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**INTEREST RATE DETERMINATION IN CHINA:
PAST, PRESENT, AND FUTURE**

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Research Questions

- ◆ Background: interest rate liberalisation will unavoidably change the determination of interest rates in China
- ◆ How are interest rates determined in China at present?
- ◆ How will interest rates be determined after liberalisation?
- ◆ What will be the role of policy interest rate? How will it be determined?
- ◆ Would deposit rates, lending rates and bond yields move higher or lower after liberalisation?



Main Findings and Arguments

- ◆ Regulated deposit rates, as well as quantity-based policy instruments, play major roles in the determination of interest rates in China at present
- ◆ After liberalisation, interest rates would be anchored by the policy rate of the PBC, which should be set close to China's equilibrium or natural rate
- ◆ We sketch three preliminary approaches to the estimation of the natural rate, which is estimated to be around 4%-4.5% for a potential growth rate of 7.5%
- ◆ The purpose of this exercise is not to establish a precise number, but to encourage more research and to provide a robust starting point for future policy experiments
- ◆ Based on this, we argue that interest rates on large deposits, as well as short-term money market rates, would likely to move somewhat higher after liberalisation, while the effect on lending rates is ambiguous



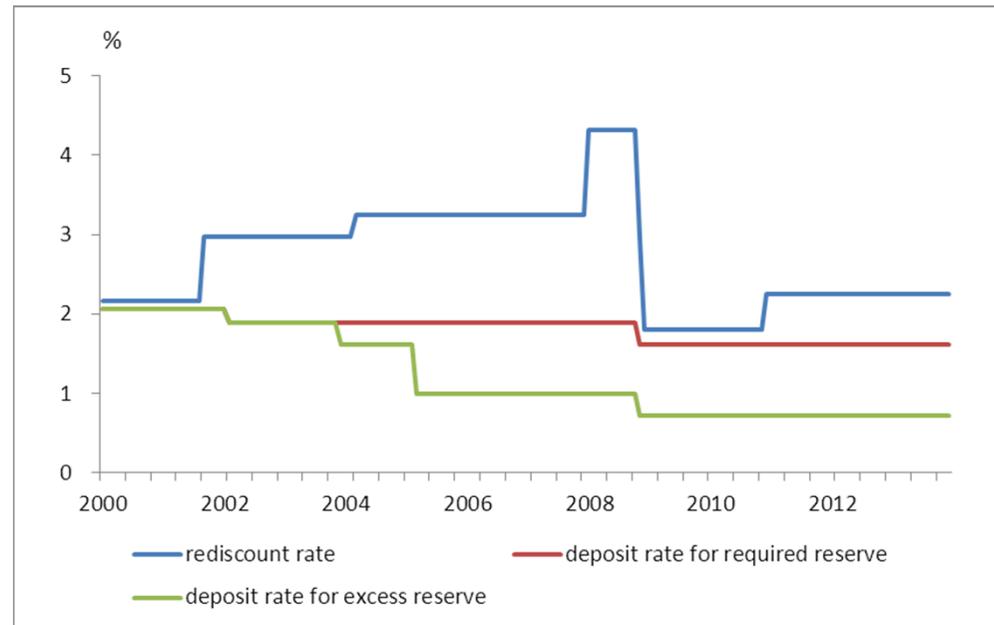
An Overview of Current Interest Rate Structure

- ◆ Interest rates for central bank operations
- ◆ Interest rates of banking products
- ◆ Interest rates in the money and bond markets
- ◆ Interest rates in other financial markets



1. Interest Rates for Central Bank Operations

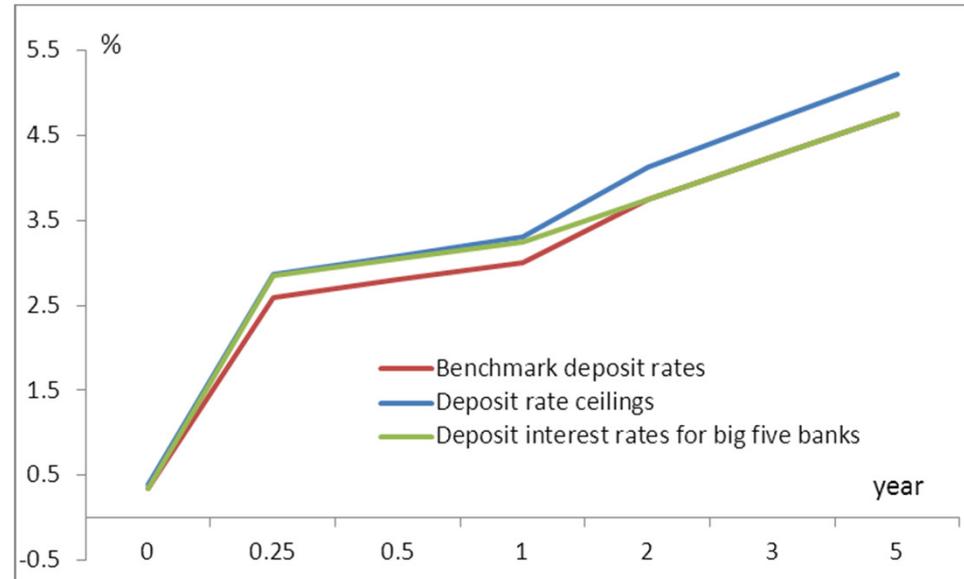
- ◆ Lending rates of the lender of last resort
 - Relending rate
 - Rediscount rate
 - Lending rate for the SLF
- ◆ Deposit rates for
 - Required reserves
 - Excess reserves
- ◆ Interest rates of open market operations
 - Central bank Repo rates
 - Central bank bill issuing rates
 - Interest rates of the SLO (new)





