

# The Effects of Capital and Liquidity Requirements in a Dynamic Model with an Interbank Market

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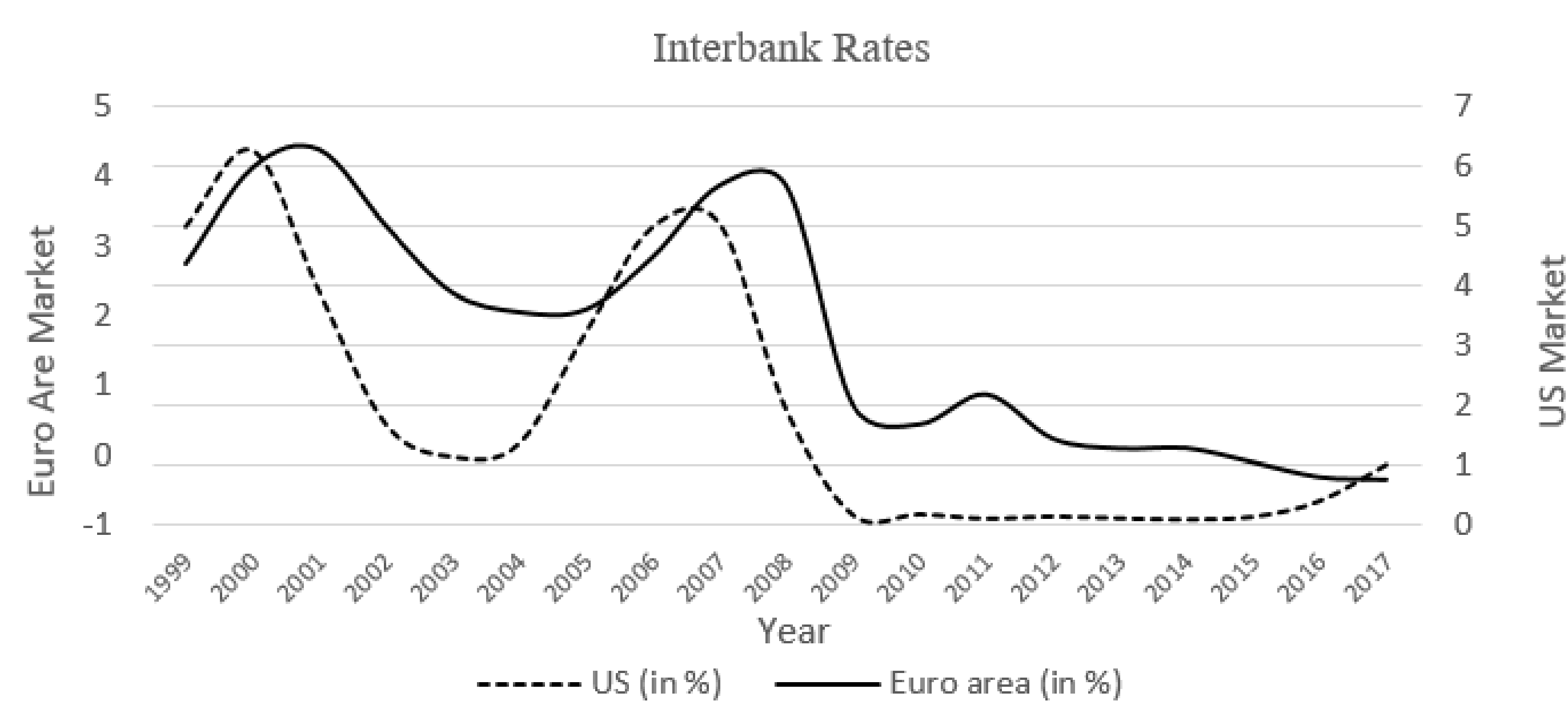
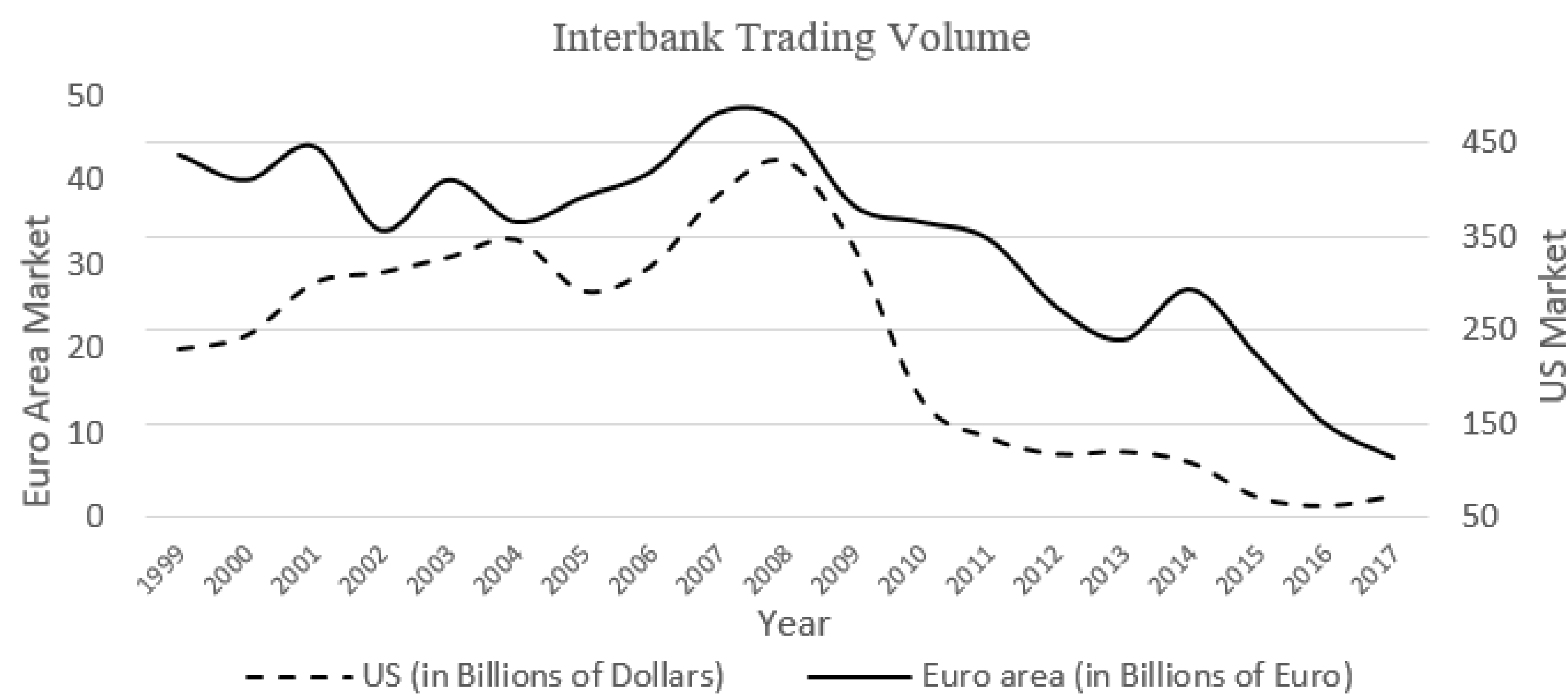
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## Introduction

