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研究报告

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VAR

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Research report

2018-9- 12 edition

TSINGHUA UNIVERSITY NATIONAL INSTITUTE OF FINANCIAL RESEARCH

Deleveraging should take a gradual approach: Evidence from the Macro influencing Factor of Non-performing Loan rate

Center for Finance and Development

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Abstract

The pace and intensity of deleveraging are currently causing policy maker and market concerns. In order to provide scientific basis for policy making in the prevention of financial risks, this paper, by establishing dynamic panel and non-balanced panel VAR model, analyzes the impact of factors such as falling house prices and economic slowdown on bank's non-performing loan ratios. The study found that: (1) Deleveraging cannot be accomplished very quickly, and its pace and intensity must be measured. The downward trend of economic growth may be the biggest risk facing the rising non-performing loan ratios of Chinese banks; (2) The impulse response of house price decline shows that non-performing loan ratios of rural commercial banks are the most sensitive, followed by city commercial banks, and the listed banks are least affected; (3) The results of variance decomposition of non-performing loan ratios demonstrate that monetary policy is transmitted more quickly in listed banks, but much slower in city commercial banks and rural commercial banks.

The main reason for this may be that the main body of their clients are insensitive to interest rate changes due to soft budget constraints. Therefore, gradually hardening the budget constraints for local governments and the financing platforms may be necessary to prevent and resolve systemic financial risks in the future.

2018

IMF 2017 12 FSAP

2018 3

2018 4 27

5 4

2018 7 31

1

1

IMF 2017 FSSA

33

2 7 3

1 5 9 1

Nkusu 2011 1998 2009 26

VAR PVAR

Klein 2013 1998 2011

VAR

Beck et al 2013 2000 2010 75

Beaton et al 2016 6 34 1996 2015

IMF 2017 FSSA

IMF 2017

[1]

PVAR Wind 108

1

2

VAR

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3

wind 2003 2017

108

2003

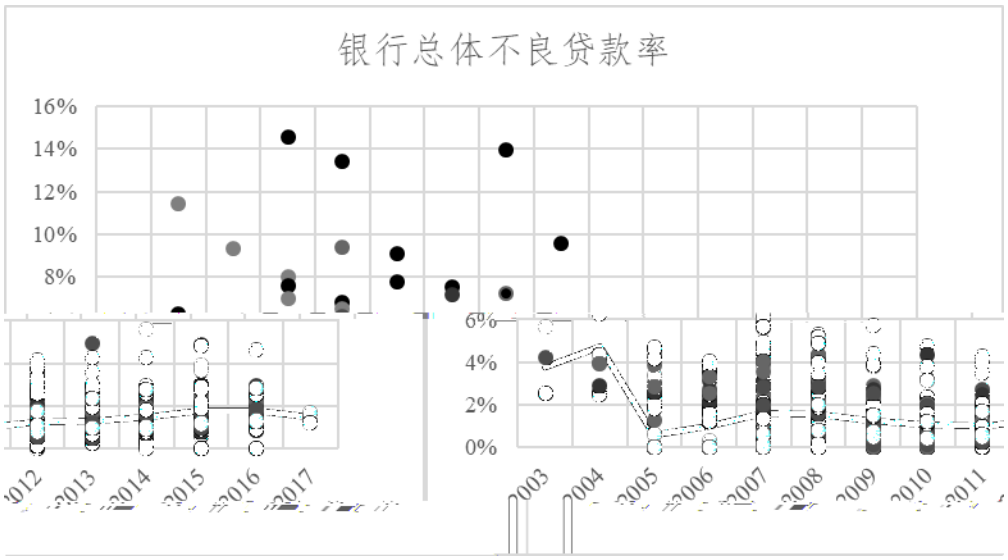
2014 2016

2017

2003 2011

2006 14 5

2017 19 5



wind

1

shibor 2007

Chibor

GDP 1

	8.25%	5.69%	-1.67%	20.85%
	7.04	0.802	6.14	8.28
	2.40%	0.64%	1.07%	3.51%
	1.02	0.085	0.88	1.16
GDP	9.4%	2.23%	6.7%	14.2%

wind

PVAR

2009

2003 2008

Chibor

$$NPL_{i,t}=\alpha NPL_{i,t-1}+\beta_0+x_t^{'}\beta+u_i+\varepsilon_{it} \qquad t=2,\cdots,T \qquad 1$$

