{t-1} \sim D(0, h_t)$$

$$\mu_t = \beta_1' \Delta IR_t + \beta_2' \Delta RRR_t + \beta_3' \Delta CBR_t + \beta_4' NEWS_t + \beta_5' CBI_t + \beta_6' IPO_t + \beta_{7,8}' Dummies_t$$

$$h_t = \lambda_0 + \sum_{n=1}^p \gamma_n h_{t-n} + \sum_{j=1}^q \lambda_j \varepsilon_{t-j}^2 + \xi_i X_{it}$$

- GARCH model is able to capture high volatility and clustering attributes in high-frequency data, it is more efficient, but less robust.

# Empirical results

**Table 3: Elasticity of money and bond market rates to changes in policy instruments**

	Elasticity in money market	Elasticity in bond market
<b>Linear model</b>		
Benchmark deposit rate	0.65	0.20
RRR	0.51	0.16
CBB issuing rate	0	0.08
Issues of CBB	0	0
<b>GARCH model</b>		
Benchmark deposit rate	0.58	0.17
RRR	0.33	0.15
CBB issuing rate	0.03	0.06
Issues of CBB	0	0
<b>Average</b>		
Benchmark deposit rate	0.61	0.19
RRR	0.42	0.15
CBB issuing rate	0.02	0.07
Issues of CBB	0	0

# Answers for research questions

- How does monetary policy transmission work under the dual-track interest rates system?

The policy transmission works reasonably well, and market rates increase in benchmark deposit rate and RRR significantly. But market rates are not particularly reactive to open market operations.

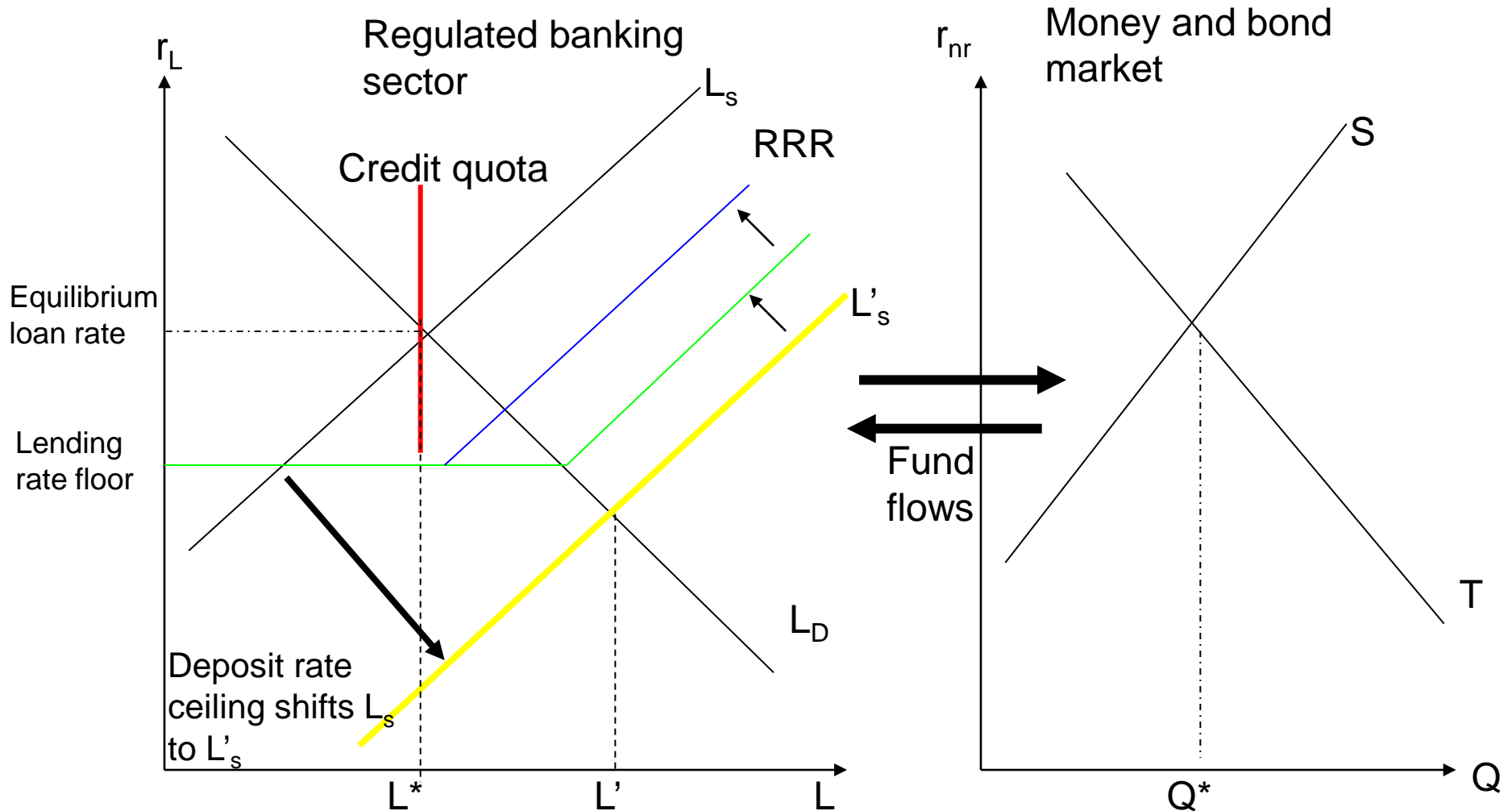
When market interest rates change, the (shadow) interest rate of bank credit moves in the same direction. Thus the PBC can influence the cost of credit from both the regulated bank system and money and bond market.

- What is relative potency of various policy instruments?

Adjusting deposit rate ceiling is the most powerful instrument for PBC, and RRR is the second powerful instrument, while the impact from open market operations is not significant.

# What are problems of current transmission mechanism?

- It is difficult to use quantity-based instruments to pull back credit supply to its equilibrium level.
- The equilibrium level is unobservable and changing over time as Macro economy changes.



# What is the next step?

- **Direct way:** liberalize interest rates gradually
- One possible way is to increase both the deposit rate ceiling and lending rate floor gradually, and liberalize them when they are close to equilibrium level.
- Pros: keep banking system stable, induce the price of capital to go back the equilibrium level and less pressure for credit quota.
- Cons: lower profit of state-owned firms, maybe lower GDP growth, strong resistance by bureaucrats.
  
- **Indirect way: develop money and bond market**
- Pros: keep banking system stable, induce more credits to move from banking system to direct finance, less resistance by bureaucrats.
- Cons: the process could be quite slow and risk in money and bond market could hamper the development.
  
- **It seems that PBC is doing both.**



**Thank You!**