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Research Report

TSINGHUA UNIVERSITY NATIONAL INSTITUTE OF FINANCIAL RESEARCH 2019-03-15 edition

A Quantitative Study on Financial Contagion

∫ A simulation based on the Chinese banking sector data

Center for Finance and Development

Ma Jun, He Xiaobei

Abstract

We present a model to study financial contagion within the Chinese banking system based on balance sheet data of listed Chinese banks. Focusing on the price channel of fire sales, we calibrate demand curves of multiple asset classes to Chinese data and model banks' in response to different constraints. Our simulation results show that an external shock can generate significant contagion effects within the Chinese

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Sheldon [illegible] Maurer (1998) [illegible] Upper [illegible] Worms (2004) [illegible]

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Burrows , 2012; Henry م Kok, 2013; Gauthier م Souissi, 2012;
Cateau م Zhou, 2015; Pyoun, 2015 Є ɾ ` ﺥ

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	261	79	27	1.3%	1.5%	3.2%
	473	107	15	2.4%	2.0%	1.8%
	404	108	24	0.1%	0.0%	0.8%
	2644	430	91	13.5%	8.1%	11.0%
	1347	441	133	6.9%	8.3%	16.0%
	378	56	13	0.9%	0.6%	0.6%

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[redacted]	ﺋﻫ ﻡﺨ	14%	12%	4%	35%	35%
	⌀ ┼	12%	11%	6%	28%	

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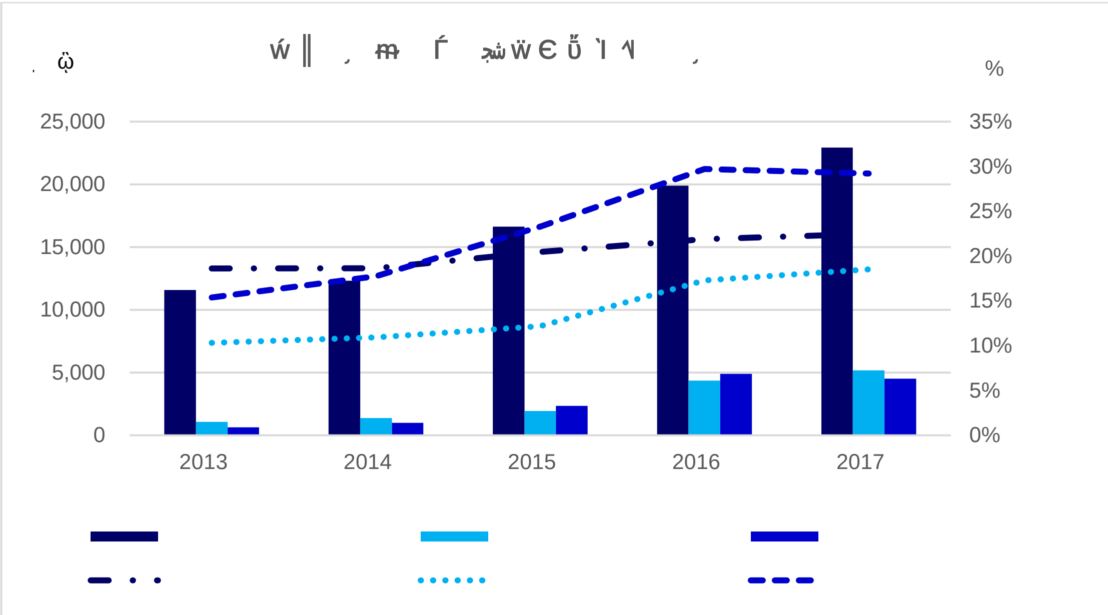

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Cifuentes , Ferrucci ﻡ Shin Ѓ 2005 Є Ï Bouchaud Ѓ 2010 Є Ï ﻡ