- The Basel Committee on Banking Supervision (BCBS) has introduced liquidity requirements to penalize banks' excess reliance on the interbank market to obtain short-term liquidity.
- **Interbank Rates and Interbank Trading Volume:**



- This raises some macro-prudential questions:

- 1) How do these Basel-style requirements affect banks' behaviour and the interbank market activities?
- 2) How do these requirements impact the real economy and social welfare?
- 3) Has the target for mitigating macro-prudential issues been fulfilled as expected?

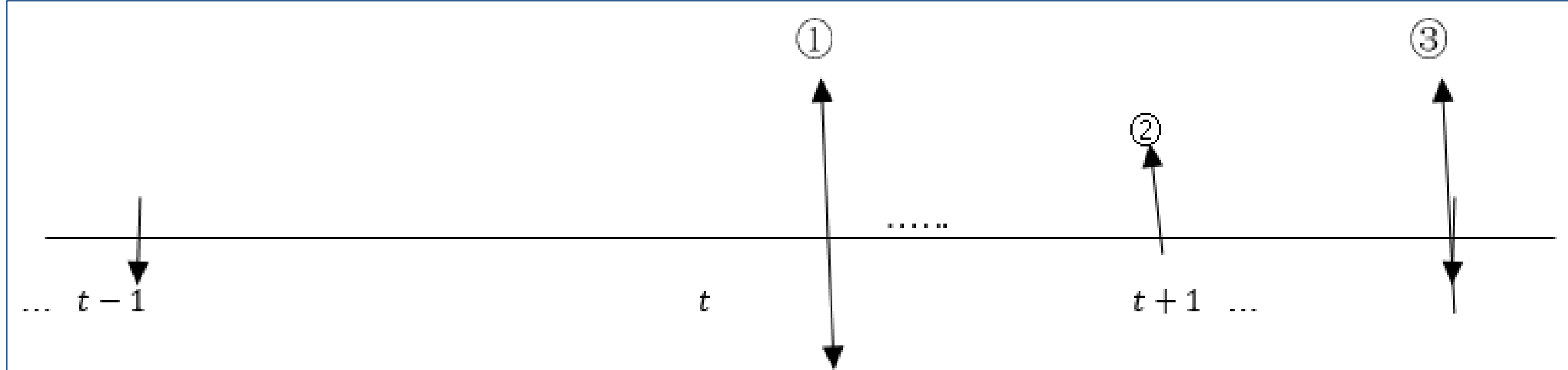
- In this paper, we build up a dynamic equilibrium model to

- 1) Investigate the impacts of Basel-style requirements on banks, interbank market, and the real economy.
- 2) Analyse from a macro-prudential perspective.
- 3) Mimic bank lending and overnight interbank market (interbank rates and interbank trading volume).
- 4) Compare the impacts among capital and liquidity requirements.

## Contributions

- We evaluate the impacts of Basel-style requirements macro-prudentially, with the consideration of interbank markets.