2. Interest Rates of Banking Products

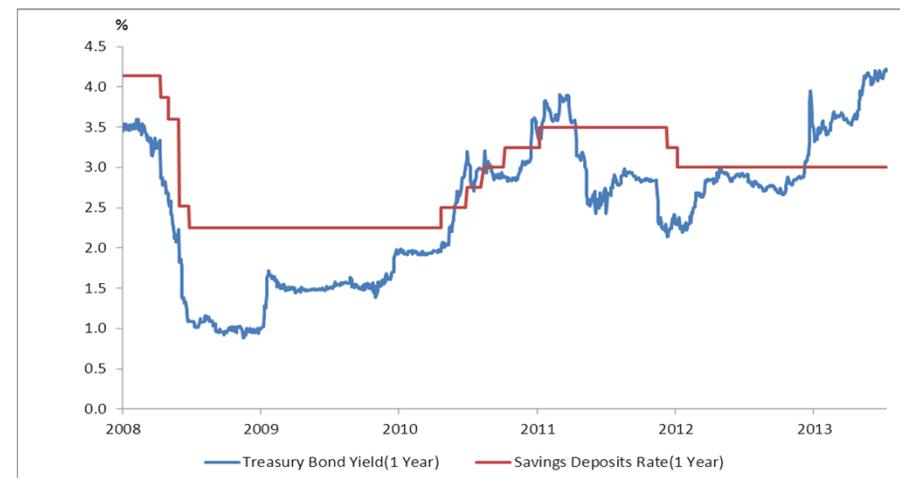
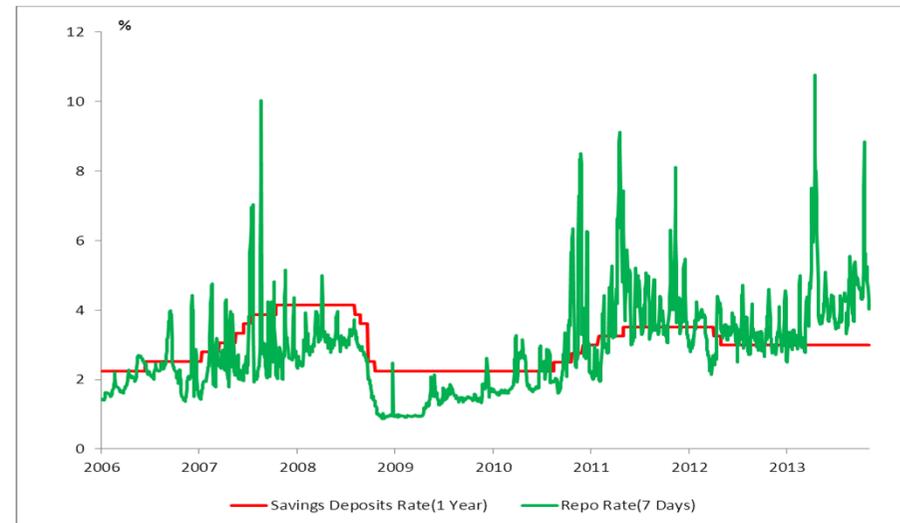
- ◆ Regulated deposit rates of different tenors
 - Banks of different sizes have different pricing strategies
- ◆ Liberalised lending rates
 - Except mortgage rates