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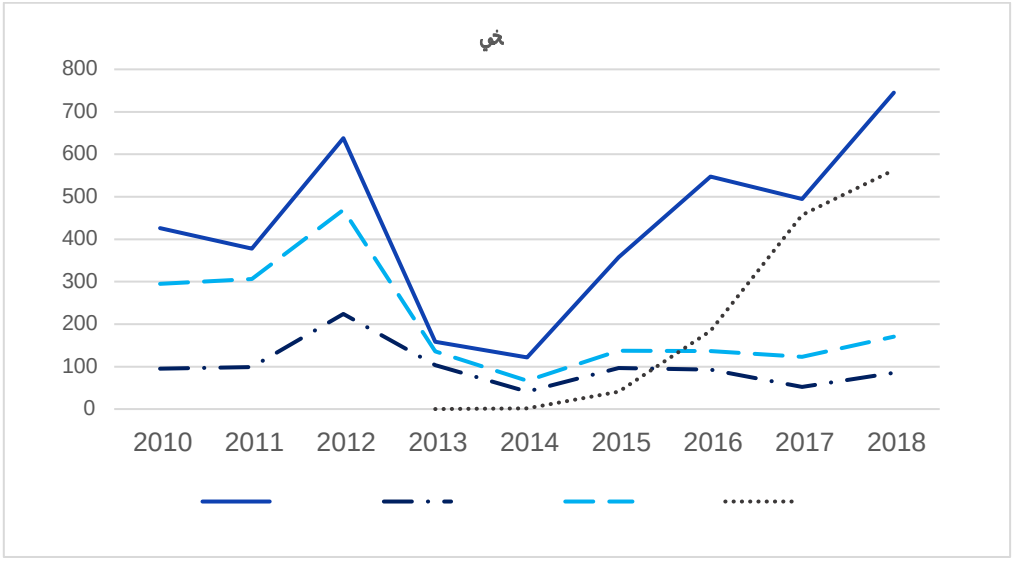

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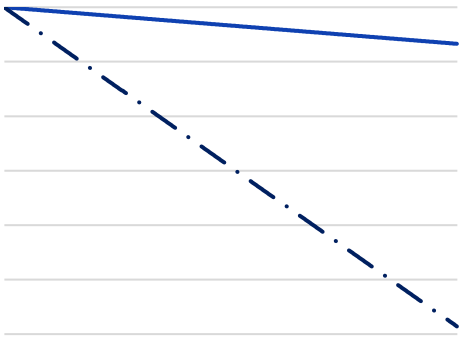

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1.

2008

[illegible]

i. [illegible]

ii. [illegible]

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ŗ N ‰ Ï A^{i} ¸ i, w^{i} ¸ i Ï

ώ (capital adequacy ratio, CAR) ҿ

$$CAR = \frac{N}{\sum_i A^i w^i}$$ Ґ 4Є

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Y. v	50%
Ґ Y. v Є	100%
	100%
`I	400% ï 1250%

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3. B ҿ

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$$\text{٧} \frac{N_{j,t+1}}{A^i_{j,t} w^i} < CAR_g$$ Ï ۊ ' ` ⌡ ¸ ٦ ώ

ŗ $q^i_{j,t}$ j ¸ i ۊ Ï I_j j

¸ ⌡ U Ï F_j j II ” ώ м Ẅ м ¸ ⌡

U ɾ j * سر lj U Ϫ $q^{i}_{j,t}$. ﻉ

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◖ ₥ ˛ Ϫ II ″ ώ м ẅ м ˛ Ґ F_jЄ Ï ↙ D ‼

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ﻉ ˛ $q^{i}_{j,t}$ Ϫ ɲ м Ґ

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q L B ﻉ , Ï $\frac{\Delta\tilde{}\ (\ )}{\ } = \frac{\Delta}{\ }$ ɾ سر Ғ n ˛ *

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$$m\underset{q^{i}_{j,t}}{\ } i\ \boxtimes_i\ {}_{F_j}(A^{i}_{j,t} - q^{i}_{j,t})\frac{\Delta p^{j}}{p^{i}} + \sum_i {}_j\frac{1}{2}\,q^{i}_{j,t}\frac{\Delta p^{j}}{p^{i}} \qquad Ґ\,6Є$$