- We propose a 'two-stage' decision making process for our quantitative analysis.
- We propose a method to harmoniously incorporate both discrete- and continuous-time factors without compromising generality.

## Timeline of the Model



### Time Sequences:

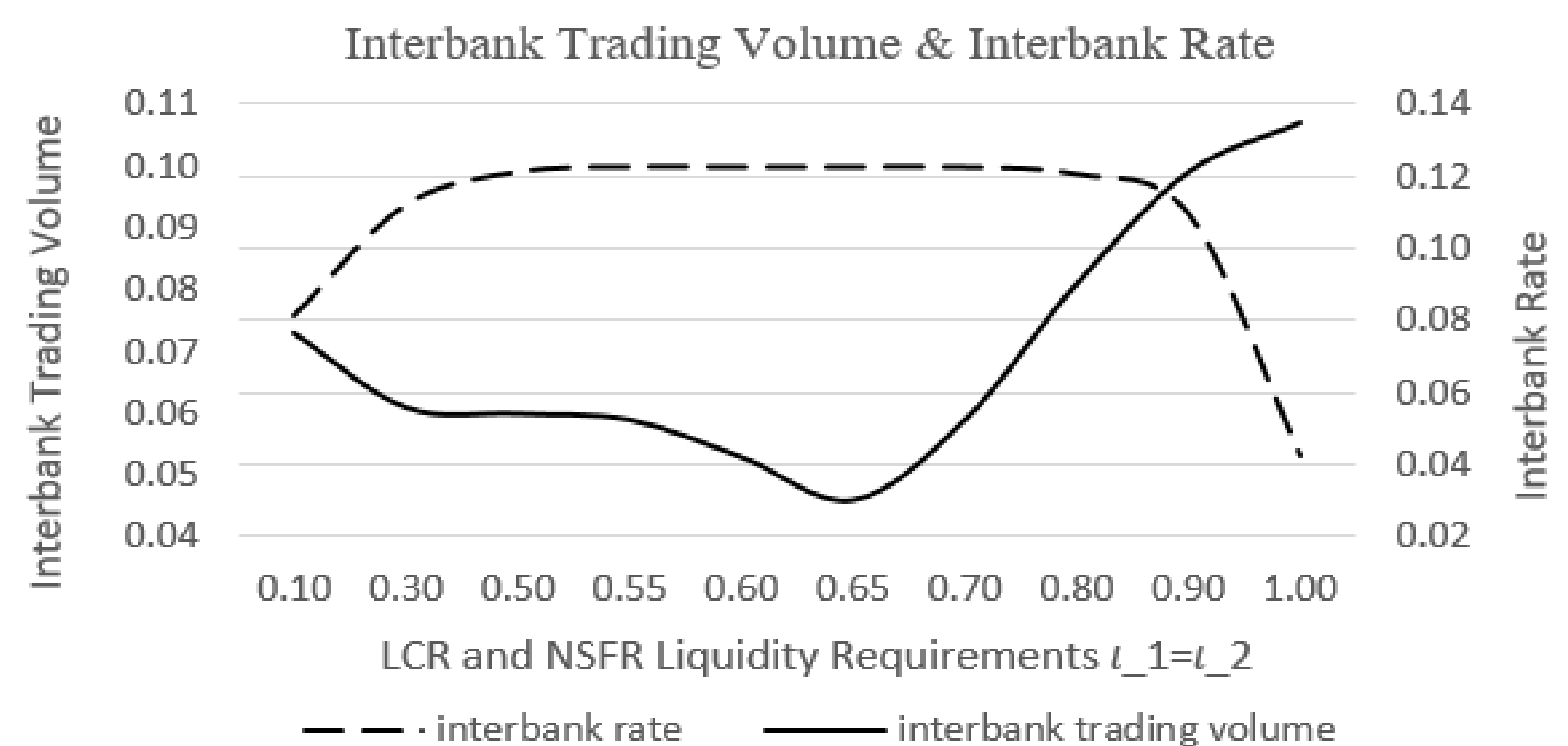
- ①: Banks make new investment choices  $(l_t, c_t)$ , based on the systematic credit shock  $Z_{t-1}$  and new aggregate deposits value  $d_t$ .
- ②: Idiosyncratic profit shock  $f_{\omega,t+v}$  and idiosyncratic deposit value variation  $f_{\psi,t+v}$  occur continuously within  $v \in [0,1]$ . The profit shock occur randomly to banks and the deposit variation makes them a probability of  $\lambda_t$  to become liquidity-deficit ones and a probability of  $1 - \lambda_t$  to become liquidity-surplus banks. For each interval  $t+v$ , banks make decisions  $(l_{t+v}^d, c_{t+v}^d, l_{t+v}^s)$ . Banks may default following the idiosyncratic shocks.
- ③: Corporate tax is levied and systematic credit shock  $Z_t$  and new aggregate deposits value  $d_{t+1}$  realise. Banks may default following the realization of these shocks.

