



ECONOMICS
CHULALONGKORN UNIVERSITY

MACROECONOMIC EFFECTS OF MACRO- PRUDENTIAL REGULATION IN ASIAN ECONOMIES

Taya Dumrongrittikul

Nipit Wongpunya

Faculty of Economics , Chulalongkorn University

PIER ECONOMIC SEMINAR: PIER, Bank of Thailand, October 17, 2025

Presentation outline

- Introduction and Motivation
- Financial and business cycles in Asian countries
- Macro-prudential policies in Asian countries
- A banking sector in the New Keynesian model and capital quality shock
- The dynamic effects of the NK model with the banking sector
- Macro-prudential regulation (MPR)

Presentation outline

- The Bayesian estimation and empirical implementation
- The dynamic effects of traditional monetary policy and macro- prudential regulation coordination.
- Model comparisons
- The combination of conventional monetary policy and Macro prudential regulation in Asian
- Welfare analysis
- Conclusions

- The global financial crisis underscored the limitations of relying on conventional monetary policy alone to safeguard macroeconomic stability.
- While the business cycle reflects fluctuations in output and employment, the financial cycle—typically associated with swings in credit and asset prices—often evolves over longer horizons and can diverge from real economic activity
- When the two cycles are not synchronized, policymakers face the risk that stabilizing one dimension may exacerbate volatility in the other.

- One key instrument in this matter has been the development of macro-prudential regulation (MPR), aimed at reducing systemic risks to financial stability.
- Prior to the financial crisis of 2007–2008, the literature on financial frictions in macroeconomics was relatively limited.
- The theoretical foundations linking financial frictions to macroeconomic dynamics stem from the financial accelerator framework of Bernanke and Gertler (1989) and Bernanke, Gertler, and Gilchrist (1999)

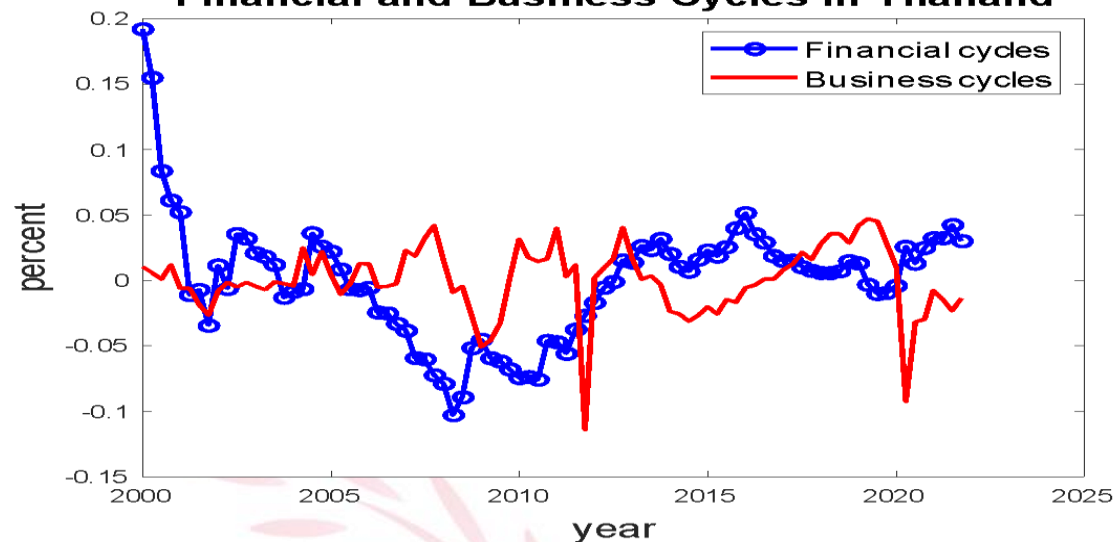
- On the policy side, macro-prudential regulation (MPR) has gained prominence as a complementary tool to mon
- Research on Thailand emphasizes the role of capital inflows and banking sector vulnerabilities.
 - Disyatat and Vongsinsirikul (2003) examined monetary policy rules in the presence of financial frictions.
 - Pongsaparn and Unteroberdoerster (2011, IMF) highlighted the importance of countercyclical capital measures to mitigate credit booms.

- While there is extensive country-level research on macro-prudential regulation (MPR) in Asia, these strands remain largely country-specific and lack comparative synthesis across Asian economies.
- Very few analyze how MPR and monetary policy interact, particularly under different shocks.
- Comparative welfare analysis—which policies deliver better stabilization outcomes for households and firms—remains underdeveloped in the Asian context
- There is no systematic attempt to estimate and compare policy rules across countries using a unified framework

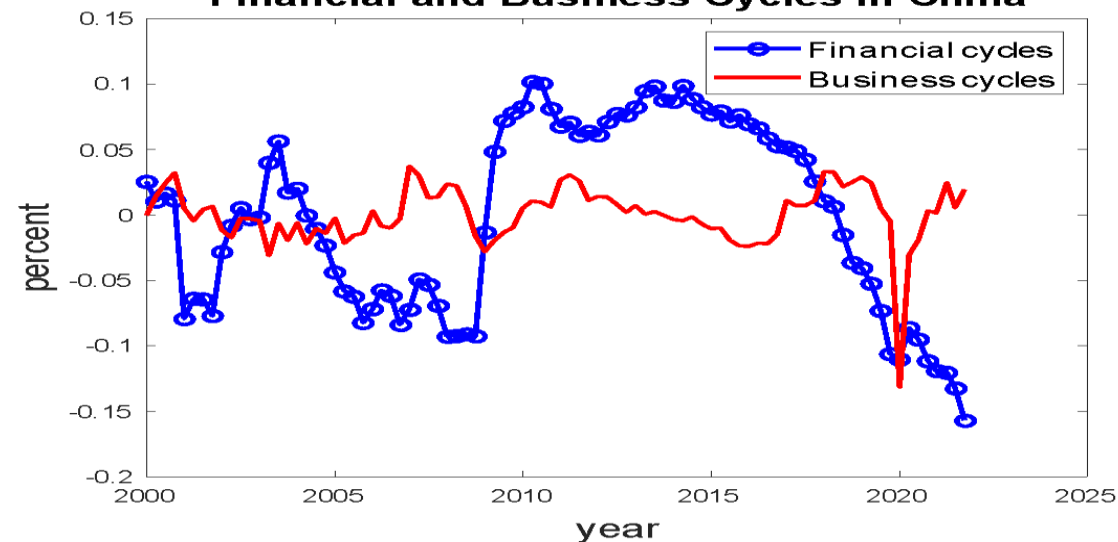
- By bridging theoretical modeling, empirical estimation, and welfare analysis, this study advances the understanding of how monetary and macro-prudential policies can jointly stabilize economies where financial and business cycles are imperfectly synchronized.
- The results hold relevance for Asian policymakers seeking to balance price stability, output stabilization, and financial stability in the presence of credit fluctuations, and global shocks.

Financial and business cycles in Asian countries

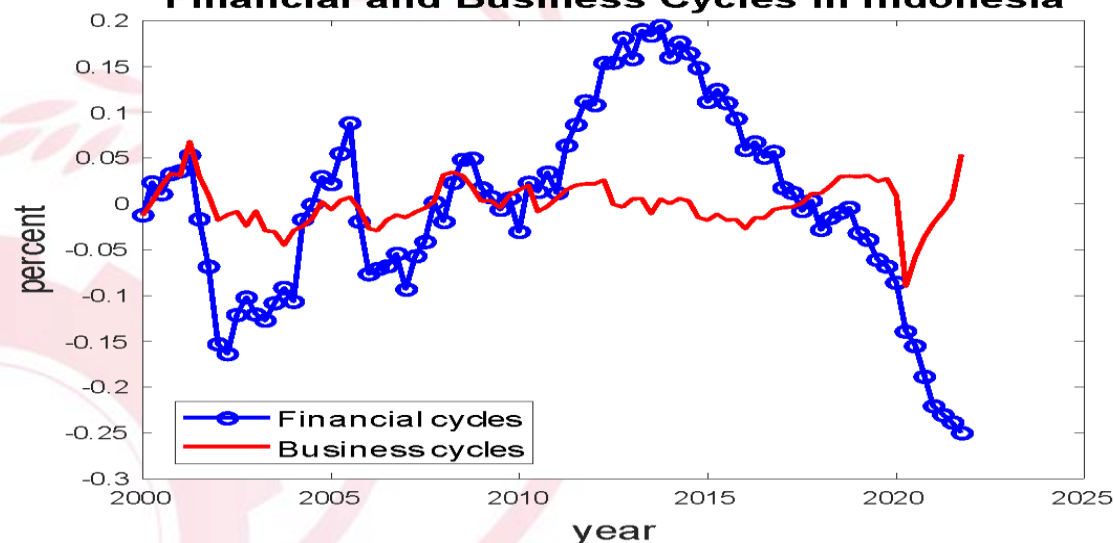
Financial and Business Cycles in Thailand