$NPL_{i,t}$ i t

t $x_t=\begin{bmatrix}\Delta \ln fj_t\\ gr_t\\ rate_t\\ qrbl_t\\ exchangerate_t\end{bmatrix}$ α

$\Delta \ln fj_t$ gr_t GDP $rate_t$

$qrbl_t$ $exchangerate_t$ $\begin{bmatrix}\beta_1\\ \beta_2\\ \beta_3\\ \beta_4\\ \beta_5\end{bmatrix}$

u_i ε_{it} $Cov(\varepsilon_{it},\varepsilon_{is})=0, t\neq s, \forall$

i 1

ε_{it}

[1]

Arellano and Bond 1991

GMM GMM T

Blundell and Bond 1998 GMM

NPL VAR

NPL

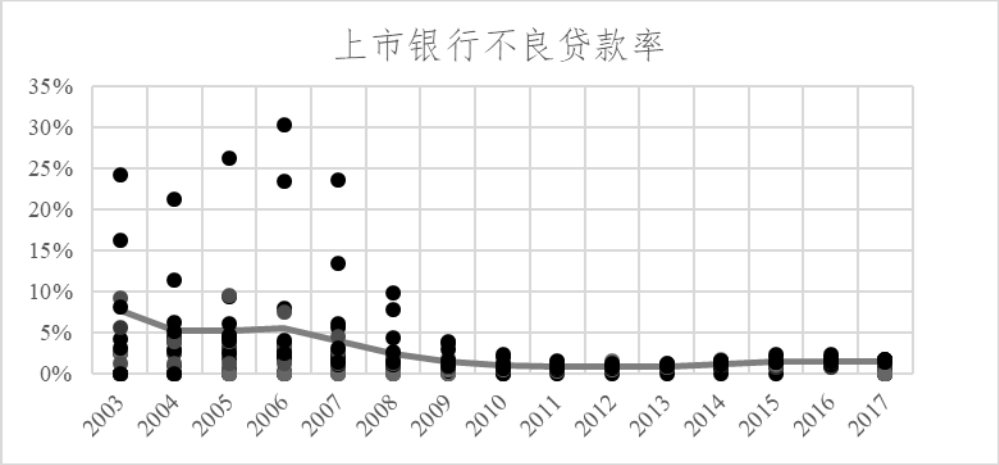
$$\begin{cases} Y_{i,t} = Y_{i,t-1}A_1 + Y_{i,t-2}A_2 + \cdots + Y_{i,t-p+1}A_{p-1} + Y_{i,t-p}A_p + X_{it}B + u_{it} + e_{it} \\ t = 1,2,\cdots,T_i; i = 1,2,\cdots,N. \end{cases} \quad 2$$

$Y_{i,t} = [NPL_{i,t}, \Delta \ln fj_t, gr_t, rate]$ X_{it}

$A_1, A_2, \cdots, A_p, B$ u_{it}

e_{it} GMM

Holtz Eakin et al 1988


上市银行不良贷款率
35%
30%
25%
20%
15%
10%
5%
0%
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

			GMM		GMM	
$NPL(-1)$	0.632***	0.631***	0.755***	0.6279***	0.7208***	0.6309***
	0.0189	0.0191	0.0798	0.0371	0.0050	0.0052
qrbl	0.0282***	0.0291.***	0.037***	0.0285***	0.0418***	0.0389***
	0.0045	0.00565	0.0098	0.0102	0.6458	0.0007
gr	-0.1086***	-0.106***	-0.1121***	-0.105***	-0.0976****	-0.0895***
	0.0164	0.0182	0.0155	0.0130	0.0026	0.0025
exchangerate	0.0058***					