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$$N_{j,t+1} = N_{j,t} - \sum_i CL^i_{j,t} - \sum_i FL^i_{j,t} - \sum_i ML^i_{j,t} + \sum_i NIM^i_{j,t} - \sum_i R^i_{j,t} \quad (10)$$

(LGD)

$$\sum_i CL^i_{j,t} = \sum_i A^i_j \quad PD^i_{j,t} \quad L\ G\ D \qquad (11)$$

PD م LGD ŭ ẅ ғ ِ مخ A^i ĩ ɾ سر Ï

Ϫ Â Ï Ғ ғ ҷ Ш ŭ ɾ

D ″ 2018 ₥ ƙ Ғ ғ ҷ₥ ƙ PD ɾ

Ẑ ҷ 50% Ґ м ẅ Є Ï ɲ

Ï سر ẗ ″ Ґ˜ II فخ 50% ِ м ẅ ɾ سر

ẃ ‖ Ï 2018 ẃ ‖ خي 0.95%, ғ ҷ ẃ ‖

ِ PD Ï Ẑ ҷ 100% ɾ

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$$\sum_i FL^i_{j,t} = \sum_i \frac{1}{2} q^i_{j,t} \frac{\Delta p^i}{p^i} \qquad (12)$$

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ẅ $\sum_i {}_{i}^{F}ML^i_{j,t}E$

$$\sum_i {}_{i}^{F}ML^i_{j,t} = \sum_i {}_{i}^{F}(A^i_{j,t} - q^i_{j,t})\frac{\Delta p^i}{p^i} \qquad 1\ 3$$

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ِ Ґ A^i Є ɨ ҷ م ẃ ‖ Ï `ا Ϫ ẃ ‖ ˜ ⌐ ẃ ɻ ب ƙ ẃ ɻ ɻ

[illegible] 2018 [illegible]

[illegible]

$$NI_{j,t+1} = \sum_i A_t^i R_t^i - \sum_k L_t^k R_t^k \qquad (14)$$

[illegible]

[illegible] 12 [illegible]

[illegible] $\{N_{j,t+1}\}$ [illegible] $N_{j,t+1}$ [illegible]

[illegible] $\frac{\Delta p_j^i}{p^i}$ [illegible]

1. [illegible]

[illegible]

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[illegible]

[illegible] 1.1%[4] [illegible]

[4] [illegible] 2017 [illegible]

[illegible]

1) [illegible]

[illegible]

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ق̈ Ï м ɲ ᴗ ƙ ẃ ɼ ɲ سر Ᵽ

˝ ῳ̣ м ẅ м ¸ Ӽ ᴗ ƙ ẃ ɷ ռ ƙ ꓦ Ï قحـ

м ɼ̍ ˝ ◌ Ⴌ J ɼ ɣ Ï ɲ Ḫ Ғ

Ï ꓦ ɣ B ɥ˝ D ɼ

بم 7˝ ॥ ƻ Ï ¸ ق̈ ɧ ɼ 1 ˜

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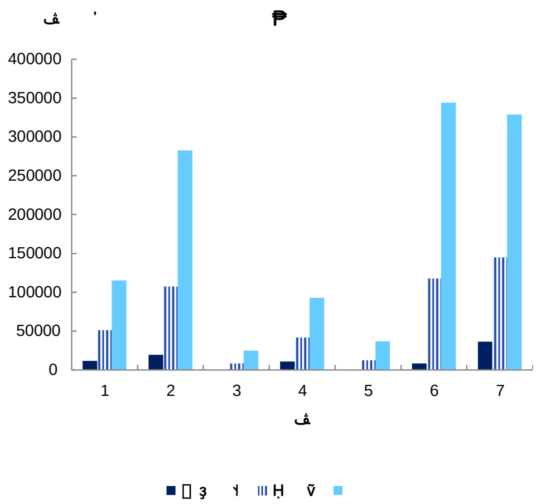

