Diego Anzoategui
Mali Chivakul
Wojciech Maliszewski

Financial Distortions in China: A General Equilibrium Approach

Motivation

1 Abundant and cheap credit has supported economic growth in recent time, with a sizable chunk of credit financing low-return activities. This is not sustainable as capital allocation has become increasingly inefficient and it is taking more and more credit to generate growth.

2 The main problem is the misallocation of capital, promoted by two main distortions in the system: Interest rate ceiling and implicit guarantee. Officially interest rate reform has been completed by it is taking time for banks to fully adjust to the new environment. Progress on SOE reform has been slow.

3 A formal model to evaluate general equilibrium effects of these two reforms is missing. Only two previous studies on this subject: Feyzioglu and others (2009) relies on partial equilibrium model and assume monetary policy at work. Song and others (2014) suggests that the real effects of interest rate liberalization depend on how much savings would rise as a response. They do not however assess the consequences of removing implicit guarantees.

Key findings

1 Removing the deposit interest rate ceiling alone would not result in a more efficient allocation of credit. It would reduce lending rates, increase capital intensity in the economy and boost output. But all enterprises would expand despite their efficiency level, resulting in lower TFP.

2 Removing implicit guarantee would lead to more efficient allocation of capital and higher GDP as the role of less efficient enterprises is reduced.

Interest rate ceiling (I)

- Deposit rate ceiling officially abolished in October 2015

- In reality, a partial liberalization already started through the emergence of alternative saving products such as wealth management products (WMPs) and money market funds (MMFs)

- Deposit rate ceiling is a form of financial repression (tax on household saving). It also provides little incentive for bank competition and efficiency.
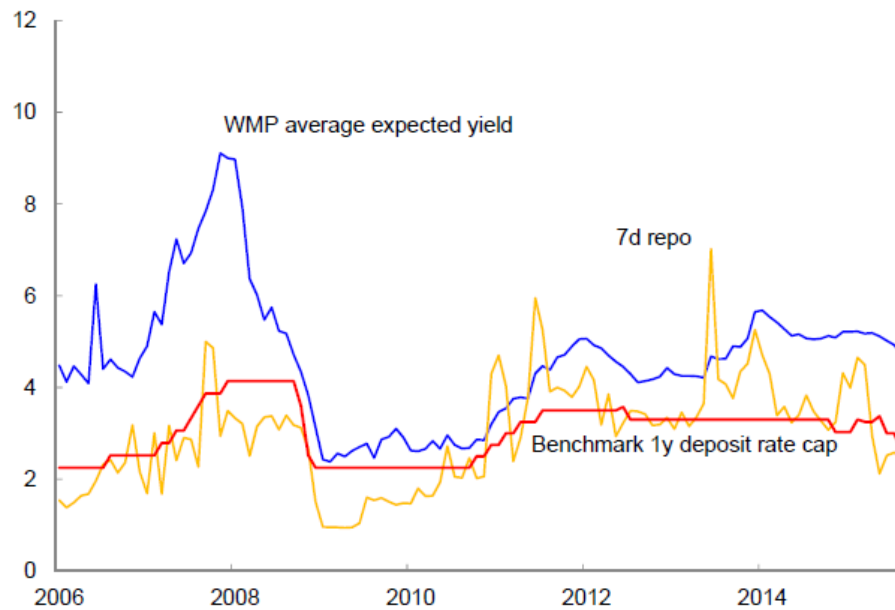
Interest rate ceiling (II)

Average deposit rate
(%)
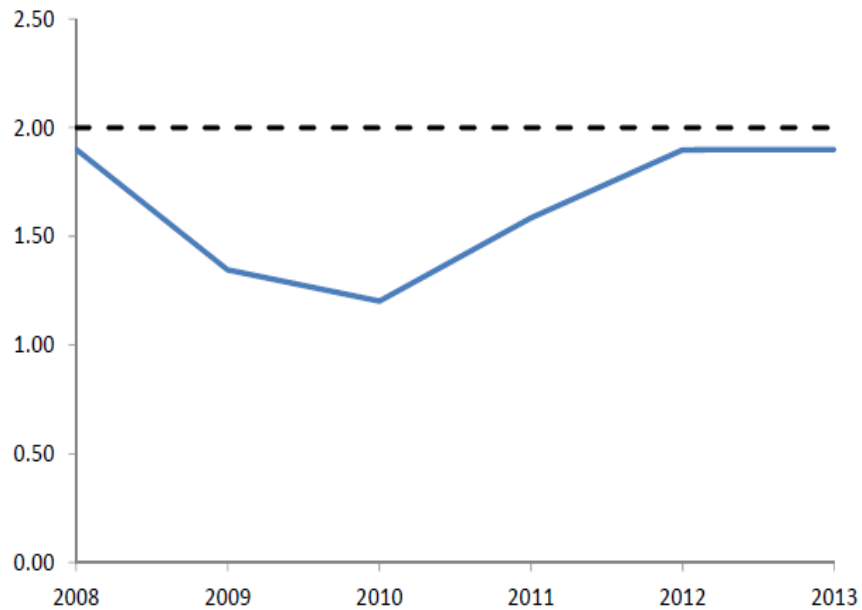
Source: Bankscope.