30

GMM Sargan p

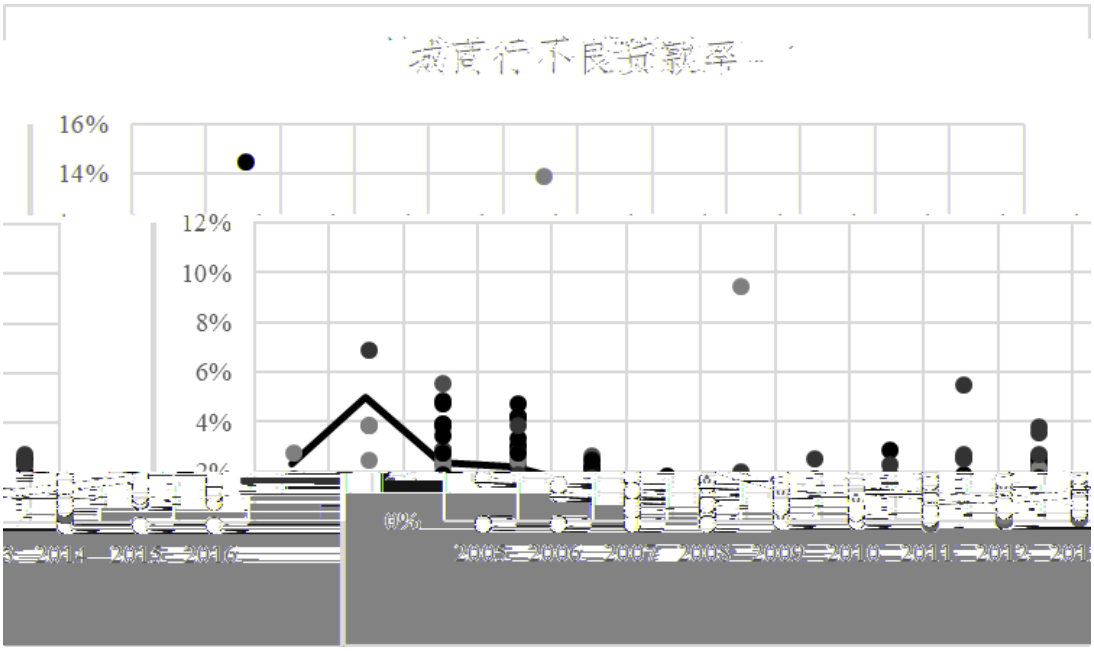
0 05 A B

AR 2 p 0 05

GMM

GMM GMM

0 62 0 75



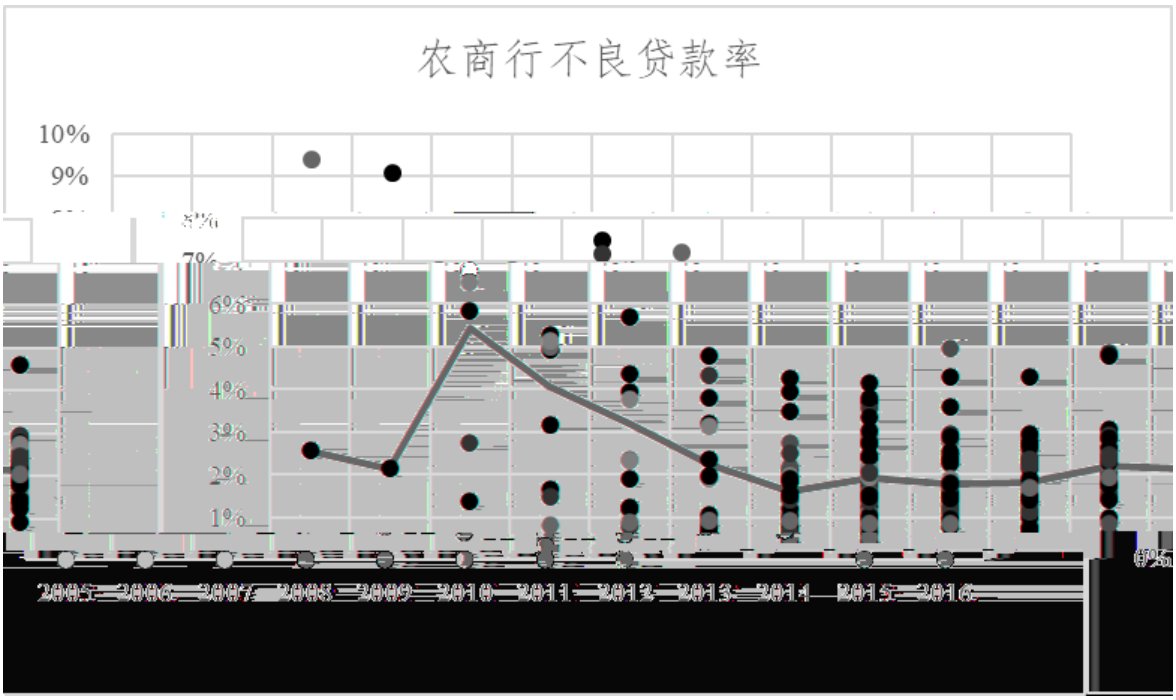
			GMM		GMM	
	1	2	3	4	5	6
$NPL(-1)$	0.423***	0.418***	0.560***	0.1708***	0.5490***	0.3620***
	0.0484	0.0477	0.0468	0.0067	0.0371	0.0023

qrbl	1.750	1.018	2.078***	-2.0127***	2.4126***	-0.3765
						0.3647
	1.264	1.512	0.6850	0.572	0.6458	

