2019 4 64 2019 2 1

60

Logit نجى GDP

GDP

2017 /GDP 1

0.40-0.68

“ ”

TSINGHUA PBCSF 清华五道口 | NIFR 国家金融研究院

Research Report

2018-11- edition

TSINGHUA UNIVERSITY NATIONAL INSTITUTE OF FINANCIAL RESEARCH

Early Warning Indicators of Financial Crisis

Center for Finance and Development

Ma Jun, He XiaobeiandLiu Shurui

Abstract

A rapidly growing macro-leverage ratio, measured by M2 to GDP ratio or private debt to GDP ratio, has provoked heated debates on increasing financial risks and the stance of macroprudential policies in China. Drawing on cross-country data between 1990 and 2010, we explore the explanatory factors for financial crises, using a panel logit model that considers variables such as GDP growth, external debt, savings rate, capital market openness, etc. We find that the private debt to GDP ratio has a strong explanatory power for the probability of financial crises, while the M2 to GDP ratio is not significantly correlated to financial crises. If the private debt to GDP ratio goes up by 1 percentage point in China, the probability of a banking crisis will increase by 0.40-0.68 percentage points. The following policy implications can be drawn from our research. Although policymakers must be cautious with financial risks stemming from an excess deleveraging process, it is important to understand that an increasing macro-leverage is the key warning indicator for financial crises. Given the high private debt to GDP ratio in China, a tightening policy stance that aims to deleverage the Chinese economy should be always in place in the medium to long run.

2009-2016

“ ”

Probit/Logit نجى

نجى Frankel Rose(1996) Logit نجى

100 22

GDP

Logit نجى IMF

(Berg

Pattillo,1999a; Bussiere Fratzscher,2006; Demirgüç-Kunt

Detragiache,2000; Frankel Rose,1996) نجى

نجى Kaminsky (1998)

Berg Pattillo(1999b) نجى

نجى

(Frankel Saravelos,2012) نجى

(

, 2011)

Logit نجى

Logit نجى

Probit نجى Logit نجى

Davis Karim(2008) Logit نجى

نجى

Reinhart Rogoff(2011)

Frankel Rose(1996)

25% Kaminsky, Lizondo

Reinhart(1998) 15%

Reinhart Rogoff(2011)

2008-09

Obstfeld 2009 2010 Rose Spiegel 2010 Berkmen

2009 Frankel Saravelos

2012 2009

2008-

2009

Borio Lowe 2002

2004

Schularick Taylor 2012 1870-2008

Gourinchas Obstfeld 2012

Reinhart Rogoff 2009 800

Drehmann Juselius 2013

Early Warning

Indicator GDP GDP

2009 2007 2008

24 24

2011 1993 2009

KLR Logit نجی 2009

M2/GDP

/GDP

Logit نجى

نجى 60

M2 GDP

GDP

نجى

( ) نجى

60 1990-2010

Logit

Reinhart Rogoff Reinhart Rogoff

1800-2010 نجى

Reinhart Rogoff(2011)

Reinhart

Rogoff(2011) 15%

M2 GDP

GDP GDP

GDP GDP GDP GDP GDP

Chinn Ito(2006)

“ ”

M2 GDP

Drehmann Juselius(2014)

HP نجى

“ ” 2.1

2.1

	1,428.00	0.21	0.40	0.00	1.00
	1,424.00	0.18	0.39	0.00	1.00
M2/GDP	1,121.00	56.55	37.94	10.56	232.92
M2/GDP	1,121.00	0.05	4.74	-33.04	81.25

/GDP	1,235.00	59.74	49.86	2.01	312.03
/GDP	1,235.00	0.06	5.39	-31.88	77.87
GDP	1,417.00	3.50	4.09	-23.98	33.74
/GDP	1,387.00	12.10	13.44	0.10	108.62
/GDP	756.00	62.28	81.87	2.93	1111.27
/GDP	1,259.00	9.46	11.75	-128.80	62.36
GDP	1,417.00	12.64	15.61	0.14	97.01
	1,293.00	0.61	0.37	0.00	1.00
/GDP	1,406.00	36.09	26.23	0.10	231.19