3. Interest Rates in the Money and Bond Markets

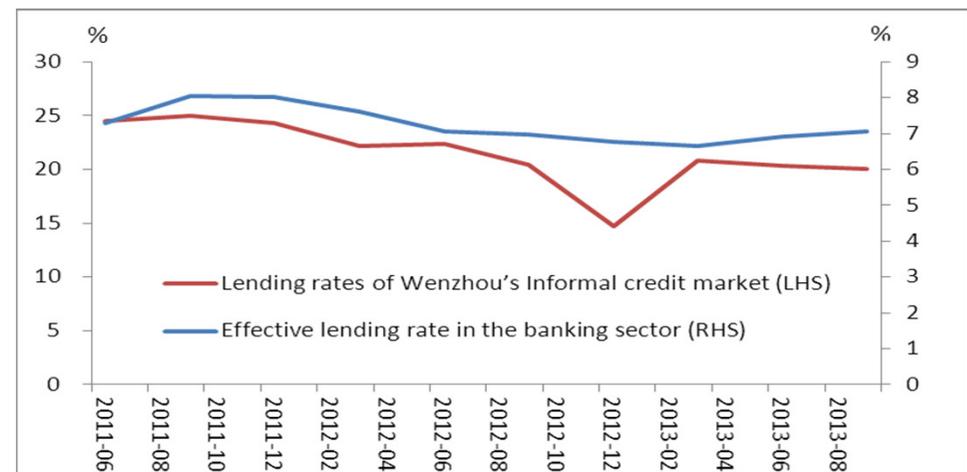
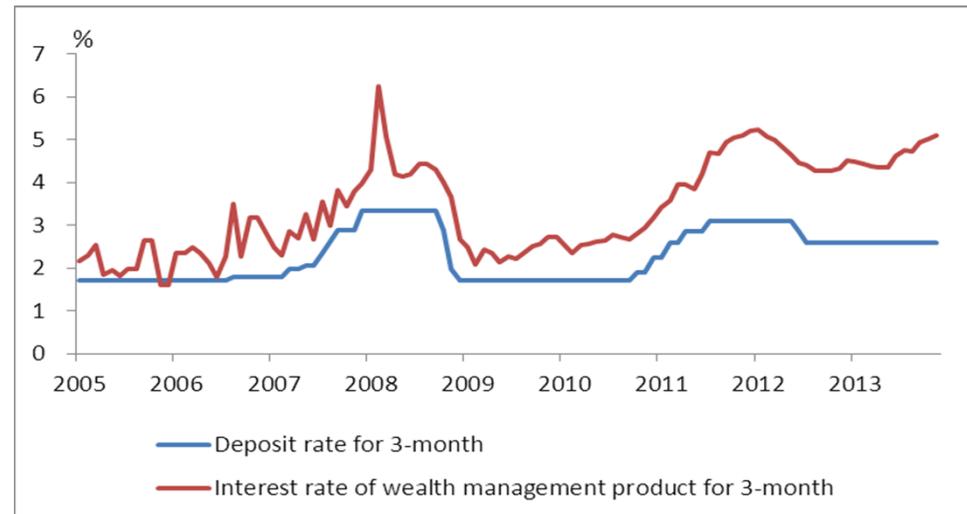
- ◆ Money market
- ◆ Chibors, Shibors, and Repo rates
 - Tenors from overnight to 12 month
 - Overnight and 1-week Repos are the most liquid markets, but quite volatile
- ◆ Bond market
 - The market size is still relatively small, and the entry barriers are still significant for SMEs
 - The issuing rates for corporate bonds are still subject to some regulations, which may not always be binding





Interest Rates in Other Financial Markets

- ◆ Interest rates for WMPs are also quite volatile and seem to be linked to deposit rates
- ◆ Interest rates in the informal credit markets seem much higher compared to the effective lending rate in the banking sector, but they do react to changes of monetary policy (Qin et al., 2013)