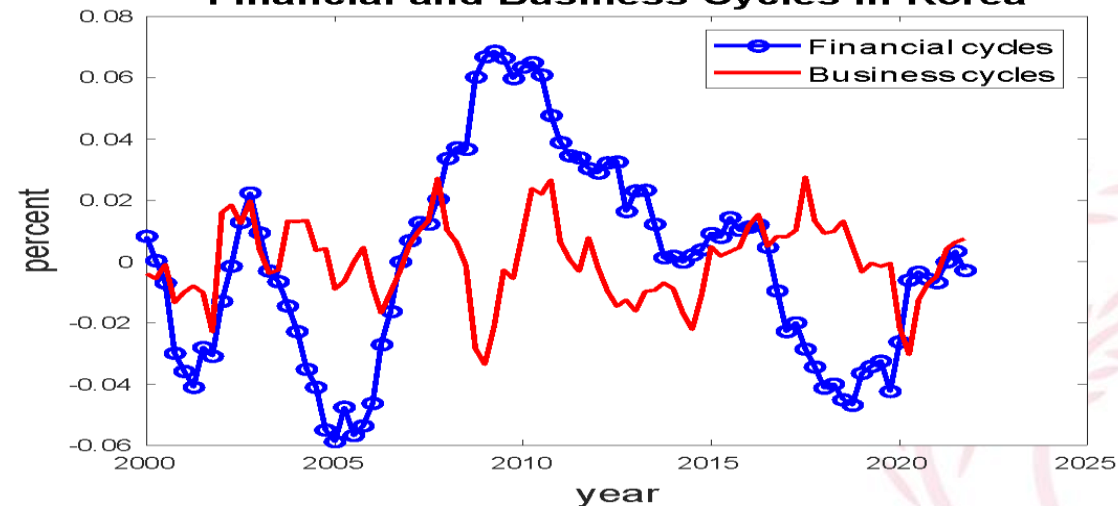
Financial and Business Cycles in China



Financial and Business Cycles in Indonesia



Financial and Business Cycles in Korea



Macro-prudential policies in Asian countries

- BOT relies primarily on borrower- and lender-based instruments such as loan-to-value (LTV) ratios for housing loans, dynamic loan-loss provisioning, and credit limits on unsecured lending.
- The People's Bank of China (PBOC) has formalized a unique system known as the Macro-Prudential Assessment (MPA), which functions as a second pillar alongside monetary policy.
- Indonesia's macroprudential framework, under the authority of Bank Indonesia (BI), is designed as part of a comprehensive policy mix strategy combining monetary, prudential, foreign exchange, and payment system policies.
- South Korea adopts a multi-agency model, where the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS) work closely with the Bank of Korea (BOK) in maintaining systemic stability.

The NK model

□ Household cost minimization problem

Household seeks to minimize its expenditure $\int_0^1 P_t(i)C_t(i)di$

Subject to a basket of goods given by $C_t = \left(\int_0^1 C_t(i)^{\frac{\zeta-1}{\zeta}} d(i) \right)^{\frac{\zeta}{\zeta-1}}$

□ Household utility maximization problem

Households optimally choose consumption good C_t and labor N_t to maximize their expected utility

$$U(C_t, L_t) = \frac{\left((C_t - \chi C_{t-1})^{(1-\varrho)} (1 - N_t)^{\varrho} \right)^{1-\sigma} - 1}{1 - \sigma}$$

Respect to their period budget constraint $B_t = R_{t-1}B_{t-1} + r_t^k K_{t-1} + W_t N_t - C_t - I_t - T_t$

The law of motion of capital $K_t = (1 - \delta)K_{t-1} + (1 - S(X_t))I_t$

The NK model

- The production is divided into three sectors, a final goods, retail and wholesale goods producers.

Retailers purchase some wholesale output $Y_t^W(i)$ and repackage it into retail output $Y_t(i)$.

The model adds the feature of price stickiness by considering the case of a staggered price setting established by Calvo(1983).

The aggregate of all prices in the economy will be
$$P_t = \left(\omega P_{t-1}^{1-\zeta} + (1 - \omega)(P_t^*)^{1-\zeta} \right)^{\frac{1}{1-\zeta}}$$

Optimal pricing behavior of intermediate goods

$$\frac{P_t^*}{P_t} = \frac{\zeta}{(\zeta - 1)} \frac{E_t \sum_{k=0}^{\infty} \omega^k \Lambda_{t,t+k} Y_{t+k} \varphi_{t+k} \left(\frac{P_{t+k}}{P_t} \right)^{\zeta}}{E_t \sum_{k=0}^{\infty} \omega^k \Lambda_{t,t+k} Y_{t+k} \left(\frac{P_{t+k}}{P_t} \right)^{\zeta-1}}$$

The NK model

The wholesale firm produces output based on $Y_t^W = A_t N_t^\alpha K_{t-1}^{1-\alpha}$

Following Yun (1996), the price dispersion Δ_t could be characterized by $Y_t = \frac{(A_t N_t)^\alpha K_{t-1}^{1-\alpha}}{\Delta_t}$

The model is completed with a balanced budget $G_t = T_t$

A conventional monetary policy

$$\log \left(\frac{R_{n,t}}{R_n} \right) = \rho_r \log \left(\frac{R_{n,t-1}}{R_n} \right) + (1 - \rho_r) \left[\theta_\pi \log \left(\frac{\pi_t}{\pi} \right) + \theta_y \log \left(\frac{Y_t}{Y} \right) + \theta_{dy} \log \left(\frac{Y_t}{Y_{t-1}} \right) \right] + \epsilon_{M,t}$$

The NK model

The wholesale firm produces output based on $Y_t^W = A_t N_t^\alpha K_{t-1}^{1-\alpha}$

Following Yun (1996), the price dispersion Δ_t could be characterized by $Y_t = \frac{(A_t N_t)^\alpha K_{t-1}^{1-\alpha}}{\Delta_t}$

The model is completed with a balanced budget $G_t = T_t$

A conventional monetary policy

$$\log \left(\frac{R_{n,t}}{R_n} \right) = \rho_r \log \left(\frac{R_{n,t-1}}{R_n} \right) + (1 - \rho_r) \left[\theta_\pi \log \left(\frac{\pi_t}{\pi} \right) + \theta_y \log \left(\frac{Y_t}{Y} \right) + \theta_{dy} \log \left(\frac{Y_t}{Y_{t-1}} \right) \right] + \epsilon_{M,t}$$

A shock process specification

$$\log \left(\frac{A_t}{A} \right) = \rho_A \log \left(\frac{A_{t-1}}{A} \right) + \epsilon_{A,t}$$

$$\log \left(\frac{G_t}{G} \right) = \rho_G \log \left(\frac{G_{t-1}}{G} \right) + \epsilon_{G,t}$$

The NK model with a banking sector

- Financial frictions affect real activity via the impact of funds available to banks
- The model follows Gertler et al. (2012) adding ingredient, the option to raise funds by issuing outside equity as well as household deposits.

A bank balance sheet $Q_t s_t = n_t + q_t e_t + d_t$

Net worth of the bank accumulates according to $n_t = R_t^K Q_{t-1} s_{t-1} - R_t d_{t-1} - R_{e,t} q_{t-1} e_{t-1}$

Banks exit with probability $1 - \sigma_B$ per period and therefore survive for $i - 1$ periods and exit in the i th period with probability $(1 - \sigma_B)\sigma_B^{i-1}$.

The NK model with a banking sector

- The banker's objective is to maximize expected discounted terminal wealth:

$$V_t = E_t \sum_{t=1}^{\infty} (1 - \sigma_B) \sigma_B^i \Lambda_{t,t+i} n_{t+i}$$

subject to an incentive constraint for lenders (households) to be willing to supply funds to the banker.

The borrowing constraint is

$$V_t \geq \theta(x_t) Q_t s_t$$

where $x_t \equiv \frac{q_t e_t}{Q_t s_t}$ is fraction of bank assets financed by outside equity

- Capital quality shock KQ_{t+1} is introduced in the model

Capital process evolves according to $S_t = [(1 - \delta)K_{t-1} + (1 - S(X_t))I_t]$

where S_t is now capital in process which is transformed into capital for next period's production according to $K_t = KQ_{t+1}S_t$