WMP yields and benchmark interest rate
(%)

Source: Wind, CEIC.

- Implicit guarantees are widespread in China. A number of borrowers enjoy privileged access to credit as creditors presume that they are implicitly supported by the government. SOEs are the main, but not the only beneficiaries.

- Implicit guarantee distorts lending decision: lend more and more cheaply to those perceived to be guaranteed regardless of the viability or profitability of the project.

- Bank bailout from the early 2000s connects implicit guarantees with deposit rate ceilings. Deposit rate ceiling acts as a subsidy to banks to pay for the guarantees that have been called.

Probability of being constrained (marginal effects) *(%)*

| | Dependent Variable: Constrained=1 | | | |
	(1)	(2)	(3)	(4)
POE	0.123***	0.117***	0.119***	0.109***
	(0.0217)	(0.0223)	(0.0231)	(0.0235)
Manufacturing Sector		0.0456***	0.0667***	0.0590***
		(0.0171)	(0.0182)	(0.0182)
Retail		0.134***	0.0844**	0.0760*
		(0.0414)	(0.0419)	(0.0432)
log(employees)			-0.0390***	-0.0371***
			(0.00700)	(0.00715)
log(years of operation)			-0.0144	-0.0323*
			(0.0168)	(0.0175)
% of production exported			-0.120***	-0.0656*
			(0.0378)	(0.0392)
Growth of sales			-0.0657**	-0.0513*
			(0.0305)	(0.0273)
Region dummies	No	No	No	Yes
Observations	2,734	2,734	2,514	2,437

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
We label a firm as constrained if either: (i) the firm applied for a loan and was rejected, (ii) did not apply because interest rates, collateral requirements or size were not favorable, or (iii) did not apply because did not think it would be approved.

Interest expenses/Total liabilities, POEs vs. SOEs
(%)

Source: NBS

The model (I)
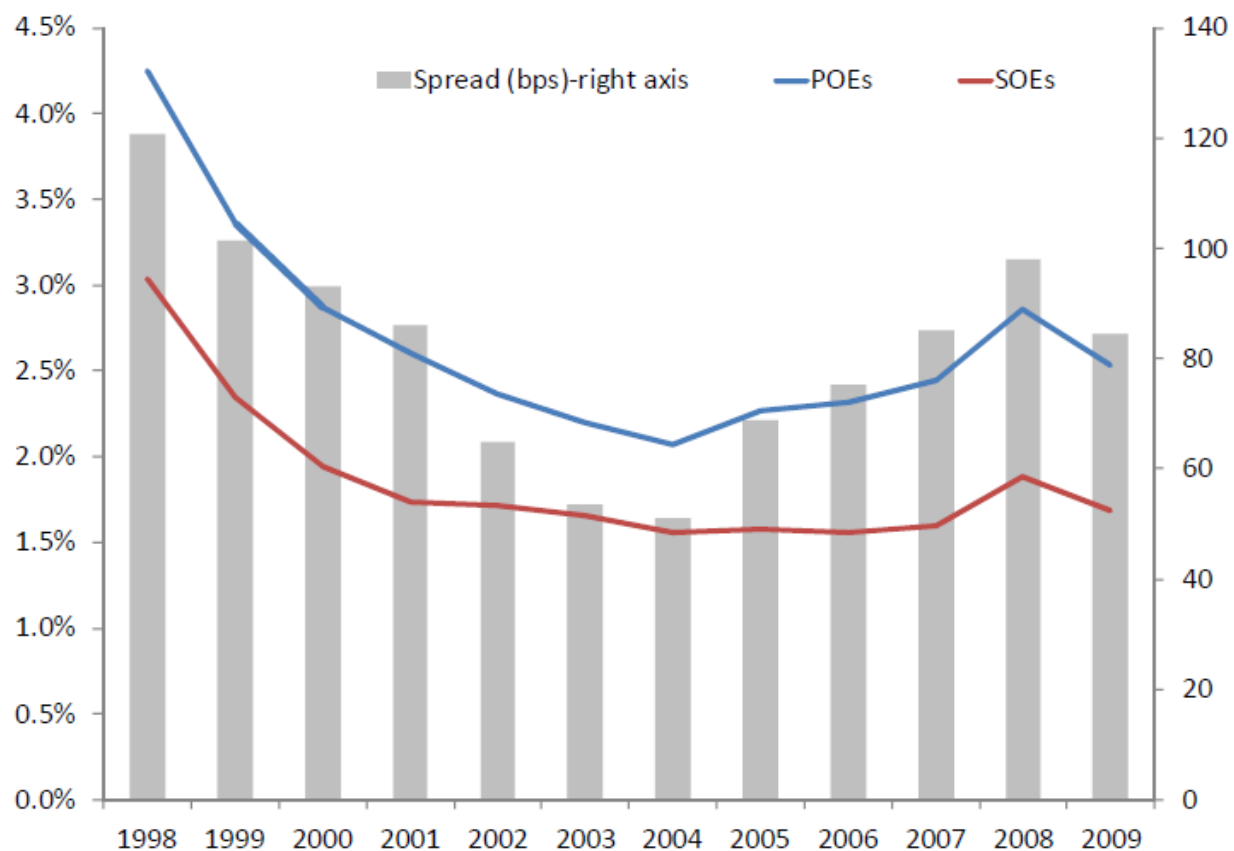
- Standard heterogeneous agents model a la Bewley-Aiyagari (Buera and Shin, 2013; Quadrini, 2000)