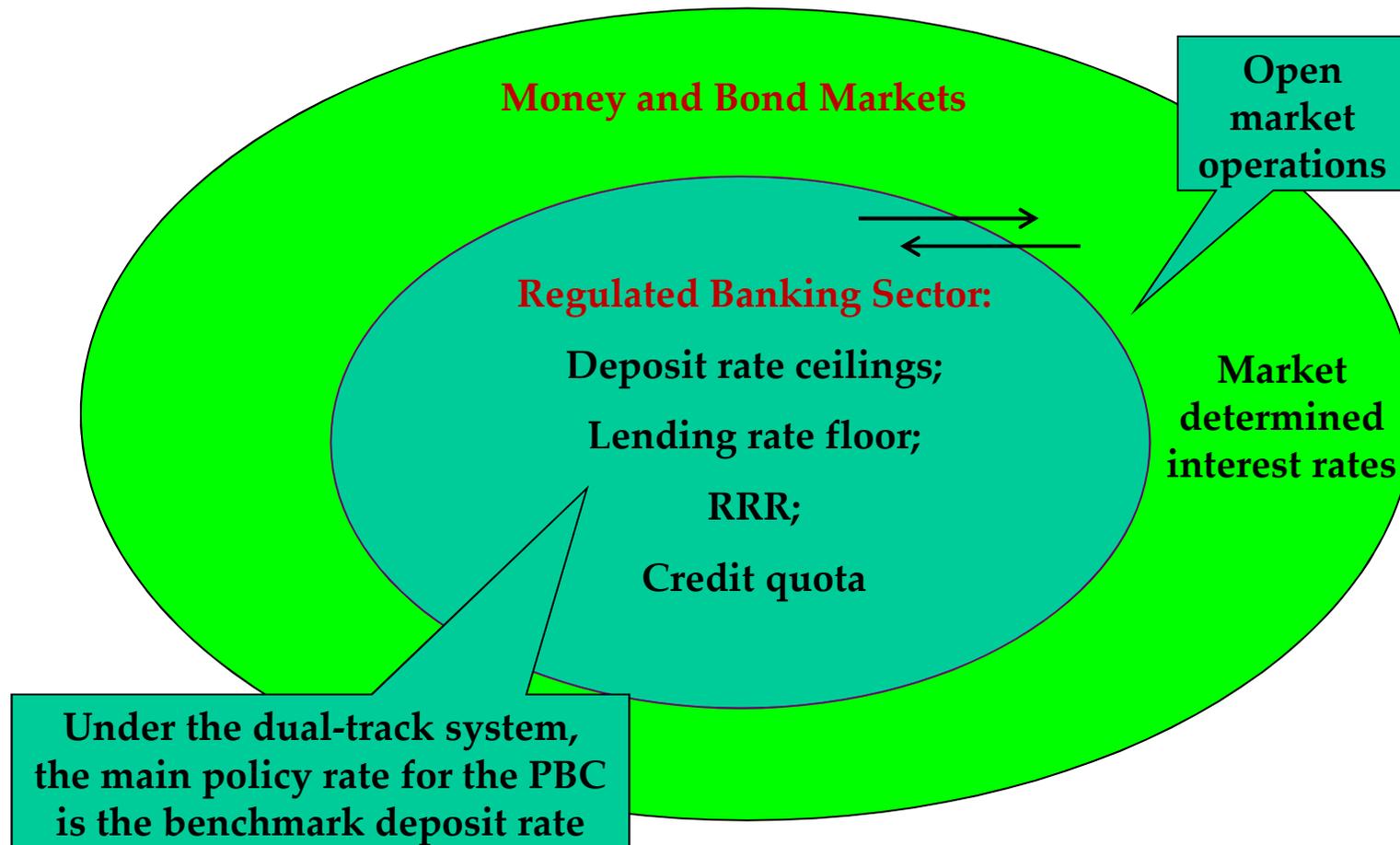




How Are Interest Rates Determined in China?



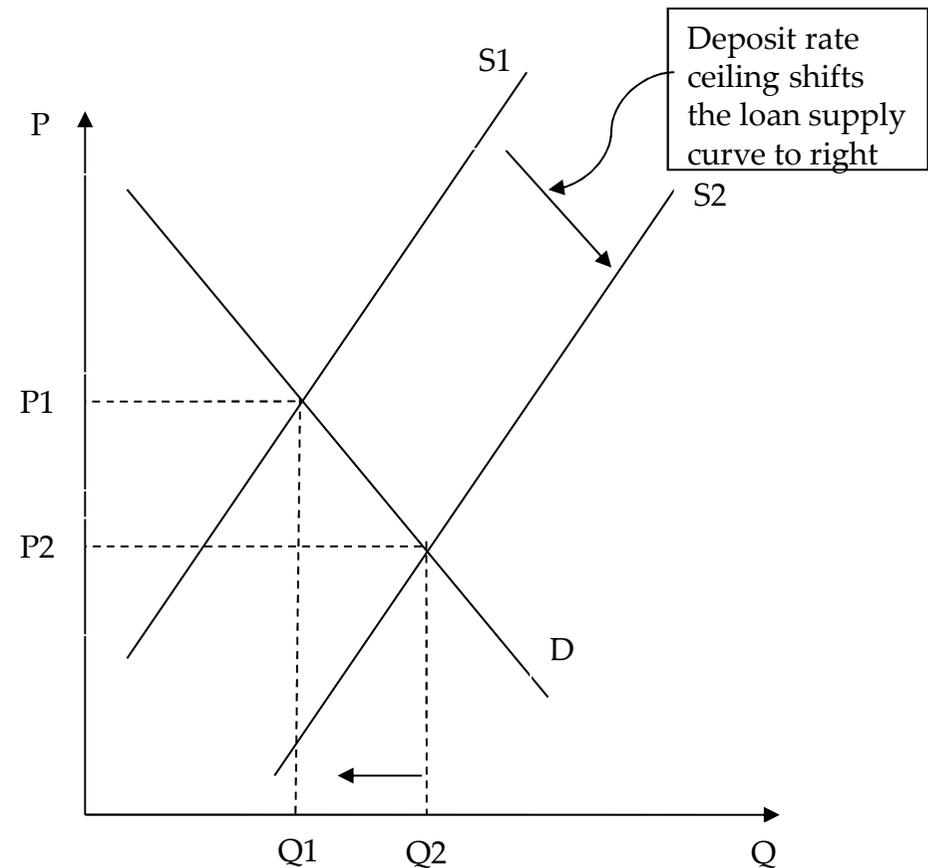
Background: Dual-Track Interest Rate System





Interest Rates in the Banking Sector

- ◆ Deposit rates are still regulated by ceilings imposed by the PBC and those ceilings are mostly binding
- ◆ Regulations on lending rates were removed last year, but are lending rates now fully determined by market forces?
 - Not completely
 - Aggregate loan quota
 - Shocks from deposit rates would affect lending rates due to market frictions (He and Wang, 2013)





Interest Rates in the Money and Bond Markets

- ◆ We construct a partial equilibrium model
 - Main result: under the dual-track interest rate system, even though interest rates in the money and bond markets have been market determined, their level and movement are still constrained by regulated deposit rates
 - See the Appendix for details
- ◆ Implications
 - The current level of interest rate in the money and bond markets is not the equilibrium level
 - Deposit rate liberalisation will not only change deposit rates, but also interest rates in other markets



Summary: How Are Interest Rates Determined at Present?