Capital quality shock also affects the balance sheet of the banks. We have

$$N_t = R_t^K (\sigma_B + \xi_B) Q_{t-1} S_{t-1} - \sigma_B R_t D_{t-1}$$

Capital accumulation with investment adjustment cost is given by

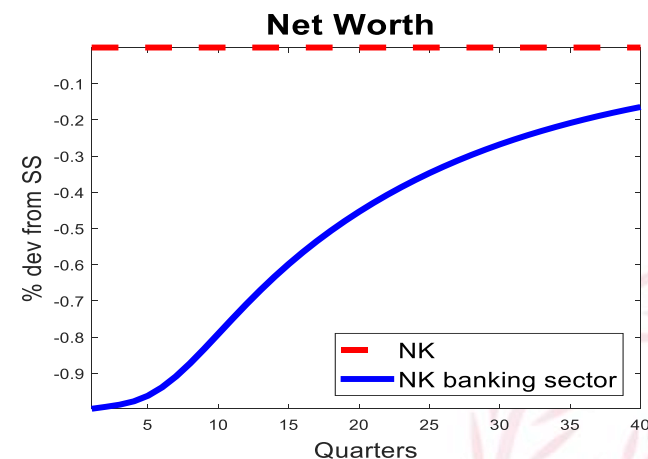
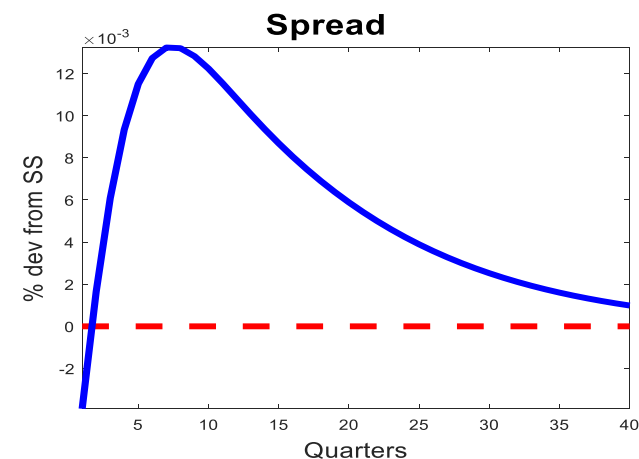
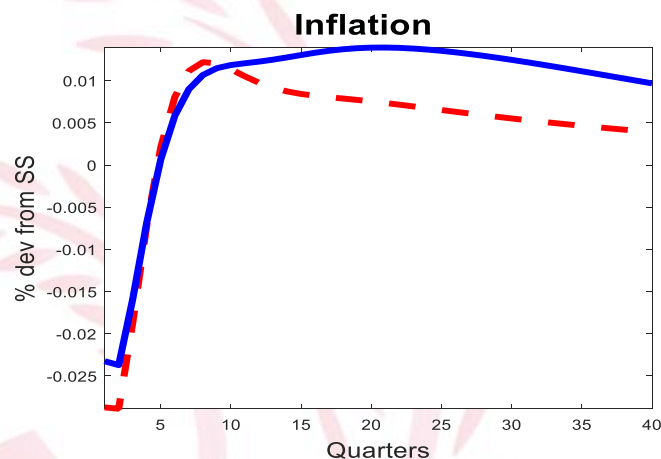
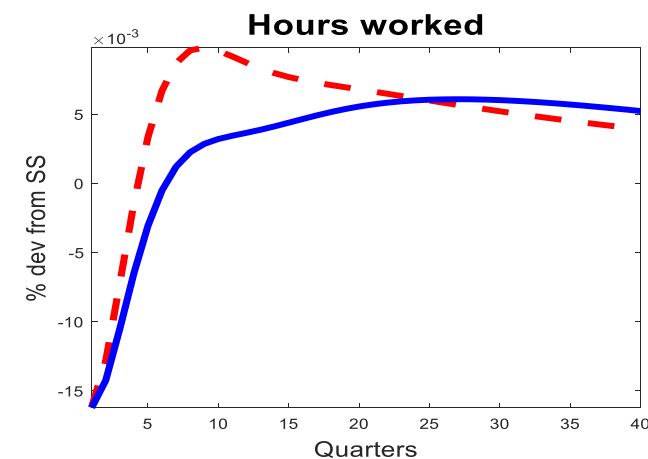
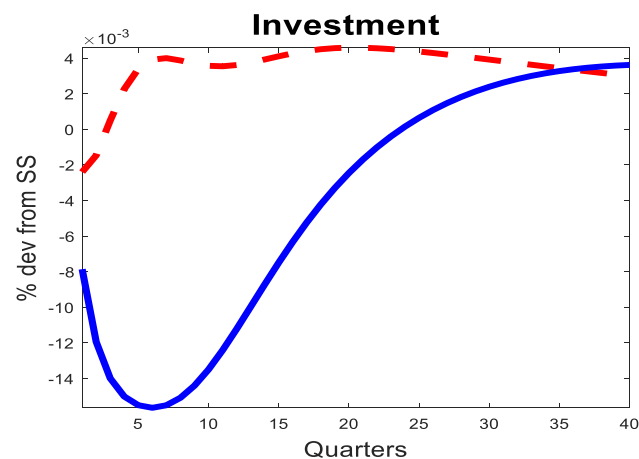
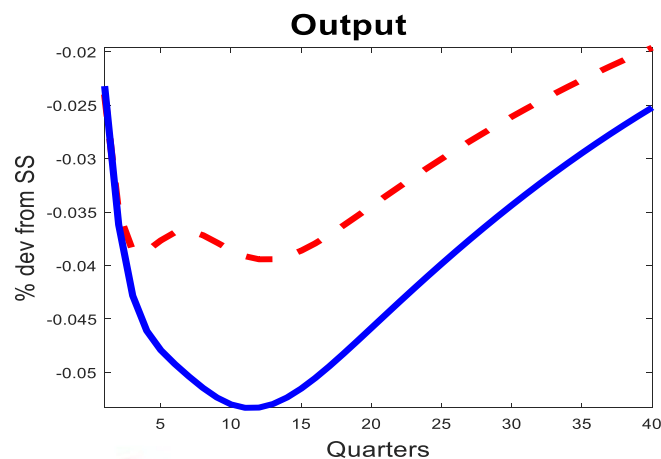
$$K_t = KQ_{t+1}((1 - \delta)K_{t+1} + (1 - S(X_t))I_t)$$

The capital quality shock process can be expressed as $\log\left(\frac{KQ_t}{KQ}\right) = \rho_{KQ} \log\left(\frac{KQ_{t-1}}{KQ}\right) + \epsilon_{KQ,t}$

The dynamic effects of the NK model with the banking sector

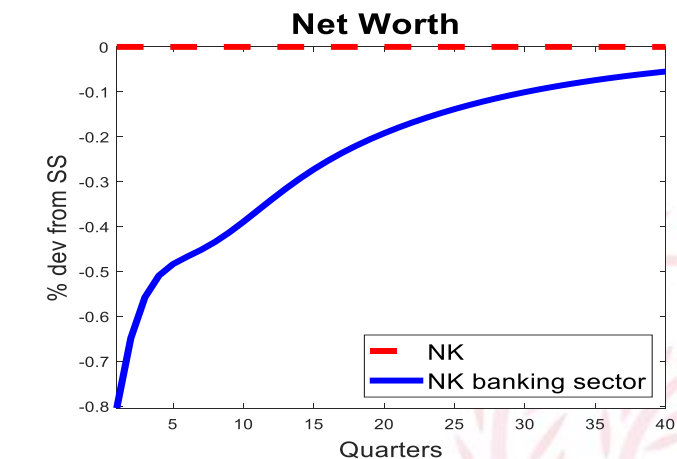
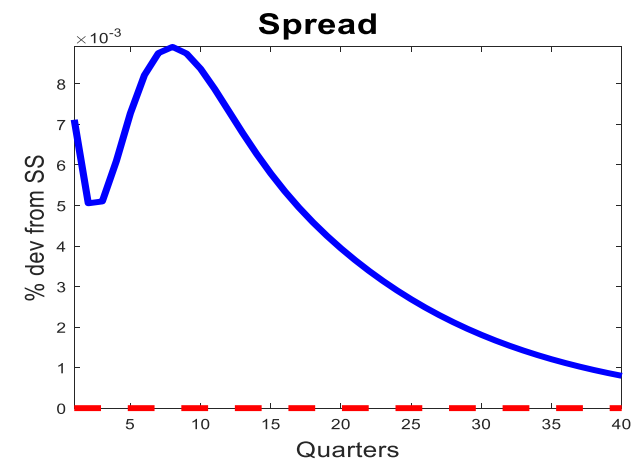
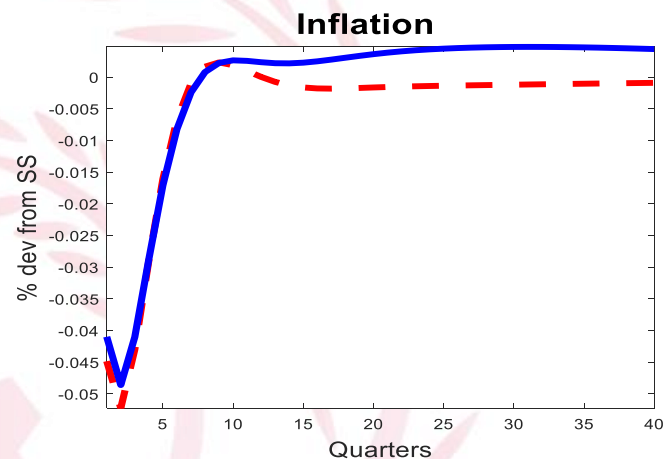
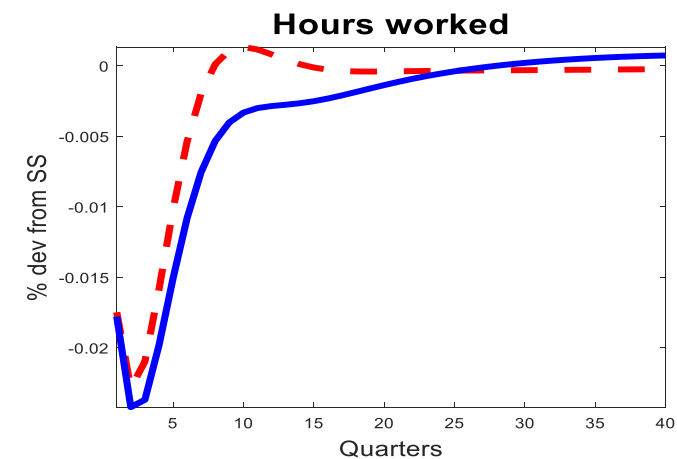
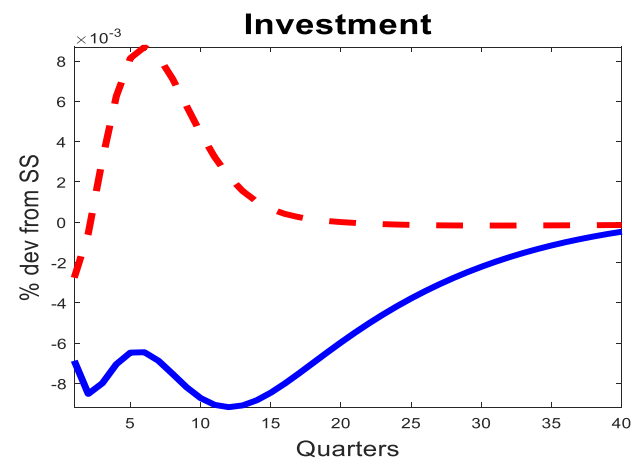
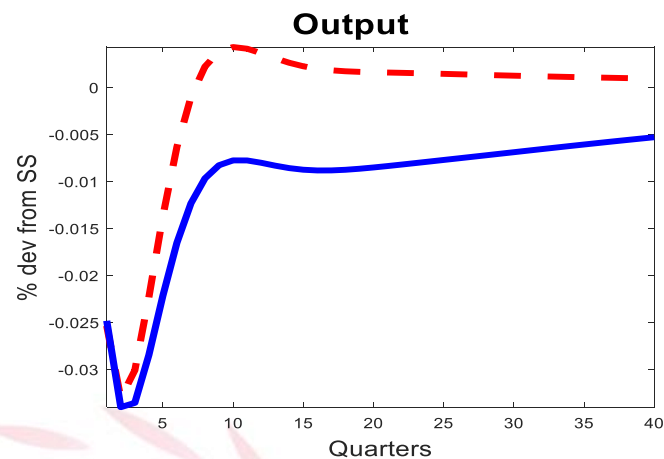
- The models are calibrated using Thai data from 2001Q1 to 2019Q4
 - Following Gertler and Kiyotaki (2010), we choose the value of σ_B so that the bankers survive 32 quarters on average
 - The Thai economy wide leverage ratio is at 3.347 and has an average credit spread of 180 basis points per year.
 - Inflation during the observation period is 2% annually.
 - Thai growth on average is 2.72% annually.
 - Government spending-GDP ratio is 0.183.
 - Outside equity target for Thai economy is 0.088
 - The structural parameters are followed the standard values in the new Keynesian model $\xi = 0.75$, $\beta = 0.99$, $\sigma_{es} = 2$, $\delta = 0.025$, $\chi = 0.7$, $\alpha = 0.7$, $\zeta = 7$, $\sigma_B = 0.9688$, $\phi_X = 2$, and $\varrho = 0.8629$.