- Four types of agents: private agents who are either workers or entrepreneurs, SOEs, banks and government.

- SOEs enjoy better and cheaper access to credit (no collateral requirement). Private-owned enterprises (POEs) face collateral constraints.

- Banks are state owned and monopolistically competitive. Government has a balanced budget, collecting revenue including profits from SOEs and the banking sector.

Households:

$$V_t(a_t, e_t) = \max_{\{a_{t+1}, c_t\}} U(c_t) + \beta E\{V_{t+1}(a_{t+1}, e_{t+1})\}$$

$$\text{st.}$$

$$a_{t+1} + (1 + \tau_c)c_t = \max\{w_t, \pi_t^{int}(a_t, e_t), \pi_t^{ext}(a_t, e_t)\} + (1 + r_t^d)a_t - T_t$$

$$a_{t+1} \geq 0$$

POEs:

$$\pi_t^{int}(a_t, e_t) = \max_{\{k_t^{int}, l_t^{int}\}} f(e_t, k_t^{int}, l_t^{int}) - (r_t^d + \delta)k_t^{int} - w_t l_t^{int}$$

$$\text{st.}$$

$$k_t^{int} \leq a_t$$

$$\pi_t^{ext}(a_t, e_t) = \max_{\{k_t^{ext}, l_t^{ext}\}} f(e_t, k_t^{ext}, l_t^{ext}) - (r_{t,poe}^l + \delta)k_t^{ext} - w l_t^{ext}$$

$$\text{st.}$$

$$a \leq k_t^{ext} \leq \lambda a_t$$

SOEs:

$$y_{t,soe} = Ak_{t,soe}^{\alpha}l_{t,soe}^{1-\alpha}$$

$$r_{t,soe}^{l} \leq r_{t,poe}^{l}$$

$$\max_{\{k_{t,soe},l_{t,soe}\}} Ak_{t,soe}^{\alpha}l_{t,soe}^{1-\alpha} - (r_{t,soe}^{l} + \delta)k_{t,soe} - w_t l_{t,soe}$$

Government:

$$G_t + \kappa \int_0^1 k_{t,soe}(j)dj = T_{c,t} + T_t + \pi_t^b$$

where,

$$\pi_t^b = \int_0^1 \pi_{t,soe}^b(j)dj + \int_{P_{ext}} \int_0^1 \pi_{t,i}^b(j)dj\,di$$