38

2 8 4 0

0 001 0 003



			GMM		GMM	
	1	2	3	4	5	6
$NPL(-1)$	0.4146***	0.4064***	0.478***	0.1733***	0.5490***	0.2957***

	0.0432	0.0436	0.0289	0.0390	0.0371	0.0151
qrbl	-5.6233***	-5.719***	-3.777***	-8.824***	2.4126***	-6.593***
	1.264	2.208	1.2170	1.135	0.6458	0.5304
gr	-24.842***	-22.79***	-19.883***	-12.942***	-7.530*	-17.378***
	4.832	6.560	1.555	2.327	4.377	1.078
exchangerate	-0.1045	-0.257	-0.2606**	-0.1903	0.3953*	-0.3221***
	0.222	0 .259	0.1181	0.1359	0.2050	0.1049
$\Delta \ln fj$		-1.789		-2.4982***		-0.0858
		1.496		0.5703		0.224
rate		-16.032		-12.406**		-11.283***
		10.06		4.850		3.305
C	9.758***	11.246	8.247***	13.891***	-3.888**	
	2.698	3.196	1.704	1.391	1.8435	

2 4 6

17 7 0 1

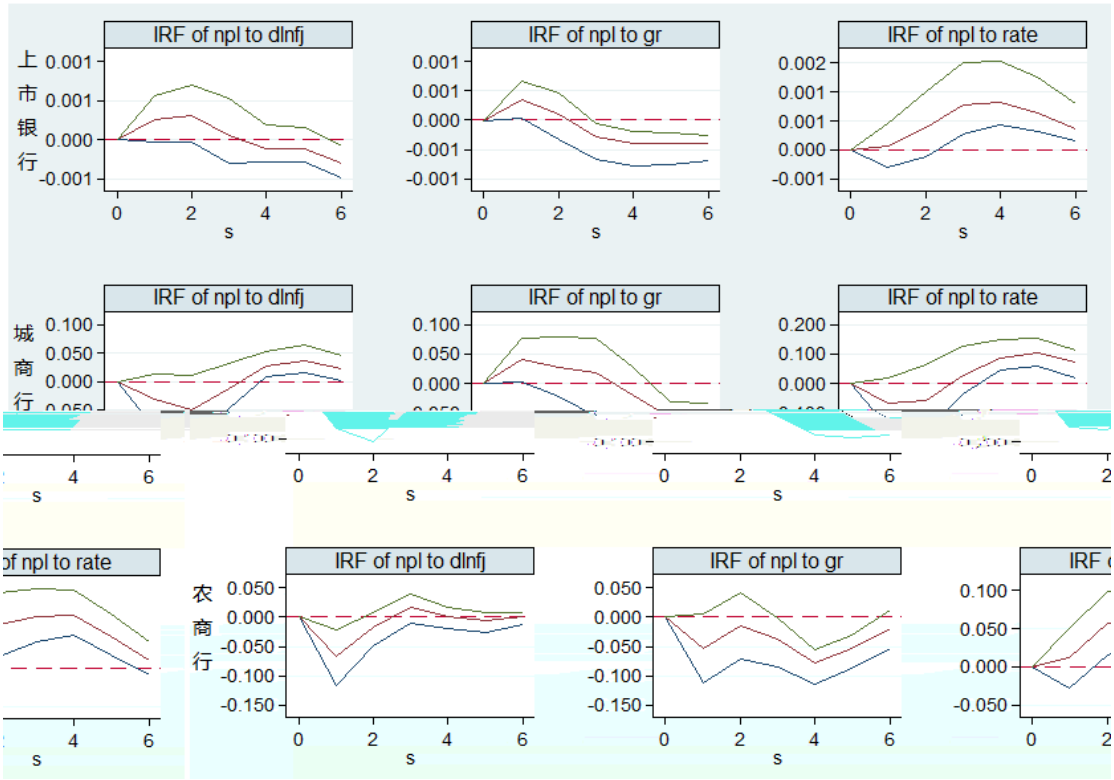
1 7

GMM

GMM

0 08 3 3

5


IRF of npl to dlnfj
IRF of npl to gr
IRF of npl to rate
上市银行
城商行
农商行
s

95

VAR

[2]