The dynamic effects of the NK model with the banking sector



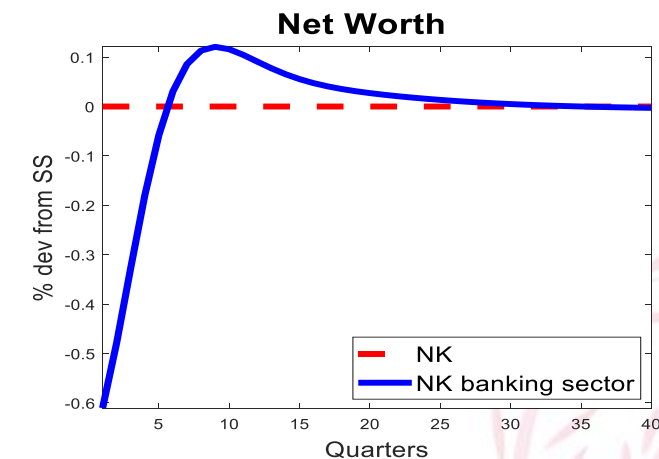
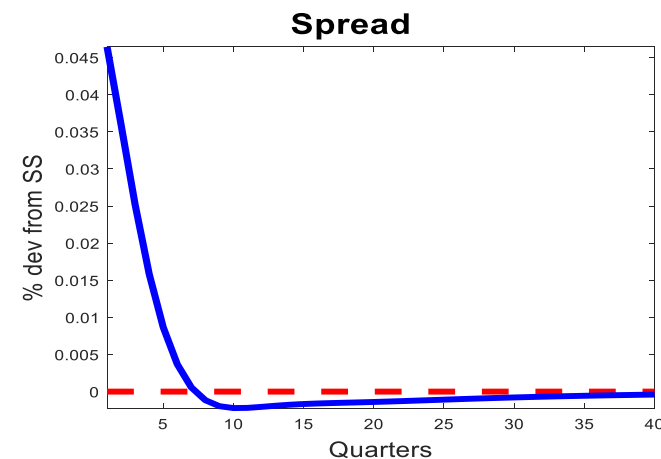
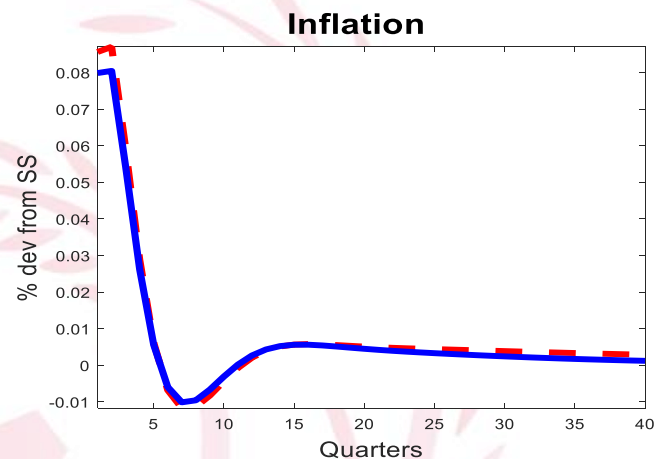
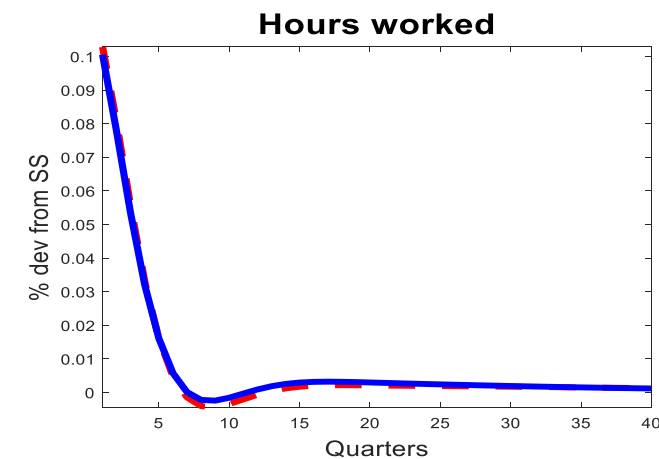
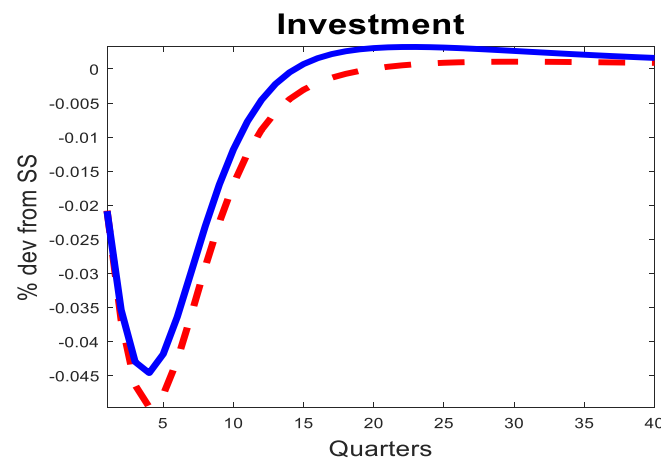
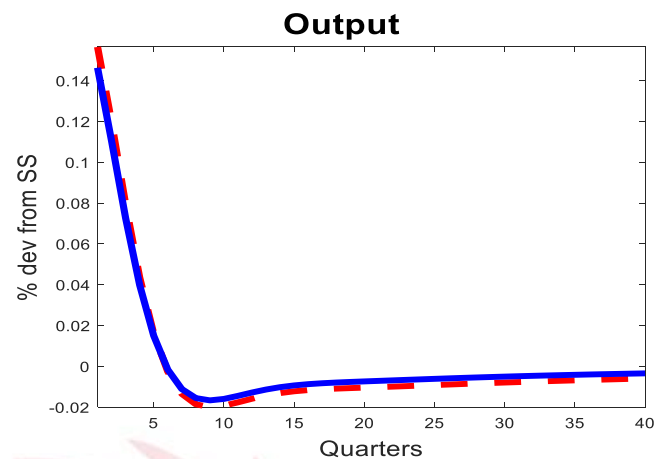
Negative capital quality shock