Banks:

$$\pi_{t,i}^{b}(j) = \max_{r_{t,i}(j)} \left\{ r_{t,i}(j)k_{t,i}^{ext}(j) - (r_t^d + \chi)k_{t,i}^{ext}(j) \right\}$$

$$\pi_{t,soe}^{b}(j) = \max_{r_{t,soe}(j)} \left\{ r_{t,soe}(j)k_{t,soe}(j) - (r_t^d + \chi - \kappa)k_{t,soe}(j) \right\}$$

st

$$k_{t,i}^{ext}(j) = \left(\frac{r_{t,poe}(j)}{r_{t,poe}} \right)^{\frac{\mu}{1-\mu}} k_{t,i}^{ext}$$

$$k_{t,soe}(j) = \left(\frac{r_{t,soe}(j)}{r_{t,soe}} \right)^{\frac{\mu}{1-\mu}} k_{t,soe}$$

$$k_{t,soe}(j) + \int_{P_{t,ext}} k_{t,s}^{ext}(j)ds \leq D_{t,j}$$

Equilibrium interest rates:

$$r_{t,poe} = \mu(r_t^d + \chi) + \xi_t$$

$$r_{t,soe} = \mu(r_t^d + \chi - \kappa) + \xi_t$$

Lending rates with deposit rate ceiling:

$$r_{t,poe} = \mu(\bar{r} + \chi) + \xi_t$$
$$r_{t,soe} = \mu(\bar{r} + \chi - \kappa) + \xi_t$$

Lending rates with liberalized deposit rate ceiling:

$$r_{t,poe} = \mu(r_t^d + \chi)$$
$$r_{t,soe} = \mu(r_t^d + \chi - \kappa)$$

Modelling implicit guarantee:

$$r_{t,soe} + \mu\kappa = r_{t,poe}$$

Model parameters

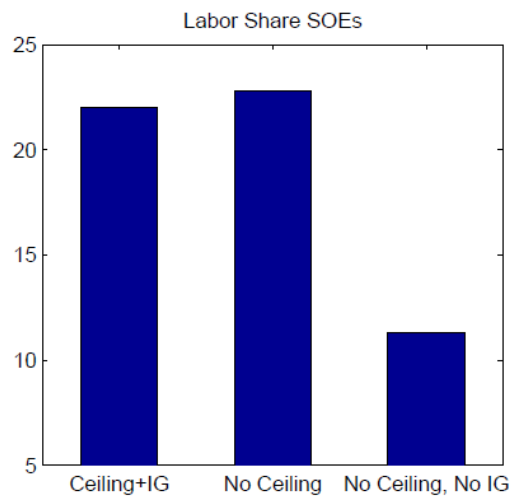| Moments	Data	Model	Parameter
Nominal deposit interest rate	330 bps	330 bps	$\bar{r} = 0.008$
SOEs vs POEs spread	200 bps	200 bps	$\kappa = 0.02/1.1$
POEs nominal loan rate	786 bps	793 bps	$\beta = 0.892$
Collateral (% of loan)	137%	137%	$\lambda = 1.73$
Banks overhead cost (% of assets)	1.15%	1.15%	$\chi = 0.0115$
VAT rate	17%	17%	$\tau_c = 0.17$
Government consumption (% GDP)	13.5%	13.5%	$g = 0.135$
Labor share SOEs	18.4%	21.5%	
Labor held by top 5% private firms	46.0%	46.5%	
Labor held by top 10% private firms	57.2%	58.8%	$e_{low} = 0.945$
Labor held by top 20% private firms	70.4%	70.7%	$\eta = 3.63$
Labor held by top 30% private firms	78.9%	77.6%	
Labor held by top 40% private firms	84.9%	82.2%	