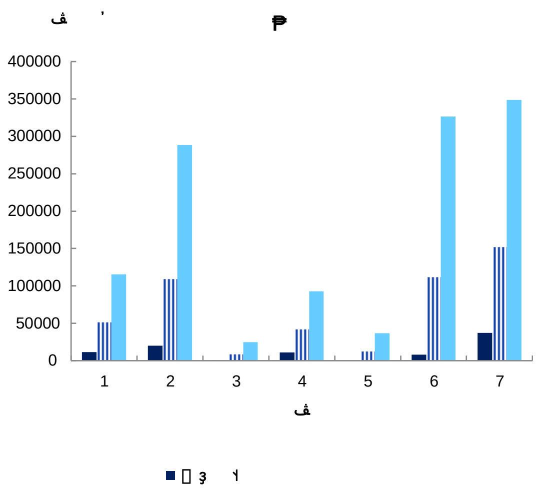

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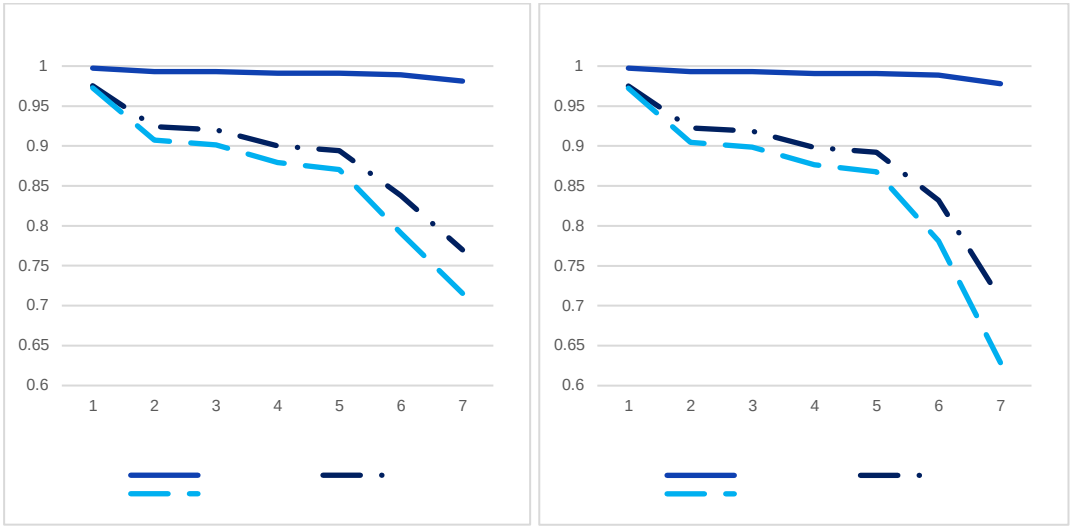

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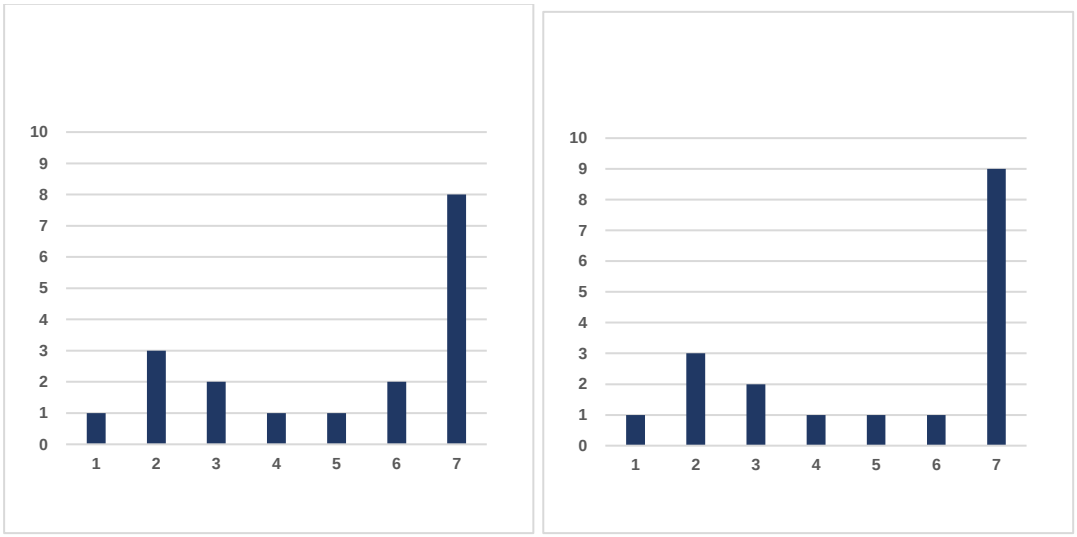