The dynamic effects of the NK model with the banking sector



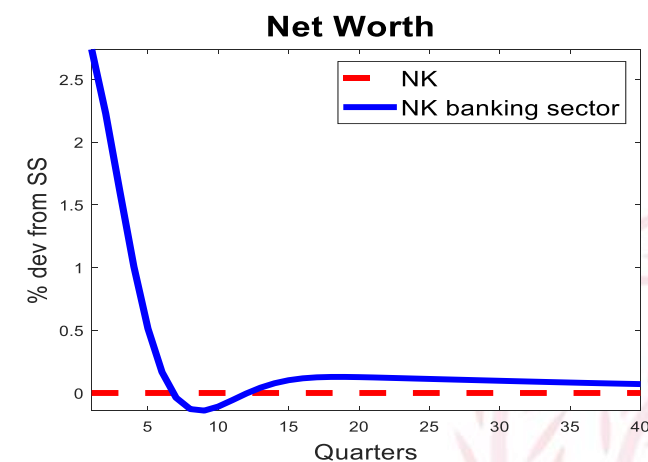
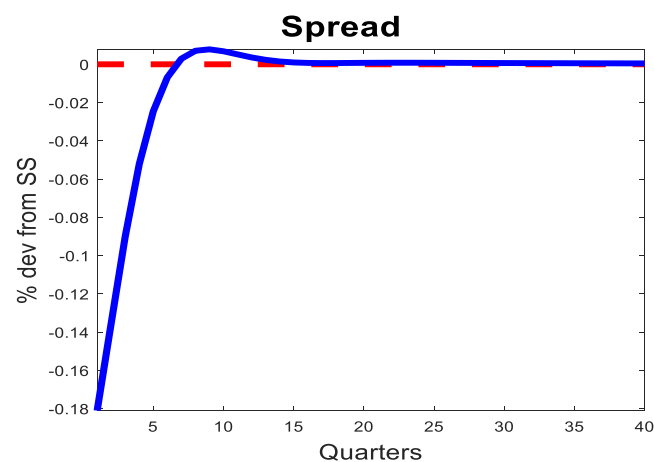
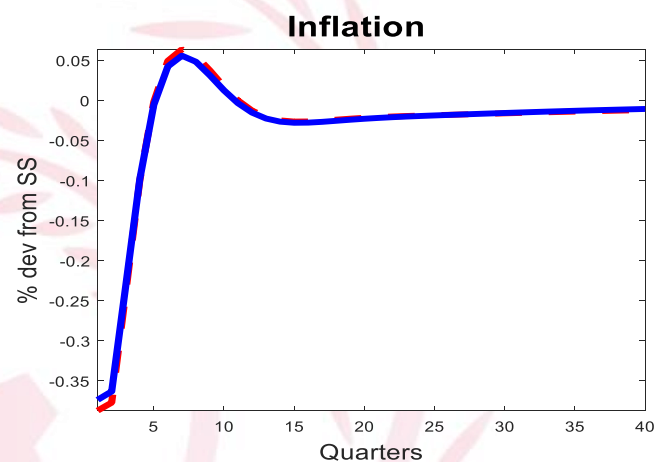
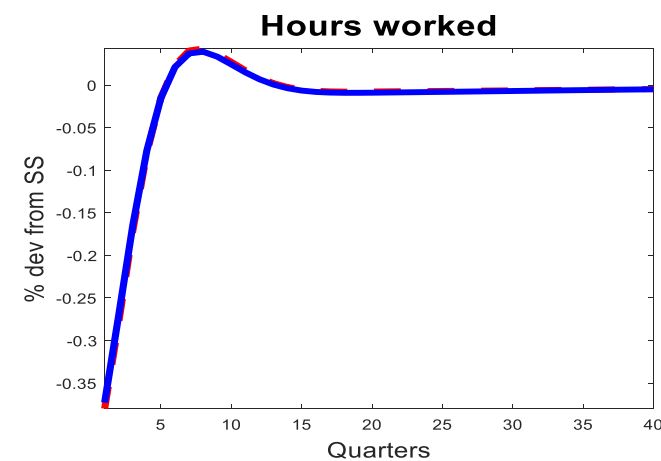
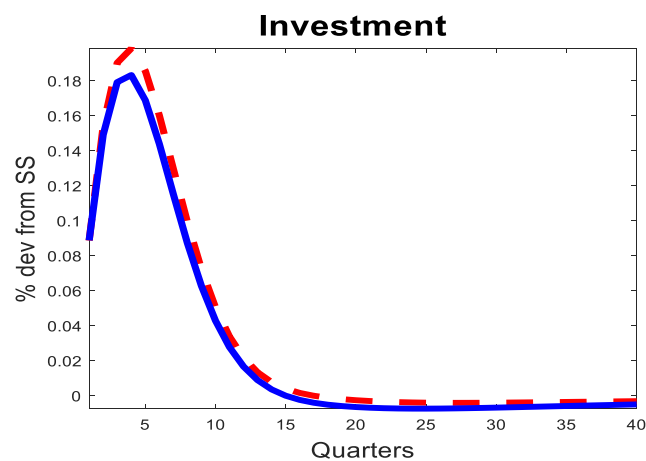
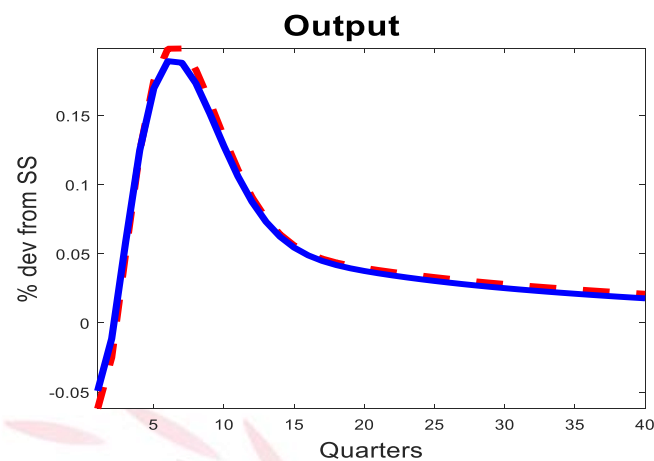
Interest rate shock (Monetary tightening)

The dynamic effects of the NK model with the banking sector



Government spending shock

The dynamic effects of the NK model with the banking sector



Technology shock

- The model can be used to examine the effects of financial macro-prudential regulation.
- This study considers a rule that directly regulates capital requirements in the form of the leverage defined as the proportion of total loans to net worth defined as:

$$lev_t = \frac{Q_t s_t}{N_t + q_t E_t}$$

- Then the rule takes the form

$$\log\left(\frac{lev_t}{lev}\right) = \rho_{lev} \log\left(\frac{lev_{t-1}}{lev}\right) - lev_y \log\left(\frac{Y_t}{Y}\right) + lev_s \log\left(\frac{1 + spread_t}{1 + spread}\right)$$

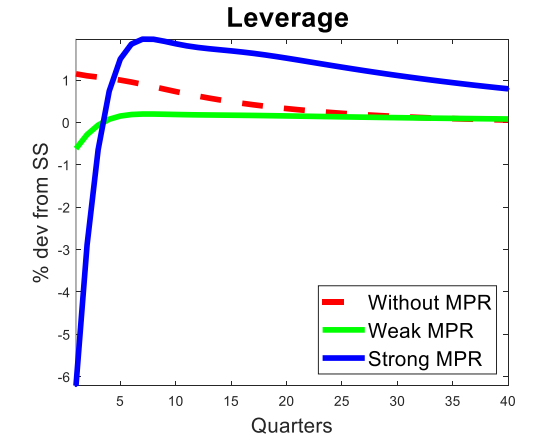
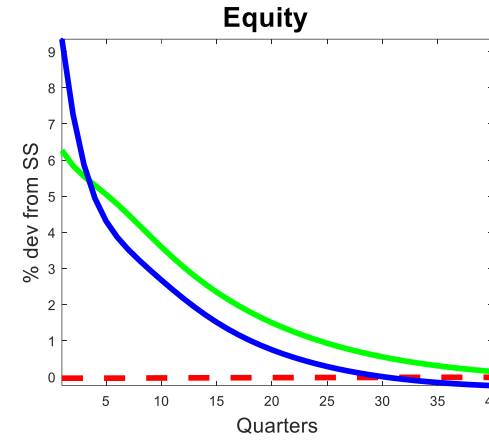
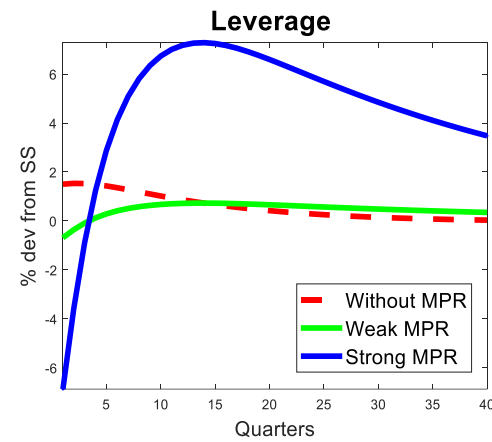
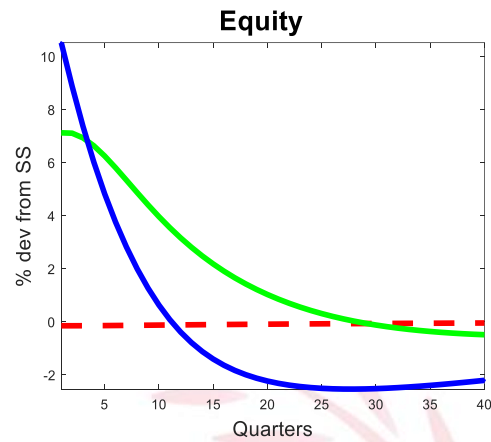
Leverage is required to respond counter-cyclically to output and pro-cyclically to spreads.

Macro-Prudential Regulation (MPR)

- When output rises above potential, leverage is reduced because higher GDP tends to be associated with overheating risks.
- When output falls below potential, leverage is increased to cushion the downturn.
- When spreads narrow or when credit market cheap, risk perception is low and regulators tighten leverage.
- MPR amplifies bank's risk-taking when credit becomes expensive to avoid credit crunches.
- Policy goal is to lean against credit booms and support lending in recessions.
- Policy goal is to avoid excessive deleveraging when financial conditions tighten.
- Essentially, the regulator leans against real economic cycles but accommodates financial stress.