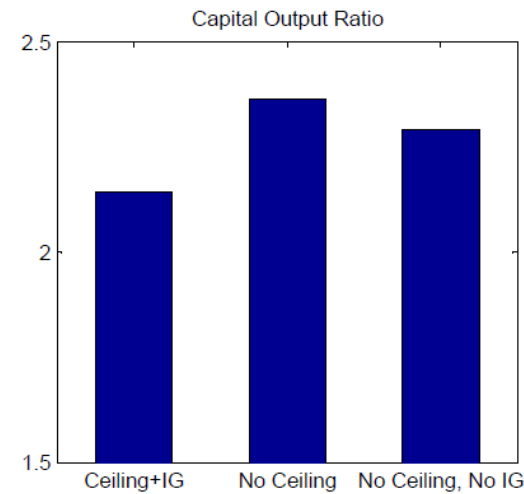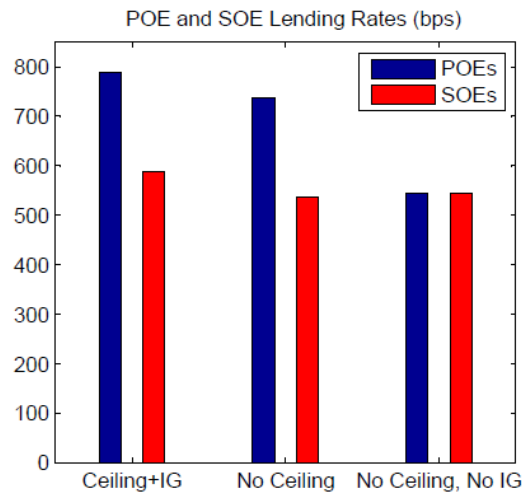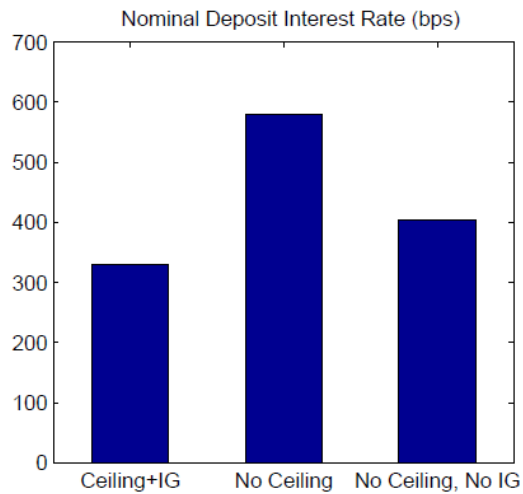# Result: Impact