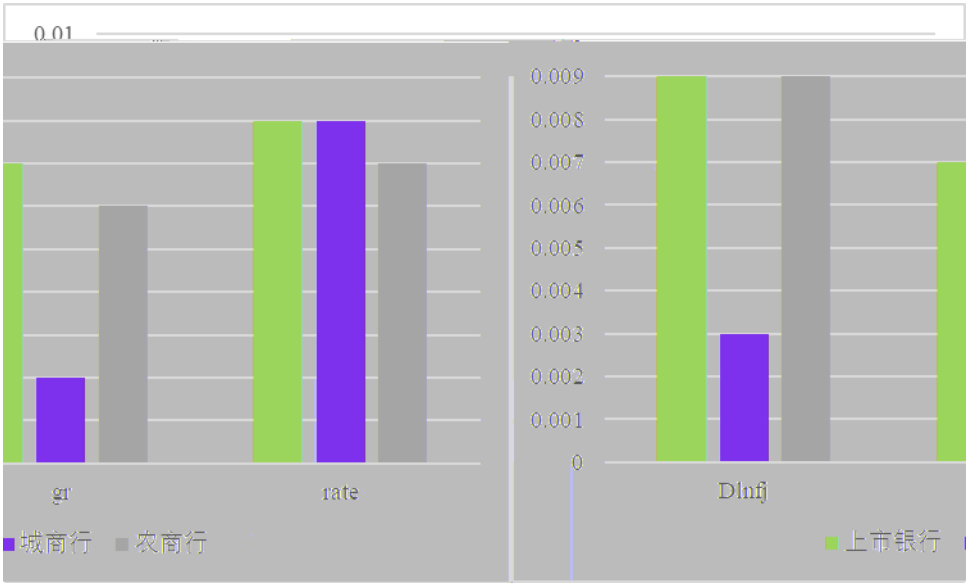
5

95 10

NPL NPL Dlnfj gr rate

1

Dlnfj gr rate NPL



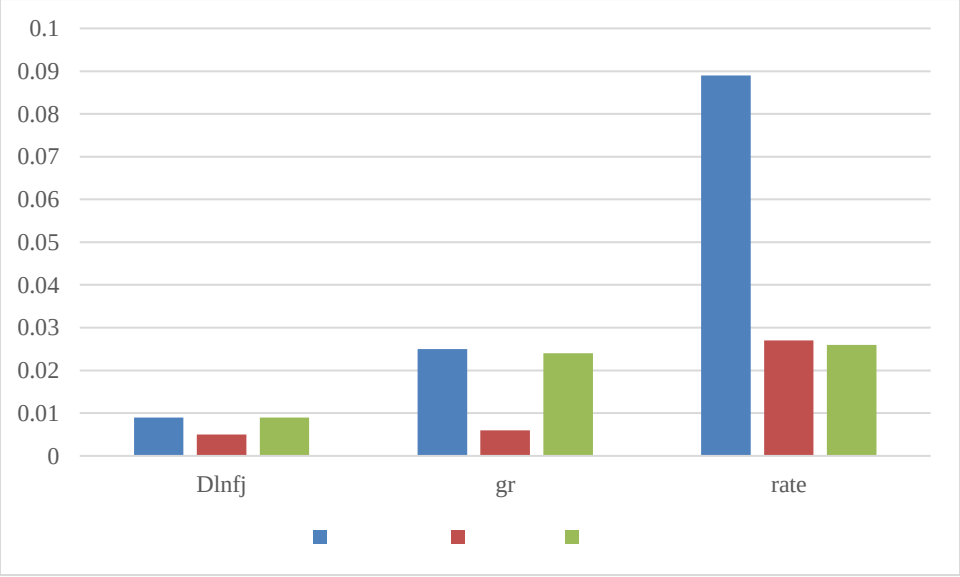
NPL Dlnfj gr rate

NPL

Dlnfj gr

rate

6



VAR

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[5] *Love, I. and L. Zicchino. 2006 Financial Development and Dynamic Investment Behaviour: evidence from Panel VAR The Quarterly Review of Economics and Finance, 46, 190 210.*

[6] Michael R. and L. Inessa, 2015. Estimation of Panel Vector Autoregression in Stata: a Package of Programs.