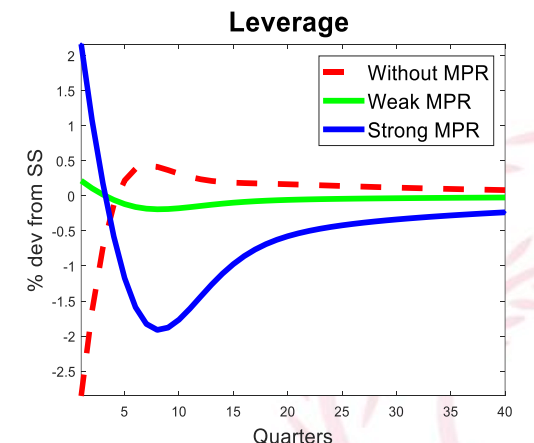
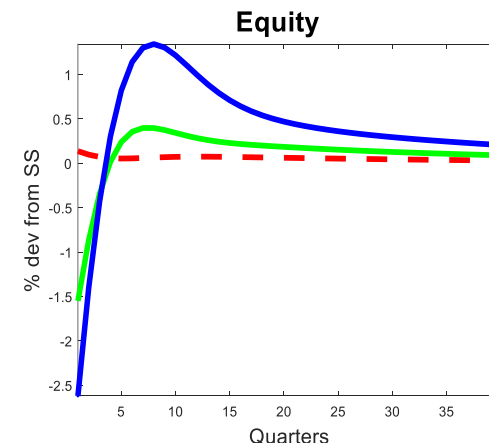
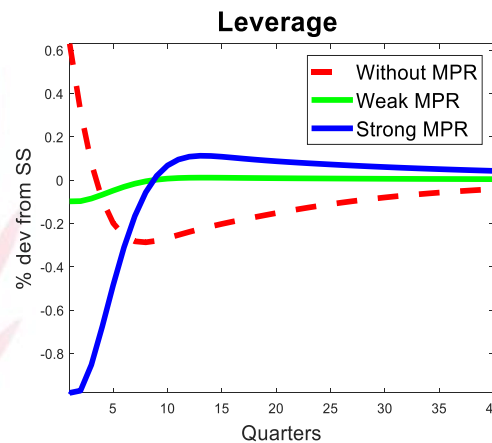
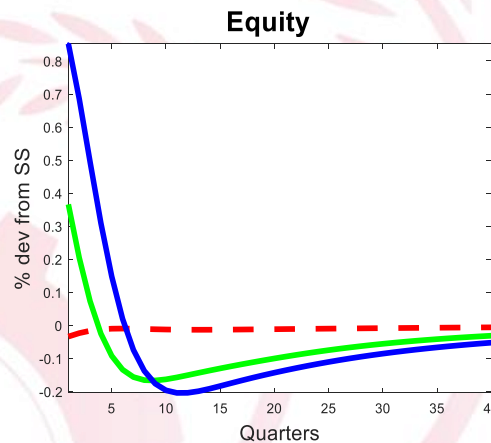
Macro-Prudential Regulation (MPR)

- The responses of equity and leverage of the macro-prudential regulations for Thailand



Negative capital quality shock

Interest rate shock (Monetary tightening)



Government spending shock

Technology shock

The Bayesian Estimation

- We use the Bayesian estimation involves specifying priors and updating them based on observed data to estimating the DSGE models for 4 different countries in Asia, namely Thailand, China, Indonesia and South Korea.
- We focus on estimating the monetary policy parameters both the conventional Taylor rule and the macro-prudential rule parameters for these countries.
- Using the Bayesian rule, the posterior distribution can be computed as

$$p(\theta|Y^T, M) = \frac{p(Y^T|\theta, M)p(\theta|M)}{p(Y^T|M)}$$

- M stands for the model
- $p(\theta|Y^T, M)$ is the posterior distribution of the parameter conditional on the model
- $p(Y^T|\theta, M)$ is the likelihood density of the model parameter
- $p(\theta|M)$ is the prior which represents pre-experimental knowledge of parameters
- $p(Y^T|M)$ is the probability of data conditional on the model.

The Bayesian Estimation

Prior distributions

Prior		Prior	
	Density	Mean	St.Dev
Taylor rule parameters			
Persistence in interest rate ρ_r	Beta	0.75	0.10
Feedback of inflation θ_π	Gamma	2.00	0.25
Feedback of output θ_y	Gamma	0.125	0.05
Feedback output growth θ_{dy}	Beta	0.125	0.05
Macro-prudential parameters			
Persistence in leverage ρ_{lev}	Beta	0.75	0.10
Feedback of output lev_y	Gamma	0.50	0.05
Feedback of spread lev_s	Gamma	0.50	0.05
Shock parameters			
Persistence in capital quality	Beta	0.50	0.20
Persistence in government spending	Beta	0.50	0.20
Persistence in technology	Beta	0.50	0.20
Capital quality	Inv. gamma	0.10	2.00
Interest rate	Inv. gamma	0.10	2.00
Government spending	Inv. gamma	0.50	2.00
Technology	Inv. gamma	0.10	2.00
Trend	Normal	0.009	0.10

Data for each country

- The log difference of real GDP
- The log difference of the CPI
- The central bank policy rate.
- All data are transformed to ensure that it is stationary. All series are seasonally adjusted.
- The observations are on a quarterly basis and from 2001Q1 to 2019Q4.
- The data is from CEIC that is a database system using data aggregated from the IMF.

The Bayesian Estimation

Prudential indicators

Steady state	Thailand	China	Indonesia	S. Korea
Leverage	3.347	4.623	2.786	4.332
Spread	0.0045	0.0026	0.0027	0.003
Xeq	0.088	0.062	0.112	0.077

Xeq denotes the ratio of outside bank equity to total assets

- **Thailand** has a moderate leverage suggesting that banks are not excessively exposed. Financial stability is relatively strong. Largest spread suggests higher risk premiums or less efficient intermediation. It could reflect structural credit risks. Relatively high outside equity participation, giving banks a stronger capital buffer.
- **China** has the highest leverage, implying greater risk-taking in the financial system, but also higher credit availability. This reflects China's growth-driven financial system but raises vulnerability to shocks. Lower spreads imply cheaper credit relative to risk. Lowest outside equity shows reliance on internal or state-backed equity, which could limit market discipline.
- **Indonesia** has the lowest leverage, indicating a more conservative banking stance and tighter credit supply. It may enhance stability but constrain growth. Lower spreads imply cheaper credit relative to risk. However, highest outside equity indicating robust external equity participation—banks depend more on outside investors, which enhances capital resilience but also exposes them to investor sentiment.
- **South Korea** has a high leverage like China, showing an aggressive credit market, likely tied to advanced financial integration but also higher systemic risk. South Korea has a mid-range spread, consistent with a mature financial system that balances competition with risk assessment. Additionally, a moderate outside equity is consistent with balanced reliance on outside equity.

The Bayesian Estimation

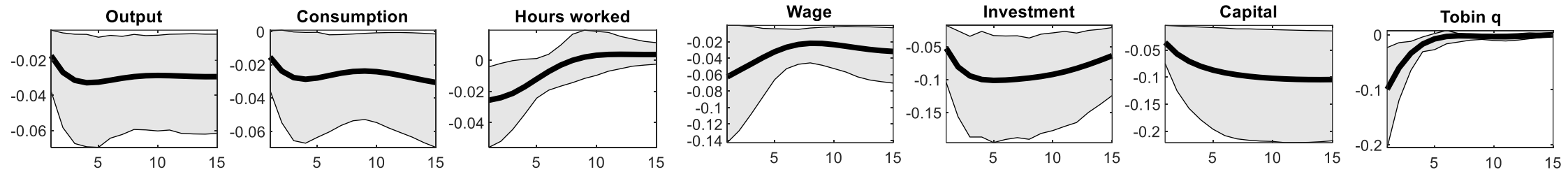
Posterior distributions for Thailand and China

Posteriors		Thailand			China		
	Density	Mean	90% interval		Mean	90% interval	
Taylor rule parameters							
Persistence in interest rate ρ_r	Beta	0.973	0.9762	0.9784	0.979	0.9732	0.9854
Feedback of inflation θ_{π}	Gamma	2.066	1.7015	2.4013	1.710	1.3174	2.1291
Feedback of output θ_y	Gamma	0.100	0.0079	0.1938	0.162	0.1044	0.2261
Feedback output growth θ_{dy}	Beta	0.115	0.0323	0.2035	0.110	0.0480	0.1897
Macro-prudential parameters							
Persistence in leverage ρ_{lev}	Beta	0.764	0.6204	0.9427	0.750	0.5773	0.9171
Feedback of output lev_y	Gamma	0.504	0.4302	0.5836	0.499	0.4297	0.5866
Feedback of spread lev_s	Gamma	0.507	0.4187	0.5810	0.502	0.3389	0.6343
Shock parameters							
Persistence in capital quality	Beta	0.507	0.1868	0.8333	0.937	0.8818	0.9747
Persistence in government spending	Beta	0.479	0.1333	0.7461	0.506	0.2023	0.8372
Persistence in technology	Beta	0.991	0.9868	0.9958	0.991	0.9886	0.9943
Capital quality	Inv. gamma	0.071	0.0275	0.1282	0.906	0.4473	1.4987
Interest rate	Inv. gamma	0.087	0.0734	0.0979	0.058	0.0494	0.0655
Government spending	Inv. gamma	0.365	0.1395	0.5904	0.385	0.1413	0.6475
Technology	Inv. gamma	3.761	3.0708	4.3875	7.428	6.4485	8.2600
Trend	Normal	0.009	0.1479	-0.0017	0.151	-0.0027	0.3159