2.1 1428 0.2

1135 0 293 1

1990 2010 20

4 2008

2008

1992-1999

8

1994

1.5 8.6

1990-2010

GDP

نجی

2

2.2 2.3 GDP

/GDP M2 GDP M2/GDP

2.2

/GDP

/GDP

2.3

M2/GDP

2.2 /GDP

	(1)	(2)	(3)	(4)
/GDP	0.0382***	0.0378***	0.0408***	0.0668***
	(0.0107)	(0.0107)	(0.0130)	(0.0176)
/GDP	0.0301***	0.0296***	0.0297***	0.0236***
	(0.00591)	(0.00599)	(0.00601)	(0.00725)
/GDP	-0.0852***	-0.0847***	-0.0862***	-0.147***
	(0.0223)	(0.0223)	(0.0227)	(0.0371)

GDP		-0.0145	-0.0140	0.0195
		(0.0328)	(0.0328)	(0.0414)
/GDP			-0.0128	-0.0472
			(0.0313)	(0.0383)
/GDP				-0.0294
				(0.0286)
				-1.987**
				(0.812)
/GDP				0.0442
				(0.0307)
	599	599	599	461
	32	32	32	25

*** p<0.01, ** p<0.05, * p<0.1

2.3 M2/GDP

	(1)	(2)	(3)	(4)
M2/GDP	0.0188	0.0146	0.0217	0.0120
	(0.0121)	(0.0126)	(0.0144)	(0.0185)
/GDP	0.0263***	0.0257***	0.0262***	0.0207***
	(0.00556)	(0.00563)	(0.00571)	(0.00688)

/GDP	-0.106***	-0.0984***	-0.105***	-0.125***
	(0.0249)	(0.0254)	(0.0262)	(0.0384)
GDP		-0.0278	-0.0271	-0.0195
		(0.0308)	(0.0310)	(0.0368)
M2/GDP			-0.0288	-0.0113
			(0.0297)	(0.0424)
/GDP				0.0171
				(0.0252)
				-1.592**
				(0.724)
/GDP				0.0118
				(0.0276)
	604	603	603	466
	32	32	32	25

*** p<0.01, ** p<0.05, * p<0.1

Logit

“ ” “ ”

2.4 2.4 1 /GDP

3.9%

2.4 /GDP

	(1)	(2)	(3)	(4)
/GDP	1.039***	1.039***	1.042***	1.069***
	(0.0111)	(0.0111)	(0.0135)	(0.0188)
/GDP	1.031***	1.030***	1.030***	1.024***
	(0.00609)	(0.00617)	(0.00619)	(0.00743)
/GDP	0.918***	0.919***	0.917***	0.863***
	(0.0205)	(0.0205)	(0.0208)	(0.0321)
GDP		0.986	0.986	1.020
		(0.0324)	(0.0323)	(0.0423)
/GDP			0.987	0.954
			(0.0309)	(0.0366)
/GDP				0.971
				(0.0278)
				0.137**
				(0.111)
/GDP				1.045
				(0.0321)
	599	599	599	461
	32	32	32	25

2

Logit نجى

نجى

2017 نجى /GDP

2.5 /GDP

0.40-0.68

2.5

	(1)	(2)	(3)	(4)
/GDP	0.40	0.42	0.42	0.68
/GDP	0.30	0.31	0.32	0.24

3

نجى

/GDP /GDP

/GDP /GDP

M2/GDP

2.6 /GDP

	(1)	(2)	(3)	(4)

/GDP	0.0298***	0.0277**	0.0192	0.0319**
	(0.0113)	(0.0113)	(0.0136)	(0.0161)
/GDP	0.0113***	0.00897**	0.00855**	0.0169***
	(0.00418)	(0.00415)	(0.00413)	(0.00612)
/GDP	-0.137***	-0.131***	-0.127***	-0.0495
	(0.0283)	(0.0282)	(0.0282)	(0.0377)
GDP		-0.0611**	-0.0615**	-0.0168
		(0.0304)	(0.0304)	(0.0371)
/GDP			0.0356	0.0300
			(0.0313)	(0.0385)
/GDP				-0.0593**
				(0.0272)
				-2.027***
				(0.686)
/GDP				-0.114***
				(0.0310)
	563	563	563	452
	30	30	30	26