[7] Mwanza Nkusu,2011,"Nonperforming Loans and Macrofinancial Vulnerabilities in Advanced Economies", IMF Working Paper 11/161

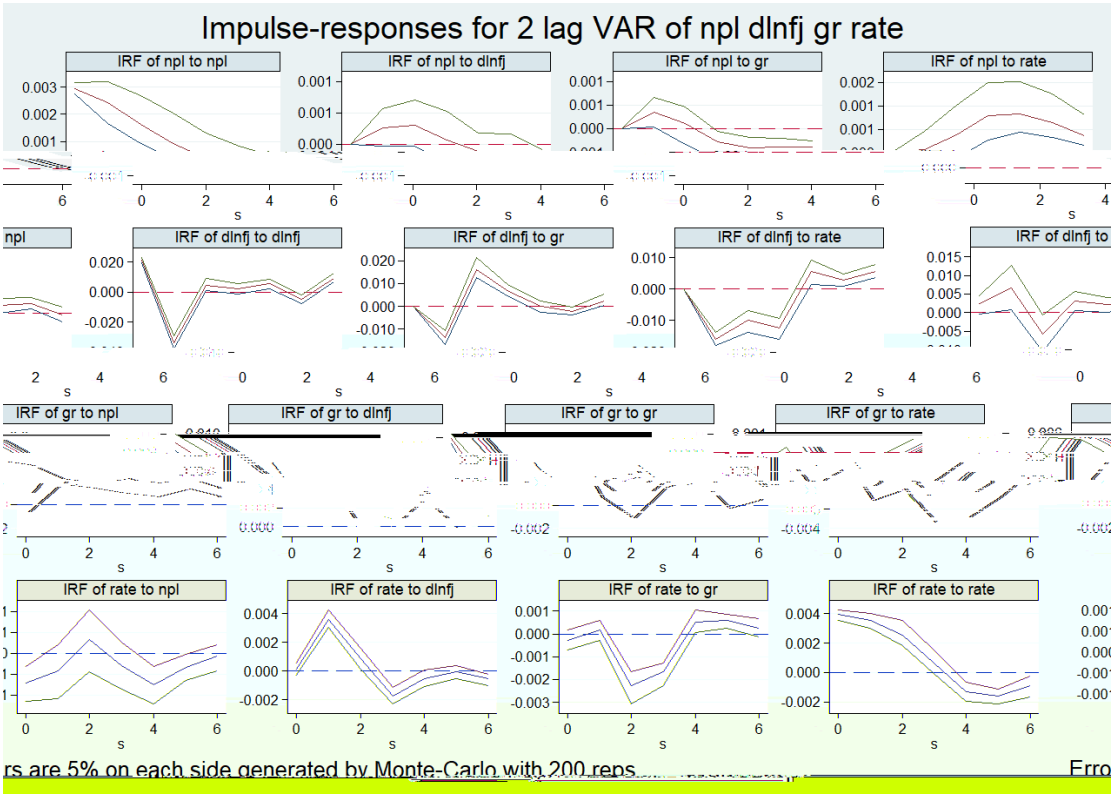
[8]

[9]