of liberalizing deposit rate ceiling (I)
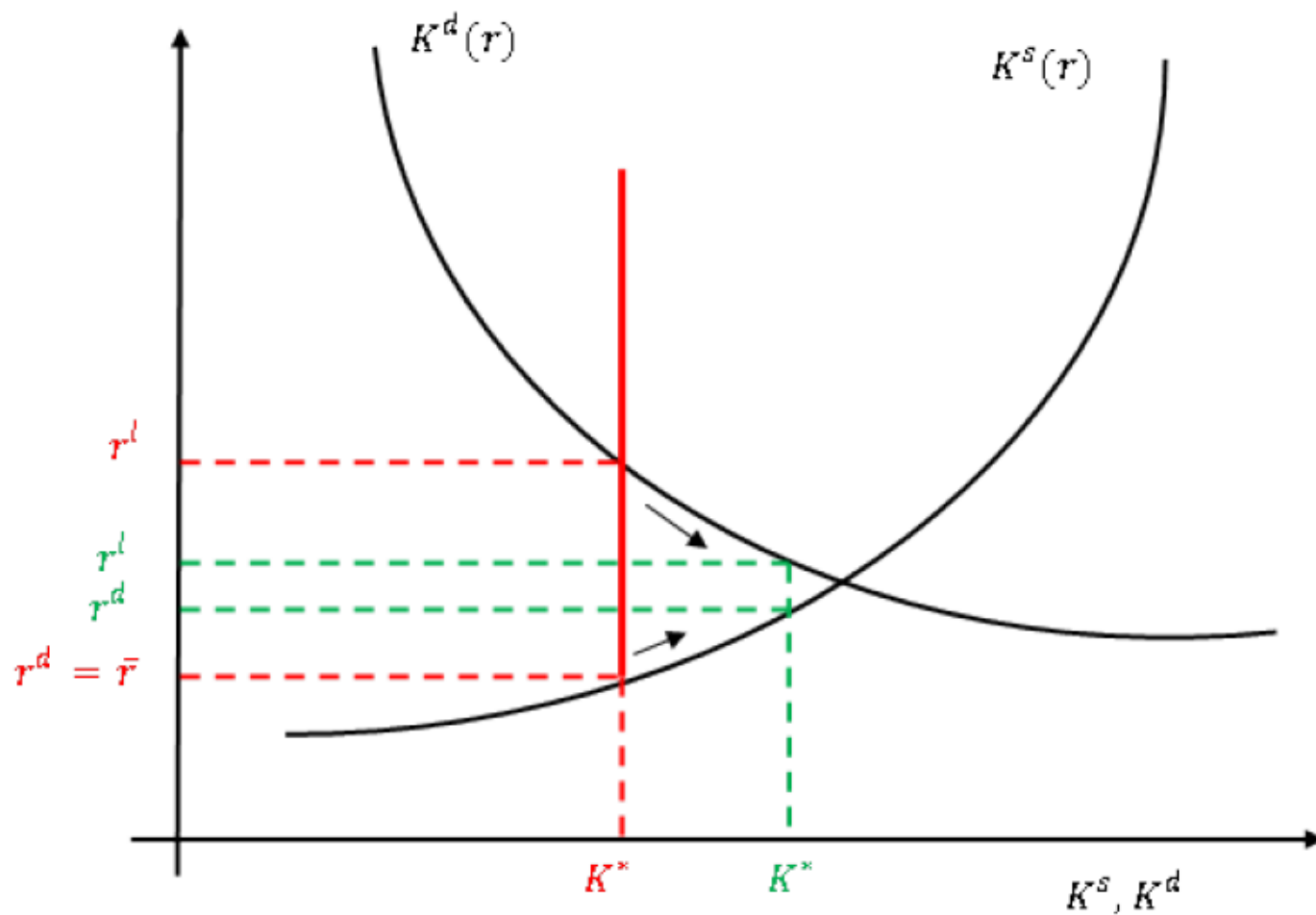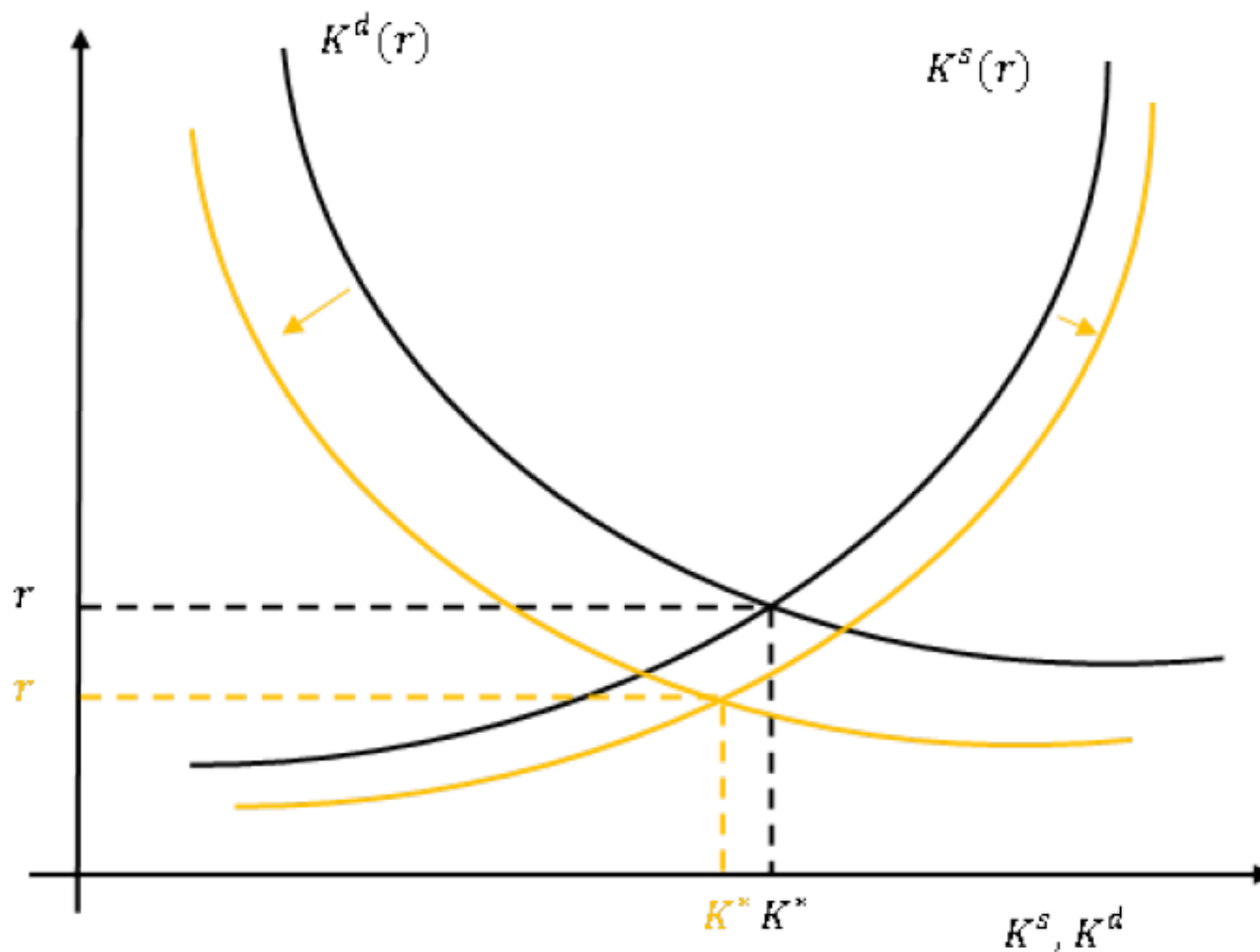
Source: CEIC.