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* ﻡ * ґ ɼ˜ Ï ﺧﻲ ﺭ

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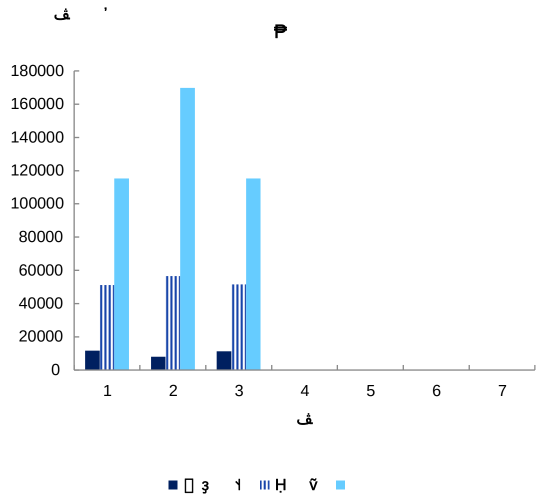

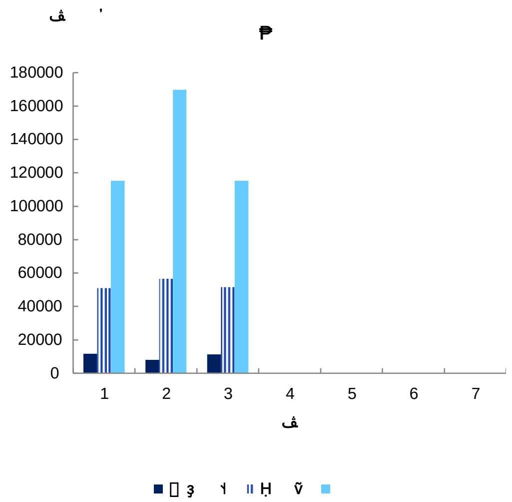

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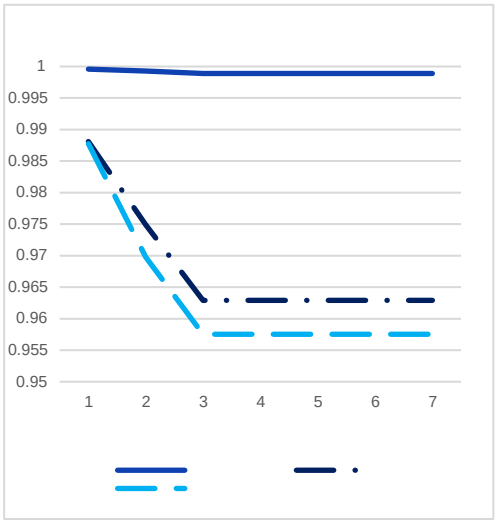