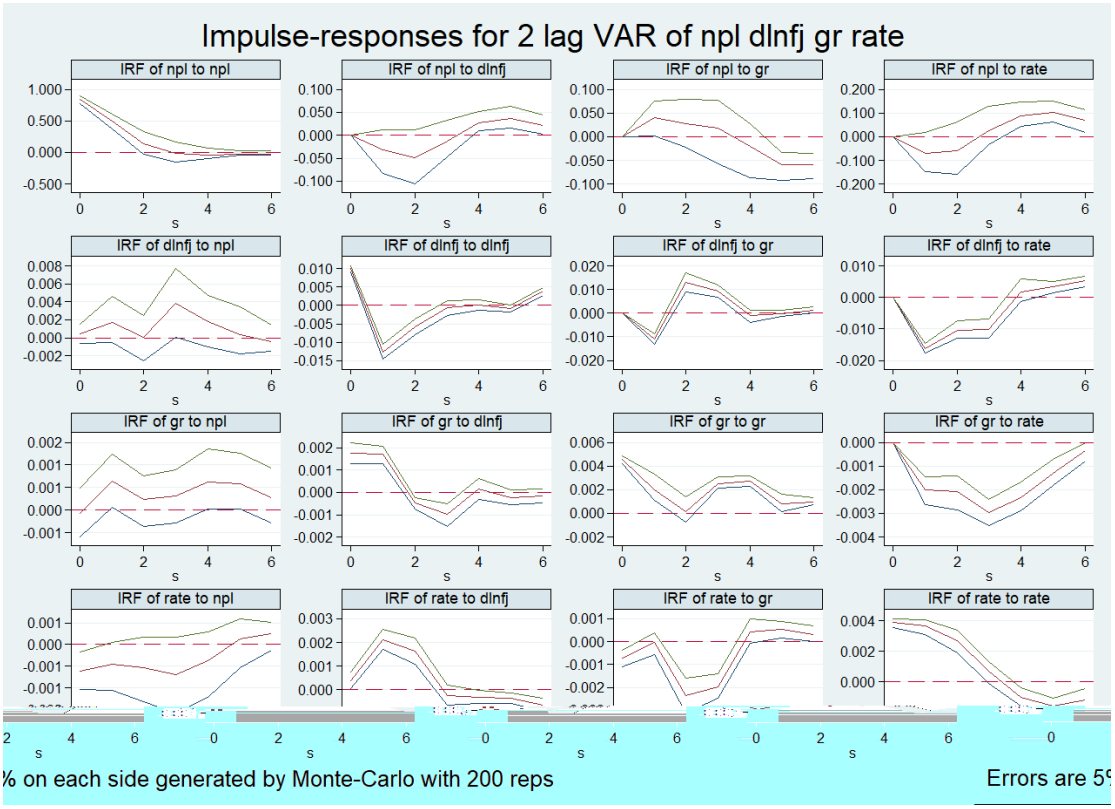
[10]

[11]