## Key Results

- Capital and liquidity requirements reduce bank lending, interbank rates, and interbank trading volume.

	No regulation	Capital		Capital and Liquidity		
		$\kappa = 6\%$	$\kappa = 12\%$	$l_1 = 100\%$ $l_2 = 100\%$	$l_1 = 110\%$ $l_2 = 100\%$	$l_1 = 100\%$ $l_2 = 110\%$
<b>Loans</b>	<b>1.896</b>	<b>2.177</b>	<b>2.158</b>	<b>1.949</b>	<b>1.948</b>	<b>1.946</b>
Liquid Assets	-0.427	-0.048	0.086	0.172	0.174	0.176
Equity Issuance Ratio	-29.50%	-38.90%	-26.66%	4.79%	4.79%	5.09%
Pay-out Ratio	29.50%	49.50%	37.26%	5.81%	5.81%	5.51%
<b>Interbank trading volume</b>	<b>0.192</b>	<b>0.073</b>	<b>0.070</b>	<b>0.107</b>	<b>0.112</b>	<b>0.107</b>
<b>Interbank rate</b>	<b>20.84%</b>	<b>11.61%</b>	<b>11.25%</b>	<b>4.24%</b>	<b>0.44%</b>	<b>4.24%</b>
S.D. of Interbank rate	1.32%	0.80%	0.04%	2.44%	2.36%	2.43%
Bankruptcy Prob.	0.89%	0.00%	0.00%	0.00%	0.00%	0.00%
Bank Equity Value	3.494	4.034	3.982	1.971	1.970	1.970
Social Welfare	5.831	6.114	6.035	3.831	3.830	3.819
S.D. of Soc. Welfare	0.047	0.252	0.259	0.330	0.331	0.436

- Interbank trading volume is U-shaped related to Liquidity
- Interbank rate is inversely U-shaped related to Requirements



## Policy Implications

- Basel-style capital and liquidity requirements could have several macro-prudential impacts on banking system, through the interbank markets.
- Liquidity requirements could, in a way, mitigate banks' reliance on the interbank to manage their liquidity issues only with an appropriate level of the required ratios.
- Our results imply that the current ratio (100%) required seems ineffective in addressing banks' reliance on the interbank market.

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## Key References

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