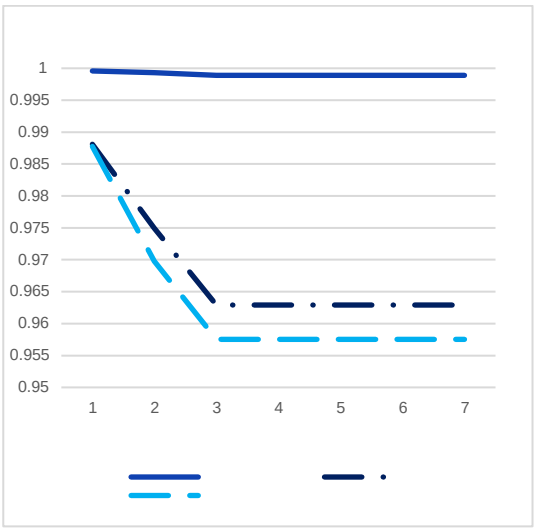

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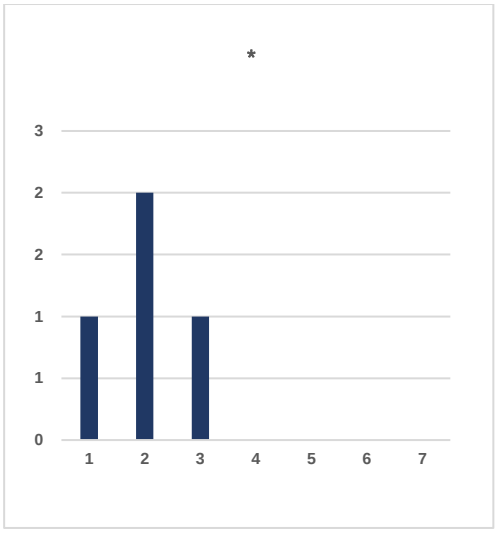

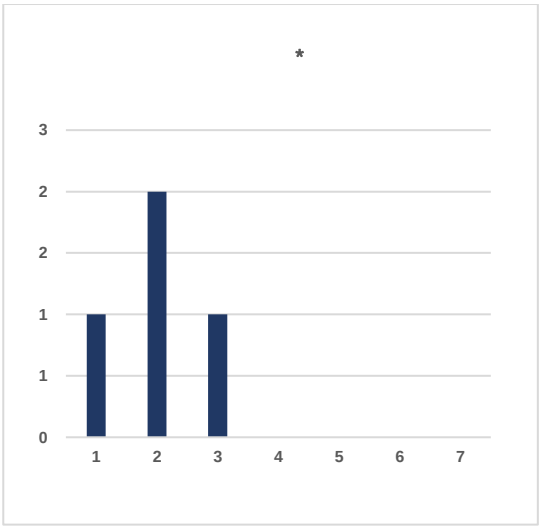

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2016 [illegible] 2017 [illegible] 3 [illegible]

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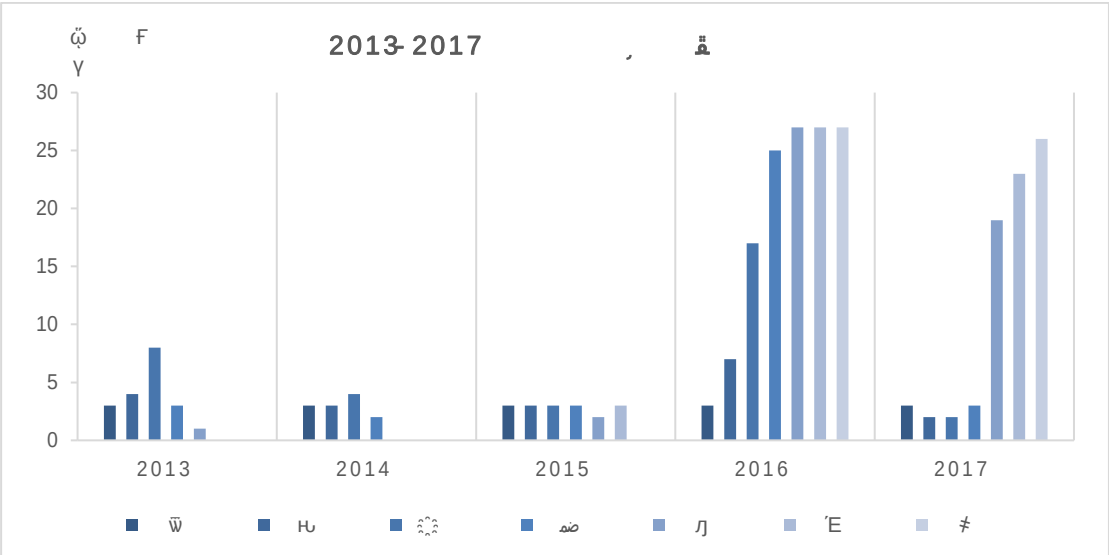