- ◆ The current structure of interest rates in China is a dual-track system, and main policy rates are regulated deposit rates across different tenors. The PBC regulates such rates by administrative order rather than by market channels
- ◆ Liberalised lending rates and interest rates in the money and bond markets are still anchored by regulated deposit rates
- ◆ The PBC uses a mixture of quantity- and price-based instruments to manage aggregate credit supply in the economy, and has increasingly focused on guiding market rates towards desired levels using open market operations and other new instruments such as the LPR, SLF, and SLO
- ◆ Interest rates in the informal credit markets seem much higher, but their movements seem to be also closely linked to deposit rates



Interest Rate Determination after Liberalisation



A Big Picture

- ◆ After liberalisation, interest rates will be determined by both the central bank and market forces
- ◆ Short-term rates will be largely anchored by the central bank's policy rate, while longer term interest rates will be mainly determined by market forces, adjusting for term and risk premia
- ◆ Interim measure
 - The bond markets remain underdeveloped in China
 - The PBC may still need to set targets for medium-term interest rates and manage the shape of the yield curve
- ◆ But a fundamental change is that the PBC will use the composition and size of its own balance sheet to control and influence markets rates instead of using administrative orders to regulate rates



Monetary Policy Framework after Liberalisation

- ◆ Policy target: a short-term interest rate
- ◆ Main policy tool: managing the central bank's balance sheet via operations in the markets
- ◆ Taylor rule as an analytical tool: specify the response of the policy rate to macroeconomic conditions

$$i_t = \pi_t + r_t^* + a_\pi(\pi_t - \pi_t^*) + a_y(y_t - \bar{y}_t)$$

- ◆ Questions
 - At what level should the PBC set the policy rate ?
 - What will r^* be in the Chinese version of the Taylor rule?
- ◆ Natural interest rate as a benchmark
 - Summarize the macroeconomic circumstances against which we evaluate interest rates
 - Provide a reference for the stance of monetary policy: neutral rate



Definition of Natural Interest Rate

◆ Definition

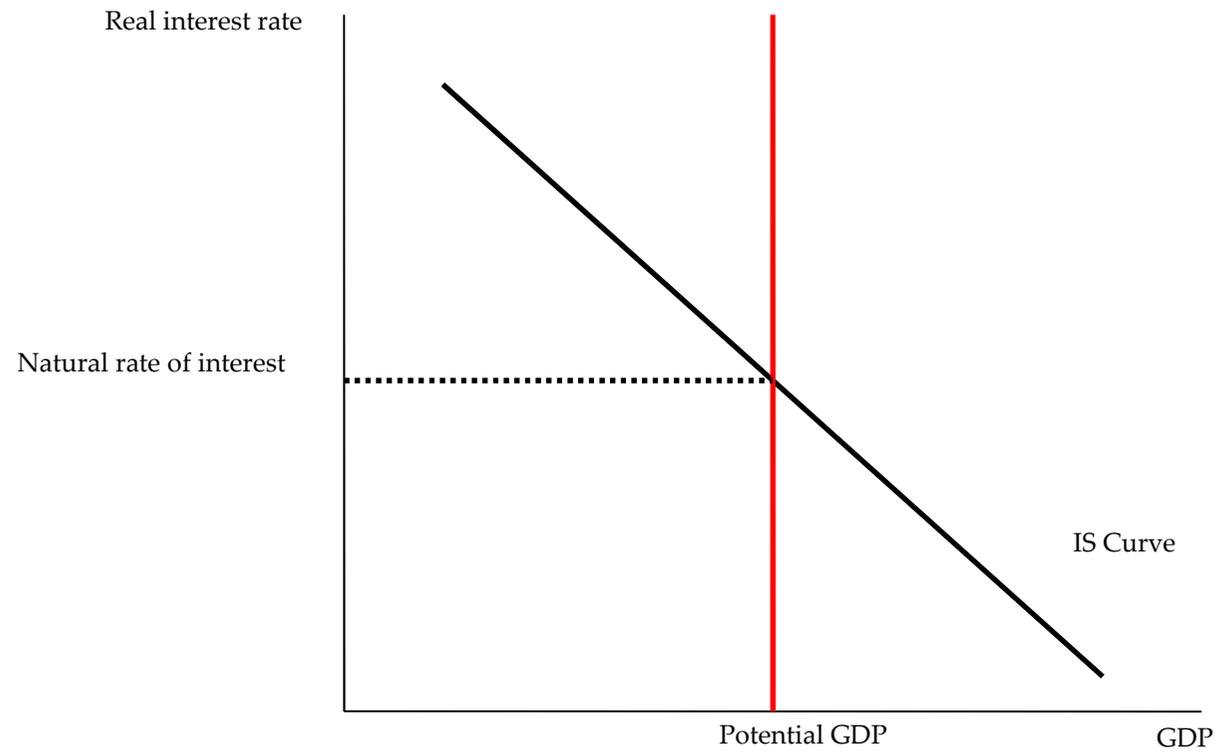
- The natural interest rate is the equilibrium real interest rate consistent with stable low inflation and potential output, in absence of transitory shocks to demand and supply