Liberalization and bank competition
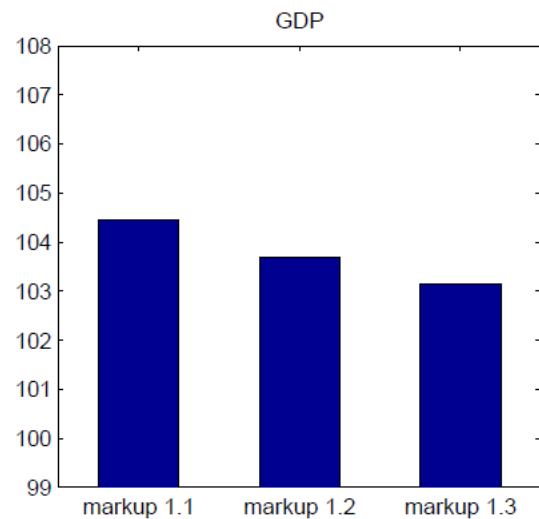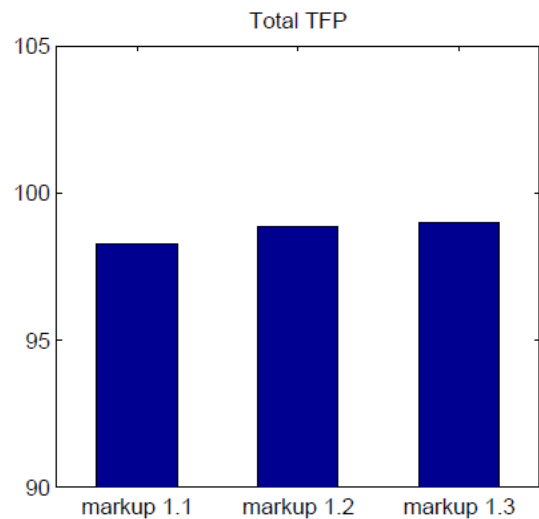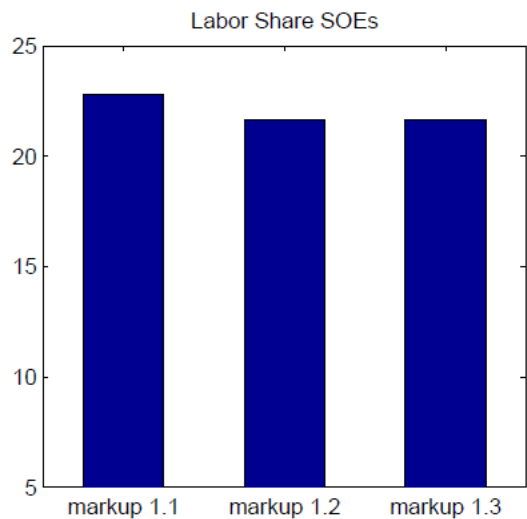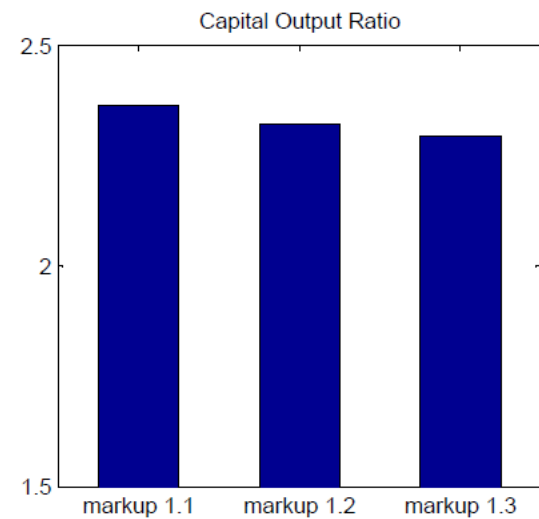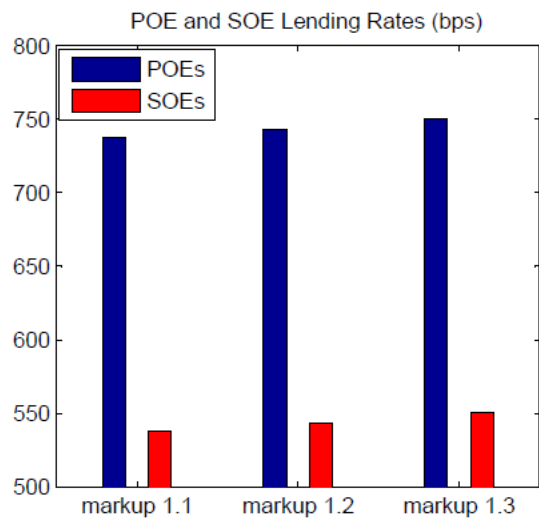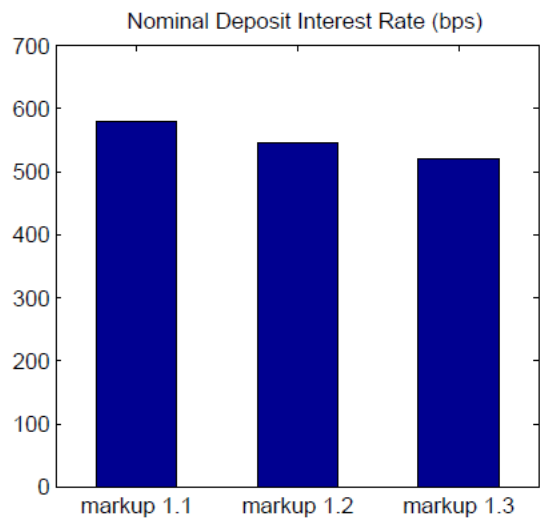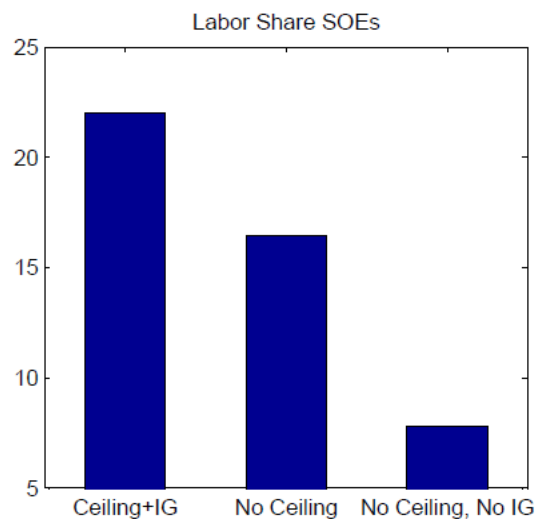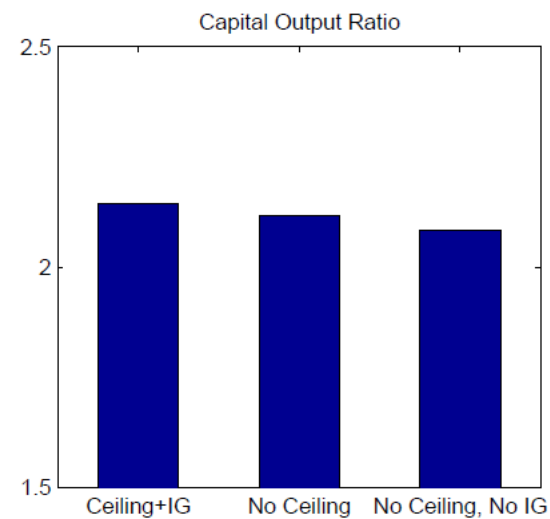
Result: Impact of removing implicit guarantee

Taking into account other reforms

- A number of reform measures in the Third Plenum package that could shift aggregate savings curve such as one-child policy and strengthening social safety net

- In a full reform simulation, we introduce a shock to the discount factor β

- Illustrative exercise of calibrating the shock so that the total stock of savings does not change after the interest rate liberalization

Result: Full reform

Key findings

1 Removing the deposit interest rate ceiling alone would not result in a more efficient allocation of credit. It would reduce lending rates, increase capital intensity in the economy and boost output. But all enterprises would expand despite their efficiency level, resulting in lower TFP.

2 Removing implicit guarantee would lead to more efficient allocation of capital and higher GDP as the role of less efficient enterprises is reduced.