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س Χ Ϊ ᎗ ώ Ϊ ᎘ ᎀ

Ϊ ᎀ Χ ᅳ (LCR)

$$\frac{\sum A^{i}_{j,t} y^{i}_{j,t}}{NF_{j,t}} = LCR_{reg} \qquad (1\ 8)$$

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$NF_{j,t}$

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[illegible]

[illegible]

$$inf_{j,t} = \beta_j^A A_{j,t} - C_{j,t} \quad (19)$$

$$out f_{j,t} = \beta_j^L L_{j,t} \quad (20)$$

$$gap_{j,t} = out f_{j,t} - inf_{j,t} \quad (21)$$

[illegible]

$$m_{q_{j,t}^i} \sum_i \sum_j F_j^i (A_{j,t}^i - q_{j,t}^i) \frac{\Delta p_j^i}{p^i} + \sum_i \sum_j \frac{1}{2} q_{j,t}^i \frac{\Delta p_j^i}{p^i} \quad (22)$$

[illegible]

$$q_{j,t} = \sum q_{j,t}^i = gap_{j,t} + \sum A_{j,t}^i \geq \sum q_{j,t}^i \quad (23)$$

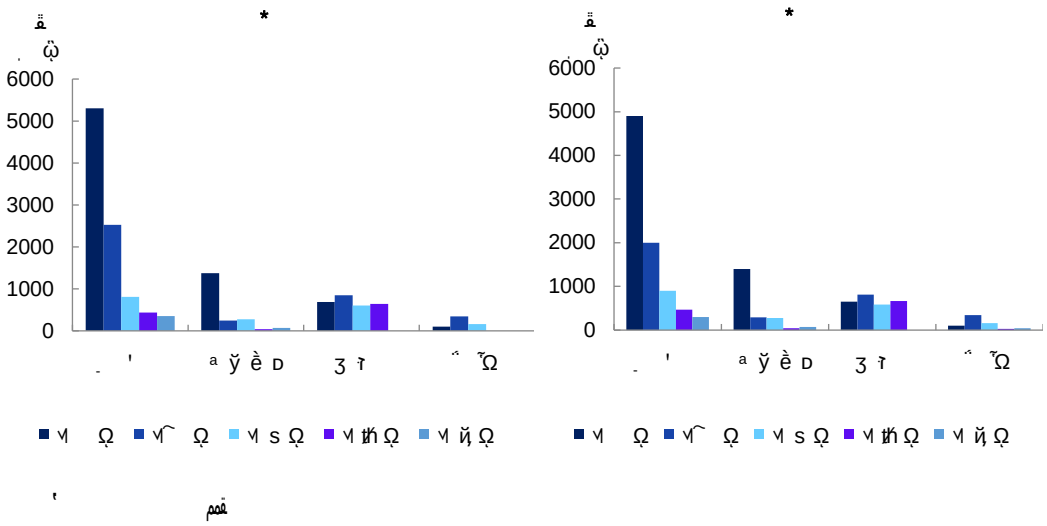
$$q_{j,t} = \sum A^i_{j,t}, \quad i \in \sum A^i_{j,t} < \sum_i q^i_{j,t}$$