◆ Comments

- As the interest rate that equates output along the steady state IS curve to its potential level

$$i_t = \pi_t + r_t^* + a_\pi(\pi_t - \pi_t^*) + a_y(y_t - \bar{y}_t)$$

- Expressed in real terms: “Act Nominal While Thinking Real”
- There is no such thing as a single consensual concept behind the natural rate of interest: it is model-specific and its estimation should be under the guidance of the model in use





On the Estimation of Natural Interest Rate

- ◆ Natural interest rate = GDP growth rate? More than 7% in China?
 - Golden Rule: in the Solow model of growth with exogenous saving rate
 - The golden rule does not directly apply in China: the Chinese economy has much higher saving rates than the mature economies
- ◆ Natural interest rate is difficult to estimate and impossible to know with precision
 - Unobservable and potentially time-varying
 - Need to correct for the effects of interest rate control and financial repression
 - Alan Blinder (1998): “It is therefore most usefully thought of as a concept rather than as a number, as a way of thinking about monetary policy rather than as the basis for a mechanical rule.”
 - We sketch three preliminary approaches to its estimation



Method I. Calibration-Based Estimates

- ◆ Laubach and Williams (2003, REStat)
 - Estimate the natural interest rate and potential output jointly by applying Kalman filtering techniques to a system of reduced-form equations that describe relations between the natural rate and observables such as output and inflation
 - Similar research: Garnier and Wilhelmsen (2005, ECB WP), Manrique and Marques (2004, WP), Mesonnier and Renne (2007, EER)
- ◆ The method cannot be directly applied to the Chinese data
 - The specification applicable to advanced economies with free interest rates cannot correct for potential institutional biases
- ◆ Our approach: calibrate the critical equation using carefully chosen parameters for China



- ◆ The key relation in Laubach and Williams (2003)

$$r^* = \frac{1}{\sigma} g + \theta$$

g : growth rate of potential output

θ : rate of time preference

σ : intertemporal elasticity of substitution (IES)

- ◆ This relation holds in the steady state for a wide range of models
- ◆ Parameter values
 - g : historical experience
 - θ : Song et al. (2011, AER), Funke and Paetz (2013, WP)
 - σ : Song et al. (2011, AER), Garnier and Wilhelmsen (2005, ECB WP)
- ◆ We look forward to more empirical research to provide evidence for calibration in the research of the Chinese macroeconomy



Parameter	(1)	(2)	(3)	(4)
IES (σ)	2.2	2	2	1.53
Time Preference (θ)	0.3%	0.3%	0.45%	0.45%
Potential Growth (g)	7.5%	7.5%	7.5%	7.5%
Natural Interest Rate (r^*)	3.71%	4.05%	4.2%	5.35%

◆ Comments:

- (1) and (4) seem to correspond to the upper bound and the lower bound of our estimates, given the choice of parameter values
- 4-4.5% as a baseline estimate for the natural interest rate in China



Method II. Marginal Returns to Capital

◆ Basic idea

- With sufficient competition in the capital market, the natural interest rate, which is the net rent of capital, equals the marginal return to capital net of tax and depreciation

$$r^* = (1 - \tau)(MPK - \delta)$$

◆ Calculate MPK

- Consider a standard macroeconomic model featuring a constant-returns-to-scale production function
- Total output in the economy is distributed among factors according to their marginal productivities, without surplus or deficit