*** p<0.01, ** p<0.05, * p<0.1

2.7 M2/GDP

	(1)	(2)	(3)	(4)

M2/GDP	0.0130	0.00715	-0.0109	0.0125
	(0.0129)	(0.0132)	(0.0166)	(0.0225)
/GDP	0.00996**	0.00784**	0.00708*	0.0138**
	(0.00405)	(0.00388)	(0.00376)	(0.00625)
/GDP	-0.145***	-0.132***	-0.124***	-0.0536
	(0.0289)	(0.0292)	(0.0296)	(0.0396)
GDP		-0.0667**	-0.0703**	-0.0280
		(0.0304)	(0.0305)	(0.0364)
M2/GDP			0.0674**	0.0519
			(0.0329)	(0.0522)
/GDP				-0.0469*
				(0.0256)
				-1.926***
				(0.662)
/GDP				-0.118***
				(0.0322)
	568	567	567	457
	30	30	30	26

*** p<0.01, ** p<0.05, * p<0.1

“

”

60

Logit نجى GDP

/GDP

M2/GDP نجى

2017 /GDP 1

0.40-0.68

“ ”

“ ”

”H % Ч p

Berg, A. and Pattillo, C., 1999a, "Predicting Currency Crises: The Indicators Approach and an Alternative", Journal of International Money and Finance, 18(4): 561-586.

Berg, A. and Pattillo, C., 1999b, "Are Currency Crises Predictable? A Test", IMF Staff Papers, 46(2): 107-138.

Borio, C. E. and Lowe, P. W., 2002, "Asset Prices, Financial and Monetary Stability: Exploring the Nexus".

Borio, C. E. and Lowe, P. W., 2004, "Securing Sustainable Price Stability: Should Credit Come Back From the Wilderness?".

Bussiere, M. and Fratzscher, M., 2006, "Towards a New Early Warning System of Financial Crises", Journal of International Money and Finance, 25(6): 953-973.

Cecchetti, S. G., Mohanty, M. S. and Zampolli, F., 2011, "The Real Effects of Debt".

Davis, E. P. and Karim, D., 2008, "Comparing Early Warning Systems for Banking Crises", Journal of Financial Stability, 4(2): 89-120.

Demirgüç-Kunt, A. and Detragiache, E., 2000, "Monitoring Banking Sector Fragility: A Multivariate Logit Approach", The World Bank Economic Review, 14(2): 287-307.

Drehmann, M. and Juselius, M., 2014, "Evaluating Early Warning Indicators of Banking Crises: Satisfying Policy Requirements", International Journal of Forecasting, 30(3): 759-780.

Frankel, J. A. and Rose, A. K., 1996, "Currency Crashes in Emerging Markets: An Empirical Treatment", Journal of International Economics, 41(3-4): 351-366.

Frankel, J. and Saravelos, G., 2012, "Can Leading Indicators Assess Country Vulnerability? Evidence From the 2008–09 Global Financial Crisis", Journal of International Economics, 87(2): 216-231.

Kaminsky, G., Lizondo, S. and Reinhart, C. M., 1998, "Leading Indicators of Currency Crises", Staff Papers, 45(1): 1-48.

Reinhart, C. M. and Rogoff, K. S., 2010, "Growth in a Time of Debt", American Economic Review, 100(2): 573-578.

Reinhart, C. M. and Rogoff, K. S., 2011, "From Financial Crash to Debt Crisis", American Economic Review, 101(5): 1676-1706.

Schularick, M. and Taylor, A. M., 2012, "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", American Economic Review, 102(2): 1029-1061.

, 2009 Klr نجى ——

, , 03

, 2011 ,

, 06