$$\text{Ga}\, p_{j,t} - \sum_i q_{j,t}$$

$$CL_{j,t} = [\sum \text{de f a}\, \mu \neq l\, (g\, a_{h,t} p - \quad ,)] \frac{A_{j,t}}{\sum_j A_{j,t}} \qquad 24$$

$$w(CL_{j,t})$$

[illegible]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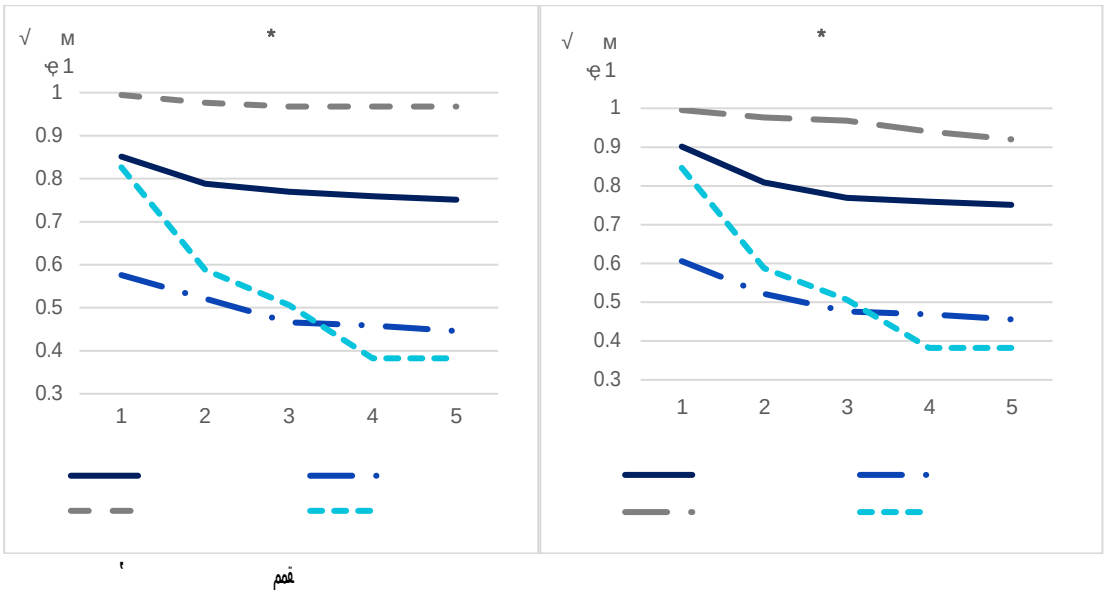
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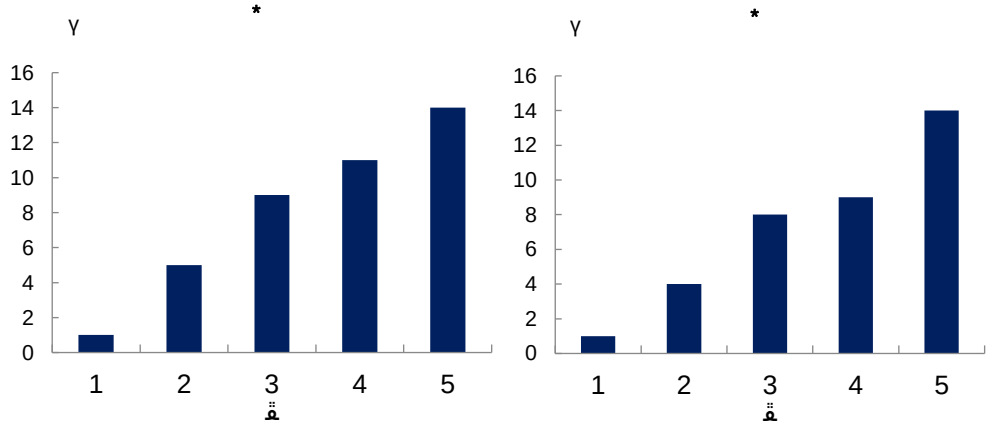
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[illegible]

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