$$MPK = \frac{\alpha}{K/Y}$$

α : share of capital income

K : capital stock

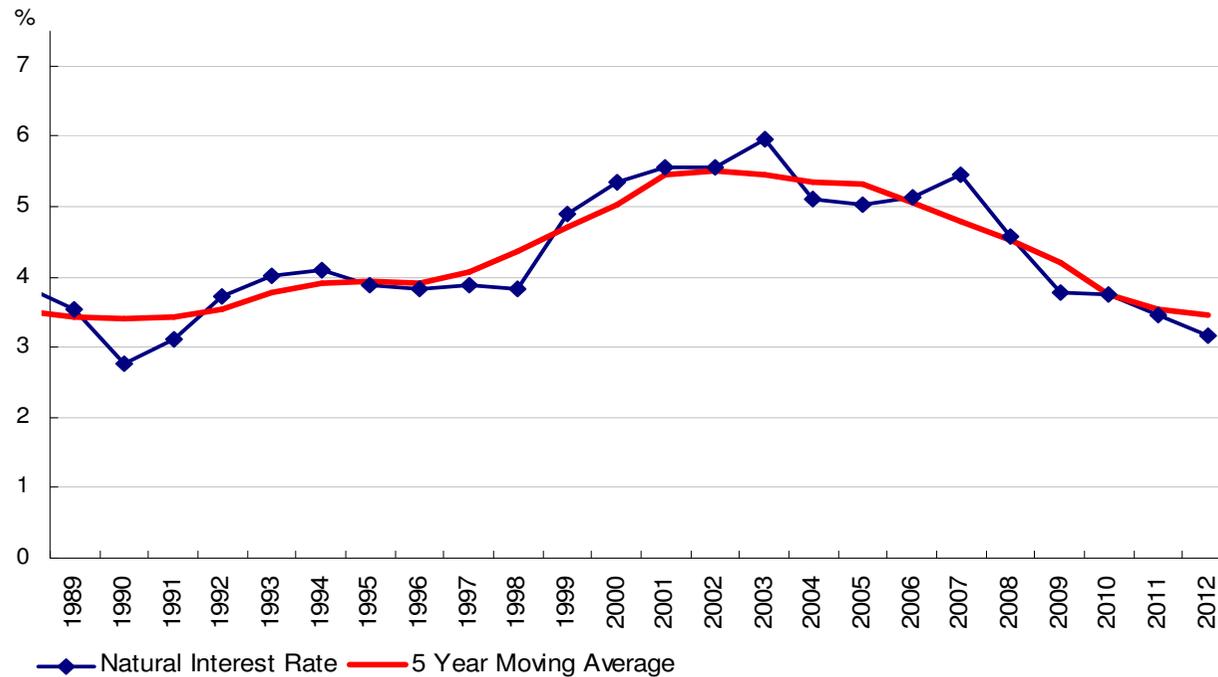
Y : total output



- ◆ The income share of capital should correspond to the measure of capital stock
 - Capital stock (K) constructed from investment flows only represents produced capital
 - It is common to back out the capital income share (α) as one minus the labor share (α_L), but this includes payment accruing to natural capital (N)
 - Our adjustment

$$\alpha = \frac{K}{K + N}(1 - \alpha_L)$$

- Follow Caselli and Feyrer (2007, QJE)
 - Based on the Wealth of Nations dataset compiled by the World Bank
- ◆ Use different price indices to deflate GDP and investment
 - Investment goods are expensive relative to final goods
- ◆ Adjust for tax and depreciation



◆ Comments

- The estimates of natural interest rate in China average at 4.3% in the range between 3.5% and 5.5%
- The estimates are time-varying, reflecting the slow evolvement of economic fundamentals
- Our estimates are consistent with Chong-En Bai's (2013) recent calculation



Method III. Cross-Country Experience

- ◆ Correct for the effects of interest rate control and financial repression
 - Based on the empirical model of He and Wang (2012)

$$r_i = a_0 + a_1 g_i + a_2 \theta_i + a_3 \tau_i + \pi_i + u_i$$

r_i : real interest rate

g_i : real GDP growth rate

θ_i : aggregate saving rate

τ_i : degree of financial repression

π_i : country fixed effects

- Use a panel of 49 economies between 1973 and 2005 to estimate the model
 - The financial repression index is between 0 and 1, compiled by the IMF
 - He and Wang's (2012) estimate for 2005 is 4.7%
- ◆ Update: the natural rate has somewhat declined, and the most recent estimate is 4.31% for 2012



Summary: What is China's Natural Interest Rate?

- ◆ Our results obtained from the three different methods are largely consistent
- ◆ A reasonable interval for the estimate of the natural interest rate is between 4% and 4.5% in China
 - Higher than Taylor's (1993) 2% and the estimate of Laubach and Williams (2003) around 3% for the U.S. economy
- ◆ Corresponding to the policy rate, a small downward adjustment for liquidity premia may be appropriate
 - In these benchmark settings, we abstract from uncertainty and have a relatively flat yield curve
- ◆ The estimation of the natural interest rate relies on one's understanding and judgment about the fundamental conditions of the economy
- ◆ Our work is not intended to give a final number, but only to provoke further research