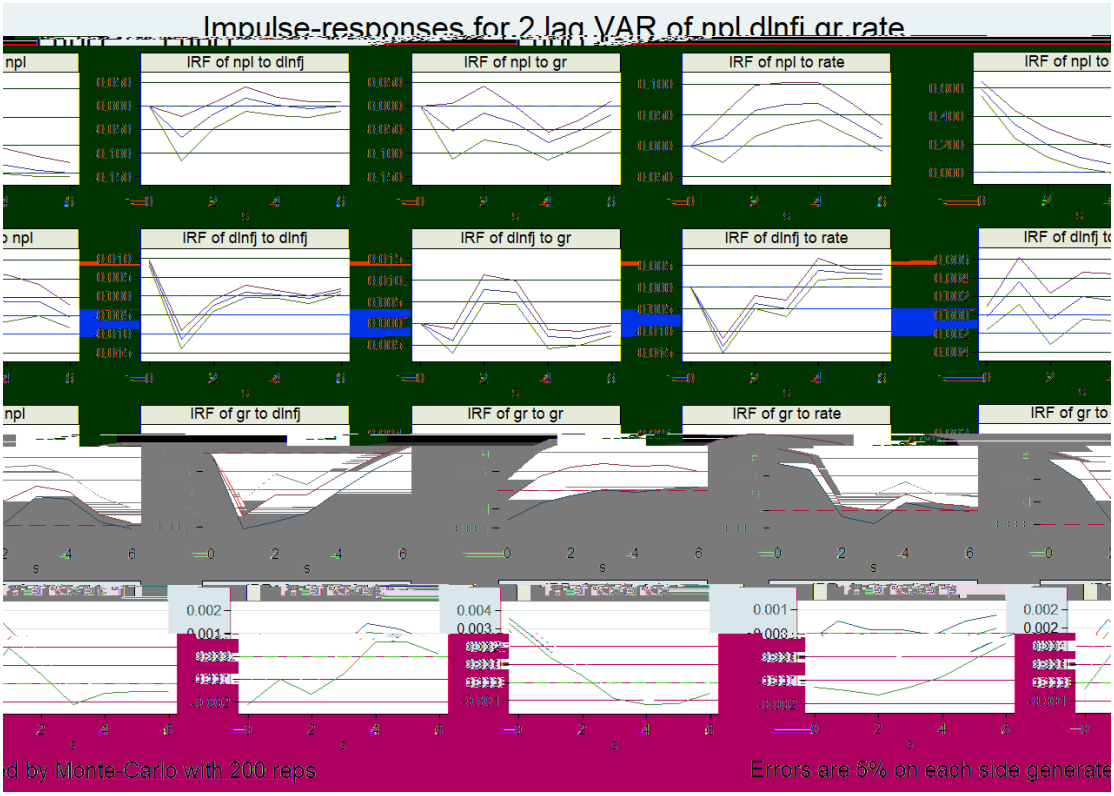
8 VAR


Impulse-responses for 2 lag VAR of npl dlnfj gr rate
IRF of npl to npl
IRF of npl to dlnfj
IRF of npl to gr
IRF of npl to rate
IRF of dlnfj to dlnfj
IRF of dlnfj to gr
IRF of dlnfj to rate
IRF of gr to npl
IRF of gr to dlnfj
IRF of gr to gr
IRF of gr to rate
IRF of rate to npl
IRF of rate to dlnfj
IRF of rate to gr
IRF of rate to rate
s
rs are 5% on each side generated by Monte-Carlo with 200 reps

9 VAR


Impulse-responses for 2 lag VAR of npl dlnfj gr rate
IRF of npl to npl
IRF of npl to dlnfj
IRF of npl to gr
IRF of npl to rate
IRF of dlnfj to npl
IRF of dlnfj to dlnfj
IRF of dlnfj to gr
IRF of dlnfj to rate
IRF of gr to npl
IRF of gr to dlnfj
IRF of gr to gr
IRF of gr to rate
IRF of rate to npl
IRF of rate to dlnfj
IRF of rate to gr
IRF of rate to rate
s
% on each side generated by Monte-Carlo with 200 reps
Errors are 5

10 VAR



Variance decomposition: s = 1,2,3,4,5,6,

Variance-decompositions: percent of variation in the row variable explained by column variable

5

	s	npl	dlnfj	gr	rate	s	npl	dlnfj	gr	rate
npl	1	1.000	0.000	0.000	0.000	4	0.941	0.009	0.011	0.040

	s	npl	dlnfj	gr	rate	s	npl	dlnfj	gr	rate
npl	1	1.000	0.000	0.000	0.000	4	0.985	0.004	0.003	0.009
dlnfj	1	0.002	0.998	0.000	0.000	4	0.015	0.253	0.326	0.406
gr	1	0.000	0.132	0.868	0.000	4	0.010	0.130	0.557	0.303
rate	1	0.023	0.009	0.032	0.935	4	0.025	0.133	0.182	0.660
npl	2	0.992	0.001	0.002	0.005	5	0.976	0.004	0.003	0.016
dlnfj	2	0.005	0.406	0.184	0.405	5	0.018	0.251	0.325	0.406
gr	2	0.012	0.173	0.702	0.114	5	0.014	0.106	0.556	0.325
rate	2	0.017	0.136	0.015	0.832	5	0.026	0.132	0.180	0.661
npl	3	0.986	0.003	0.002	0.008	6	0.961	0.005	0.006	0.027
dlnfj	3	0.003	0.308	0.304	0.385	6	0.018	0.249	0.321	0.411
gr	3	0.012	0.159	0.622	0.207	6	0.018	0.102	0.544	0.336
rate	3	0.017	0.145	0.122	0.715	6	0.025	0.127	0.176	0.671

	s	npl	dlnfj	gr	rate	s	npl	dlnfj	gr	rate
npl	1	1.000	0.000	0.000	0.000	4	0.967	0.010	0.008	0.015
dlnfj	1	0.001	0.999	0.000	0.000	4	0.029	0.372	0.225	0.374
gr	1	0.004	0.233	0.763	0.000	4	0.032	0.164	0.644	0.160
rate	1	0.032	0.005	0.197	0.767	4	0.054	0.104	0.202	0.640
npl	2	0.984	0.010	0.006	0.000	5	0.948	0.009	0.019	0.024
dlnfj	2	0.031	0.499	0.038	0.432	5	0.032	0.356	0.231	0.382
gr	2	0.007	0.211	0.674	0.108	5	0.040	0.156	0.648	0.157
rate	2	0.036	0.100	0.154	0.710	5	0.055	0.095	0.226	0.623
npl	3	0.978	0.009	0.006	0.007	6	0.940	0.009	0.024	0.026
dlnfj	3	0.026	0.429	0.156	0.388	6	0.034	0.343	0.239	0.384
gr	3	0.019	0.190	0.648	0.142	6	0.051	0.154	0.641	0.154
rate	3	0.046	0.101	0.205	0.648	6	0.052	0.089	0.244	0.615

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