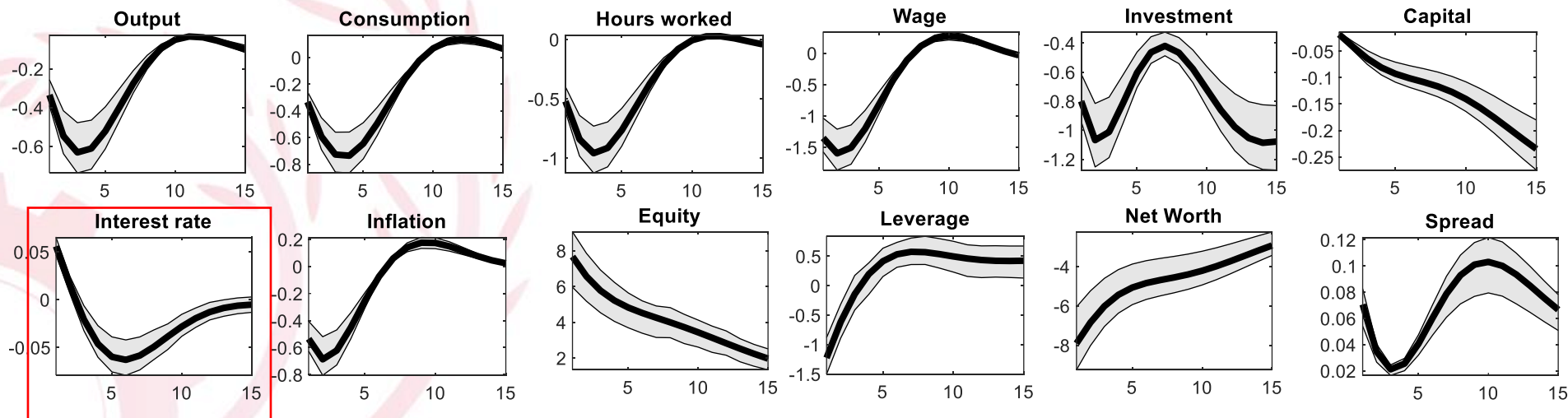
Posterior distributions for Indonesia and South Korea

Posteriors		Indonesia			South Korea		
	Density	Mean	90% interval		Mean	90% interval	
Taylor rule parameters							
Persistence in interest rate ρ_r	Beta	0.929	0.9096	0.9456	0.955	0.9462	0.9648
Feedback of inflation θ_{π}	Gamma	1.943	1.4444	2.4333	2.355	2.0644	2.6812
Feedback of output θ_y	Gamma	0.156	0.0704	0.2495	0.132	0.0483	0.2189
Feedback output growth θ_{dy}	Beta	0.111	0.0233	0.2011	0.131	0.0661	0.1945
Macro-prudential parameters							
Persistence in leverage ρ_{lev}	Beta	0.774	0.6312	0.9267	0.772	0.6362	0.9214
Feedback of output lev_y	Gamma	0.499	0.4210	0.5838	0.506	0.4321	0.5919
Feedback of spread lev_s	Gamma	0.504	0.3700	0.6207	0.499	0.4111	0.5744
Shock parameters							
Persistence in capital quality	Beta	0.926	0.8460	0.9952	0.545	0.1800	0.8815
Persistence in government spending	Beta	0.480	0.1081	0.7720	0.498	0.1363	0.8200
Persistence in technology	Beta	0.982	0.9715	0.9944	0.989	0.9829	0.9965
Capital quality	Inv. gamma	0.407	0.1087	0.8449	0.061	0.0263	0.0963
Interest rate	Inv. gamma	0.338	0.2837	0.3955	0.105	0.0883	0.1191
Government spending	Inv. gamma	0.330	0.1449	0.5349	0.309	0.1424	0.4710
Technology	Inv. gamma	7.434	6.1656	8.8802	3.159	2.6293	3.6247
Trend	Normal	0.088	-0.075	0.2549	0.213	0.0346	0.3695

The dynamic effects of traditional monetary policy and macro-prudential regulation coordination.

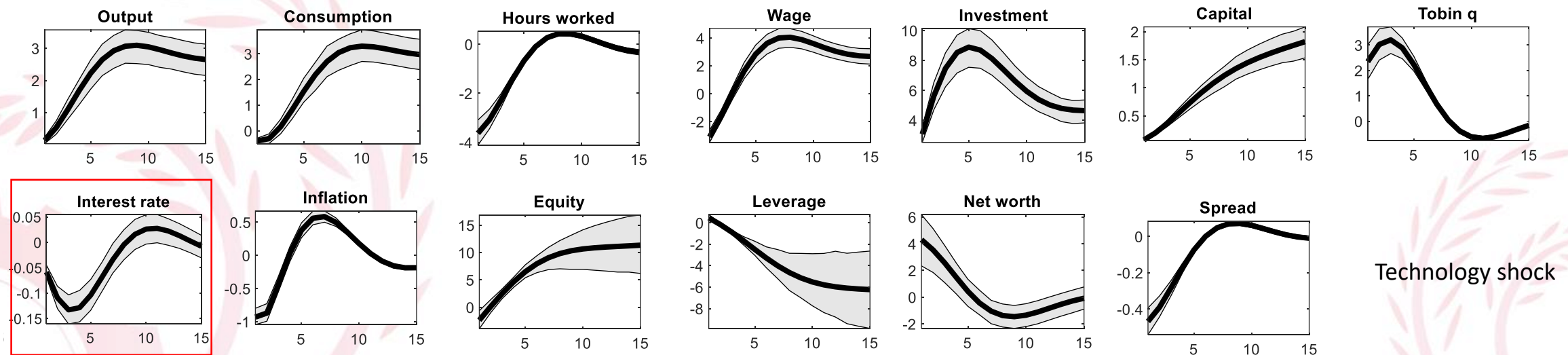
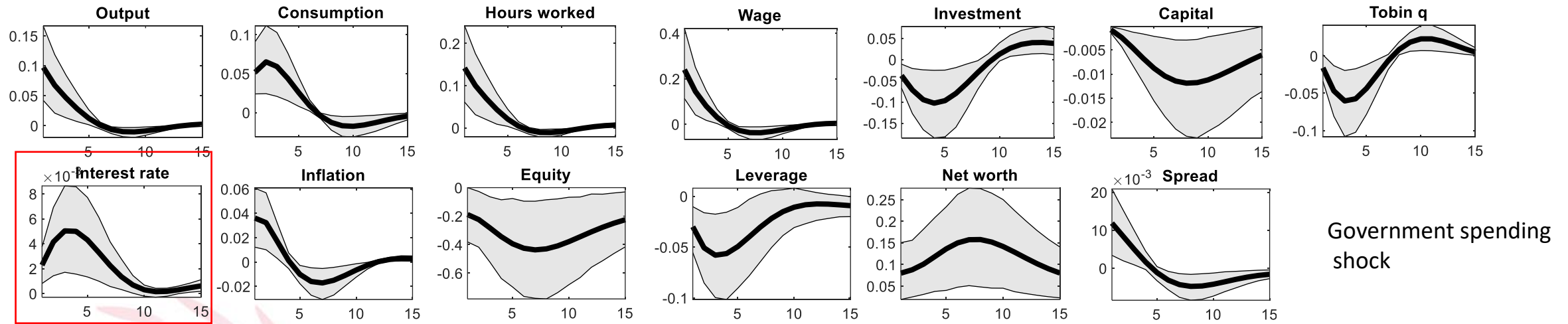


Negative capital quality shock



Interest rate shock
(Monetary tightening)

The dynamic effects of traditional monetary policy and macro-prudential regulation coordination.



The dynamic effects of traditional monetary policy and macro-prudential regulation coordination.

The impulse responses make clear how the interaction of the two channels (output-counter cyclical but spreads-procyclical) of MPR produces very different MPR policy stances across shocks.

- The MPR loosens in downturns and tightens in booms.
- For the negative capital quality shock, net MPR stance is loosening because output falls and spread rises.
- Regarding monetary tightening, output falls and spread rises. Thus, net MPR stance is also loosening.
- Under positive technology shock, output rises and spreads fall. Net MPR stance is tightening.
- Nonetheless, because of a positive government spending shock, output rises and spreads rise. Output channel tightens but spread channel loosens. Therefore, net MPR stance is ambiguous.

- Model comparison
- The hypothesis that central banks consider the macro-prudential regulation to conduct monetary policy
- Comparing two NK with banking models
 - M_1 : The models with Taylor rule
 - M_2 : The models with Taylor rule and MPR
- To compare these two models, we utilize the ratio of their posterior model probabilities.

$$po_{12} = \frac{p(M_1|Y^T)}{p(M_2|Y^T)} = \frac{p(Y^T|M_1)p(M_1)}{p(Y^T|M_2)p(M_2)}$$

The Bayesian Estimation

□ Model comparison

Country	Thailand		China		Indonesia		South Korea	
Model	M2	M1	M2	M1	M2	M1	M2	M1
Priors	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Log marginal density	-229.29	-229.33	-175.61	-175.65	-330.95	-330.99	-165.81	-165.85
Bayes ratio	1.0000	0.9449	1.0000	0.9468	1.0000	0.9648	1.0000	0.9464
Posterior model prob.	0.5089	0.49107	0.5089	0.49106	0.5089	0.49106	0.5090	0.4909

M1 is the NK banking model with Taylor rule.