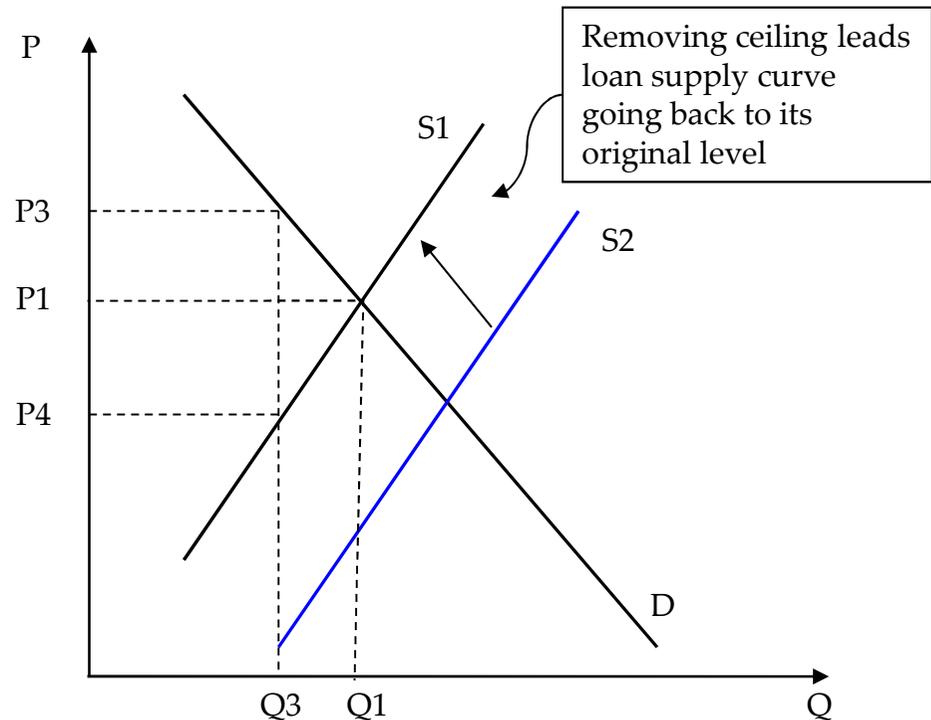
Determination of Interest Rates in the Banking Sector after Liberalisation: Deposit Rates

- ◆ Deposit rates after liberalisation will be determined by both monetary policy and market forces
- ◆ In a fully liberalised interest rate system, it is likely that interest rates on large deposits and negotiable CDs will track short-term money markets rates closely, whereas rates on small deposits would probably be somewhat lower than money market rates
- ◆ Our estimation of the policy rate suggests deposit rates would likely to move higher after liberalisation
 - This argument is also supported by the evidence observed recently: when the PBC increased the ceiling to 110% of benchmark deposit rates, deposit rates offered by banks moved close to the ceiling quickly



Determination of Interest Rates in the Banking Sector after Liberalisation: Lending Rates

- ◆ The movement of lending rates after liberalisation depends on three factors:
 - The contestability of China's banking industry
 - If banks have enough market power, they could pass the higher funding costs to clients
 - Possible remaining aggregate loan quota
 - More competition could make credit supply curve flatter
 - Competition from direct finance and capital account liberalisation
- ◆ The movement of lending rate after liberalisation is ambiguous





Determination of Interest Rates in the Money and Bond Markets after Liberalisation

- ◆ Interest rates in the money market would be closely anchored by the policy rate after liberalisation, while the bond yields would be determined by both monetary policy and market forces
- ◆ Short-term money market rates would likely to move higher after liberalisation
- ◆ We leave the determination of curvature of the yield curve to future research



Next Steps of Interest Rate Liberalisation



Environment

- ◆ Interest rate liberalisation seems to have only one step left: removing the deposit rate ceiling
- ◆ However, its success depends on many factors
 - Both banks and firms need to have hard budget constraints and become sensitive to changes in interest rates
 - Before that, an aggregate loan quota might still be needed even after deposit rate liberalisation
 - Deep and well-functioning money and bond markets are necessary conditions for smooth monetary policy transmission
 - Before that, the PBC might still need to set targets for medium-term interest rates and manage the shape of the yield curve through direct interventions in the bond markets
- ◆ Interest rate liberalisation needs a carefully designed roadmap



Roadmap

- ◆ Governor Zhou has recently outlined his roadmap of three steps
 - In the near term, the focus is to establish self-discipline in the formation of market interest rates, to grant financial institutions more discretion in setting their interest rates, to establish the prime lending rate fixing as an effective benchmark for the pricing of loan products, to promote the issuance and trading of negotiable CDs, and to gradually extend the scope of market-based pricing of liabilities of financial institutions
 - Between the near and medium terms, the key is to develop a relatively complete and efficient market interest rate system and to improve the monetary policy framework and monetary policy transmission
 - In the medium term, the objective is to fully liberalise interest rates and to be able to manage the Chinese economy based on a system of market interest rates



Concluding Remarks

- ◆ The paper attempts to shed light on the following questions
 - How should we think about the determination of interest rates in China after interest rate liberalisation?
 - Would deposit rates, lending rates and bond yields move higher or lower?
- ◆ We argue that interest rates in a liberalised environment would need to be anchored by the conduct of monetary policy, and if monetary policy were to achieve price and output (or employment) stabilisation, the policy rate should be set close to China's equilibrium or natural rate
- ◆ We sketch three preliminary approaches to the estimation of the natural rate, based on which we argue that interest rates on large deposits in the banking system and short-term money market rates would likely to move higher
- ◆ The effect on effective lending rates is somewhat ambiguous as the contestability of the banking system and the competition from the bond markets are likely to increase after interest rate liberalisation
- ◆ We leave the determination of curvature of the yield curve to future research



Thank You for Your Attention!