M2 is the NK banking model with Taylor rule and MPR

The combination of conventional monetary policy and MPR in Asian

□ Conventional monetary policy rules (Taylor-type rules)

$$\log\left(\frac{R_{n,t}}{R_n}\right) = \rho_r \log\left(\frac{R_{n,t-1}}{R_n}\right) + (1 - \rho_r) \left[\theta_\pi \log\left(\frac{\pi_t}{\pi}\right) + \theta_y \log\left(\frac{Y_t}{Y}\right) + \theta_{dy} \log\left(\frac{Y_t}{Y_{t-1}}\right) \right] + \epsilon_{M,t}$$

□ Unconventional monetary policy rules (MPR)

$$\log\left(\frac{lev_t}{lev}\right) = \rho_{lev} \log\left(\frac{lev_{t-1}}{lev}\right) - lev_y \log\left(\frac{Y_t}{Y}\right) + lev_s \log\left(\frac{1 + spread_t}{1 + spread}\right)$$

Taylor

Policy parameters	ρ_r	θ_π	θ_y	θ_{dy}
Thailand	0.973	2.066	0.100	0.115
China	0.979	1.710	0.162	0.110
Indonesia	0.929	1.943	0.156	0.111
South Korea	0.955	2.355	0.132	0.131

MPR

Policy parameters	ρ_{lev}	lev_y	lev_s
Thailand	0.764	0.504	0.507
China	0.750	0.499	0.502
Indonesia	0.774	0.499	0.504
South Korea	0.772	0.506	0.499

The combination of conventional monetary policy and MPR in Asian

- Conventional monetary policy rules (Taylor rule)
 - China $\rho_r=0.979$ and Thailand $\rho_r=0.973$ exhibit high policy smoothing, meaning they adjust interest rates gradually over time, whereas Indonesia $\rho_r=0.929$ responds more aggressively to economic shocks.
 - South Korea $\theta_\pi=2.355$ and Thailand $\theta_\pi=2.066$ are the most inflation-targeting economies, while China $\theta_\pi=1.710$ adopts a less aggressive stance, suggesting greater tolerance for temporary inflation fluctuations.
 - China places more emphasis on the output gap $\theta_y=0.162$ compared to Thailand $\theta_y=0.100$, indicating a more growth-oriented monetary stance. Meanwhile, South Korea assigns the highest weight to output growth $\theta_{dy}=0.131$, reflecting dual objectives of supporting growth while controlling inflation.

The combination of conventional monetary policy and MPR in Asian

- Unconventional monetary policy rules (MPR)
 - Thailand adopts a medium macro-prudential stance, maintaining a balanced approach to leverage control without being overly restrictive.
 - China exhibits a slightly weaker leverage control framework, allowing for more flexibility in credit and balance sheet adjustments.
 - Indonesia shows the highest leverage persistence, indicating that banks adjust their leverage more slowly and rely on gradual regulatory interventions
 - South Korea implements tight leverage monitoring, reflecting a proactive macro-prudential policy aimed at maintaining financial stability

To rank alternative macro prudential policies, we use a welfare-based criterion based on the inter-temporal household expected utility.

$$\Omega_t = E_t \sum_{\tau=0}^{\infty} \beta^{t+\tau} U(C_{t+\tau}, C_{t+\tau-1}, N_{t+\tau})$$

We compute a consumption equivalent variation CEV_t , the increase in the given by a 1% increase in consumption by defining the variable

$$CEV_t = U_t(1.01C_t, 1.01C_{t-1}, N_t) - U_t + \beta_{g,t+1} E_t[(1 + g_{t+1})CEV_{t+1}]$$

Then we use the deterministic steady state of CEV_t or CEV to compare welfare outcomes: for two welfare outcomes, Ω_1 and Ω_2

Welfare analysis

Country	Feedback	Welfare	Equity	leverage	Sd Equity	Sd Leverage	CEV
Thailand	Taylor rule	-619.6562	0.3412	2.8035	0.0719	0.7007	0.000
MPR	0.3	-621.9196	0.1464	2.6209	0.3205	0.1567	0.368
	0.4	-621.8855	0.1499	2.6344	0.3222	0.2089	0.362
	0.5	-621.8795	0.1522	2.6492	0.3264	0.2611	0.361
	0.6	-621.9016	0.1529	2.6655	0.333	0.3133	0.365
	0.7	-621.9519	0.1521	2.6836	0.3419	0.3655	0.373
China	Taylor rule	-117.6099	0.1937	4.1264	0.0371	1.3596	0.000
MPR	0.4	-117.7439	0.0412	3.6435	0.2537	0.269	0.205
	0.5	-117.7429	0.0431	3.659	0.2539	0.3362	0.203
	0.6	-117.7426	0.0447	3.6759	0.255	0.4034	0.203
	0.7	-117.743	0.046	3.6942	0.2568	0.4707	0.204
	0.8	-117.7441	0.047	3.7141	0.2594	0.5379	0.205
Indonesia	Taylor rule	-404.7736	0.4161	2.2557	0.09	0.4747	0.000
MPR	0.2	-406.1245	0.2314	2.1479	0.2947	0.0942	0.335
	0.3	-406.0772	0.2361	2.1611	0.296	0.1414	0.323
	0.4	-406.0602	0.2386	2.1756	0.3019	0.1885	0.319
	0.5	-406.0735	0.2386	2.1914	0.3122	0.2356	0.322
	0.6	-406.1170	0.2358	2.2091	0.3264	0.2827	0.333
S. Korea	Taylor rule	-452.4202	0.2889	3.7487	0.0675	1.105	0.000
MPR	0.3	-453.6116	0.1329	3.2852	0.3425	0.2110	0.263
	0.4	-453.6006	0.1367	3.3002	0.3441	0.2814	0.261
	0.5	-453.6000	0.1399	3.3169	0.3475	0.3517	0.261
	0.6	-453.6098	0.1423	3.3355	0.3528	0.4221	0.263
	0.7	-453.6301	0.1439	3.3562	0.3598	0.4924	0.267

Optimized regulatory rule in the MPR for all shocks

It is significantly at approximately 0.36%, 0.20%, 0.32% and 0.26% consumption equivalent for Thailand, China, Indonesia and South Korea respectively.

For the selected Asian countries, the optimized regulatory rule in the MPR $lev_y = lev_s$ is **between 0.4 and 0.6**. or moderate prudential tightening.

MPR policy parameters are set by $lev_y = lev_s$. A conventional Taylor rule is the model without MPR. Sd is standard deviation.

Optimized regulatory rule in the MPR for capital quality shock

Country	Feedback	Welfare	Equity	leverage	Sd Equity	Sd Leverage	CEV
Thailand	Taylor rule	-612.603	0.2861	2.795	0.0681	0.5217	0.000
MPR	0.5	-613.742	0.2421	2.602	0.2238	0.2369	0.185
China	Taylor rule	-117.025	0.098	4.2966	0.0344	0.9984	0.000
MPR	0.6	-117.093	0.1088	3.6162	0.1759	0.3452	0.104
Indonesia	Taylor rule	-398.948	0.3647	2.2562	0.0853	0.3336	0.000
MPR	0.4	-399.599	0.3304	2.1331	0.2035	0.1721	0.161
S. Korea	Taylor rule	-448.515	0.1925	3.8134	0.0638	0.8341	0.000
MPR	0.5	-449.154	0.215	3.2658	0.2467	0.3186	0.141

Hence, the optimal welfare-based policy usually prescribes **moderate** macro-prudential tightening

Optimized regulatory rule in the MPR for monetary tightening

Country	Feedback	Welfare	Equity	leverage	Sd Equity	Sd Leverage	CEV
Thailand	Taylor rule	-617.512	0.3758	2.5919	0.0203	0.4645	0.000
MPR	0.8	-618.524	0.2266	2.6499	0.2276	0.1396	0.164
China	Taylor rule	-117.512	0.2653	3.4275	0.0133	0.9174	0.000
MPR	0.7	-117.574	0.1079	3.6567	0.1809	0.2209	0.096
Indonesia	Taylor rule	-403.423	0.4475	2.1207	0.0257	0.314	0.000
MPR	0.8	-403.998	0.2905	2.1945	0.2112	0.1218	0.143
S. Korea	Taylor rule	-451.535	0.384	3.1922	0.0195	0.7155	0.000
MPR	0.7	-452.042	0.2172	3.3096	0.2352	0.1657	0.112

It shows that the **strong MPR** is optimally required in response to **monetary tightening** for all four countries.

However, the **moderate MPR** is needed to manage leveraging for **monetary loosening** for all countries.

- This study develops a New Keynesian DSGE framework with financial frictions and an active macro-prudential regulation (MPR) rule to examine the interaction between monetary policy and financial stability in Asian economies.
 - By integrating a banking sector with endogenous leverage, capital quality shocks, and credit spreads.
 - Using Bayesian estimation for Thailand, China, Indonesia, and South Korea
- In the absence of MPR, leverage and spreads respond excessively to financial and real shocks, amplifying output and credit volatility
- By explicitly incorporating MPR—designed to be countercyclical with respect to output and pro-cyclical with respect to spreads,
 - The MPR smooths credit cycles by tightening leverage constraints during booms and relaxing them during downturns.

- The results show that MPR produces very different policy stances across shocks.
 - For the negative capital quality shock and monetary tightening, the MPR stance is loosening.
 - The MPR stance is tightening for the positive technology shock
 - Under the positive fiscal policy shock, the MPR stance is mixed.
- The Bayesian estimates reveal important structural differences
 - Thailand and South Korea emphasize strong inflation targeting and balanced prudential frameworks
 - China prioritizes output stabilization but maintains relatively weaker MPR, while Indonesia combines aggressive monetary policy with high leverage persistence

- The model comparison results indicate that across all four economies, the combined framework (Taylor rule and MPR) consistently outperforms a simple Taylor rule in terms of posterior likelihood.
- Welfare analysis further indicates that moderate MPR rules are optimal and deliver the greatest consumption-equivalent gains under a negative capital quality. In contrast, strong MPR is particularly valuable in the face of monetary tightening
- An integrated policy framework combining interest-rate rules with macro-prudential tools is necessary to contain systemic risks, improve monetary transmission, smooth credit and business cycles, and enhance welfare



ECONOMICS
CHULALONGKORN UNIVERSITY

THANK YOU