

研究报告

系统性金融压力的监测——中国 CISS

¹, Manfred Kremer²,

³

⁴

⁵

摘要

CISS

13

(



)
CISS

Research Report

2019-04- edition

TSINGHUA UNIVERSITY NATIONAL INSTITUTE OF FINANCIAL RESEARCH

Measuring Systemic Financial Stress in China – China CISS

Center for Finance and Development

Ma Jun

Abstract

It is critical for financial regulators to assess the overall level of stress in the financial system in a timely manner, but various financial markets often send mixed signals. To address this problem, we present a single composite financial stress index (China CISS) based on 13 financial indicators of the equity market, the bond market, financial institutions and the foreign exchange market. To capture the stylized fact that co-movements between markets are much stronger during times of financial stress, we use the time-varying correlation matrix between sub-indices as a dynamic weighting mechanism, and identify the episodes when both the covariance and co-



conduct multiple robustness checks and find that the China CISS is a markedly robust statistic in the time dimension.



Composite Indicator of Systemic Risks CISS

CISS

CISS

CISS

CISS

2008

stress



Adrian

Brunnermeier (2016)

Co-VaR

Co-VaR

Chan-Lau (2010)

Co-Risk

Co-VaR

Acharya

2012

2016

undercapitalized

marginal expected shortfall MES

5%

systemic expected shortfall, SES

MES

SES

SES

SES

Brownlees

Engle (2017)

SES

SRISK

SRISK

SRISK

Jobst

Grey (2013)

contingent claim analysis, CCA

Co-VaR

SES SRISK

/



Financial Stress Indicator FSI

(Illing Liu, 2006)

Illing Liu

2006

11

FSI

Kansas Fed

KCFSI the Kansas City Financial Stress

Index

11

KCFSI

KCFSI

10

Principle Components Analysis



2011)

22

23

probit

Nelson

Perli

2007)

Logit

Blix Grimaldi

2010)

Probit

Girardi

Erg n

2013

Louzis

Vouldis

2013)

GARCH

(Wold , 1987)

event reclassification problem

Logit

Probit



(Illing Liu, 2006)

Adrian Brunnermeier, 2009

Hollo, Kremer Lo Duca 2012)

Composite Indicator of Systemic Stress CISS

Hollo, Kremer Lo Duca 2012)

5

15

Hollo, Kremer Lo Duca 2012)

15

CISS

CISS

Hollo, Kremer Lo Duca 2012)

CISS

LoDuca



2012

2016

GDP

40

CISS

CISS

CISS

CISS

3-4

CISS 13

CISS



CISS

2008

CISS

CISS

CISS

7

7

3

, 5

5

AA

5

credit default swap, CDS

T

Cumulative Max Loss, CMAX

:

T

104

CDS



Non-deliverable forward, NDF

3-4

14

CISS

1



Hollo (2012)

Empirical cumulative distribution function ECDF

0 1

0 1

10

2007 2 1 2017 1 31

2008 2

1

$$x = (x_1, x_2, \dots, x_n)$$

$$(x_{[1]}, x_{[2]}, \dots, x_{[n]})$$

$$x_{[1]} \leq x_{[2]} \leq \dots \leq x_{[n]} \quad x_{[1]}$$

$$x_{[n]}$$

$$F_n(x_i)$$

$$x_t$$

$$S_t$$

$$s_t = F_n(x_t) : \begin{cases} \frac{r}{n}, & x_{[r]} = x_t = x_{[r-1]}, r = 1, 2, \dots, n-1 \\ 1, & x_t = x_{[n]} \end{cases} \quad (1)$$

$$F_n(x^*)$$

$$x_t$$

$$x^*$$

$$r$$

$$x_t$$

$$x$$



$$s_t = \frac{3}{4} \cdot 0.35 + \frac{1}{4} \cdot 1 = 0.7125$$

$$2 \cdot 2 = 4$$

$$s_{n-T} = F_{n-T}(x_{n-T}) = \frac{r}{n-T}, \quad x_{[r]} = x_t = x_{[r-1]}, r = 1, 2, \dots, n-1, n-T-1$$

(2)

$$T = 1, 2, \dots, N$$

$$2 \cdot 0 = 0$$

13
CISS

CISS

3

(3)

$$S_t = \frac{1}{13} \sum_{i,j=1}^{13} s_{i,j,t}$$

EWMA

t

$$s_{i,j,t} = (1 - \alpha) s_{i,j,t-1} + \alpha \tilde{s}_{i,j,t}$$

$$\tilde{s}_{i,j,t} = \frac{s_{i,t}^2 + s_{j,t}^2}{s_{i,t} + s_{j,t}}$$

(4)

0.5

$\tilde{s}_{i,t}$

$\forall s_{i,t}$

0.5

CISS

0.93

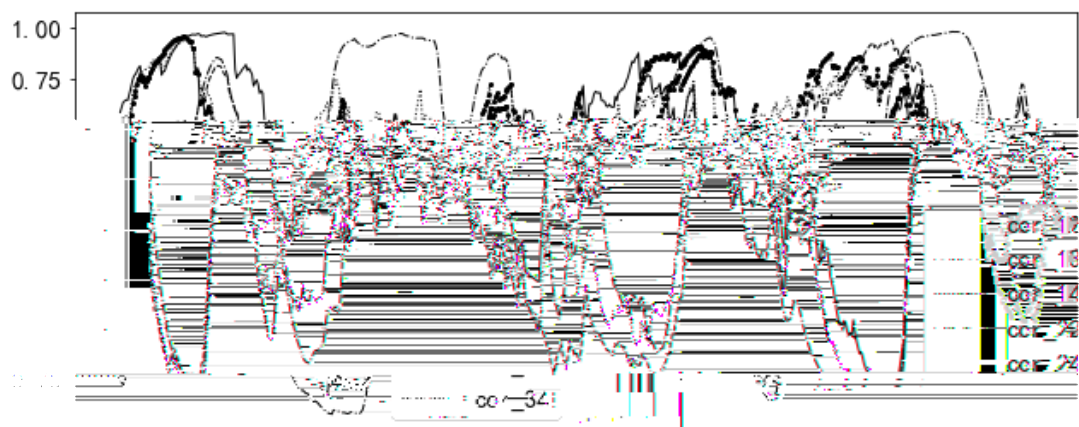
6

$s_{i,j,initial}$

$\tilde{s}_{i,initial} \quad \tilde{s}_{j,initial}$

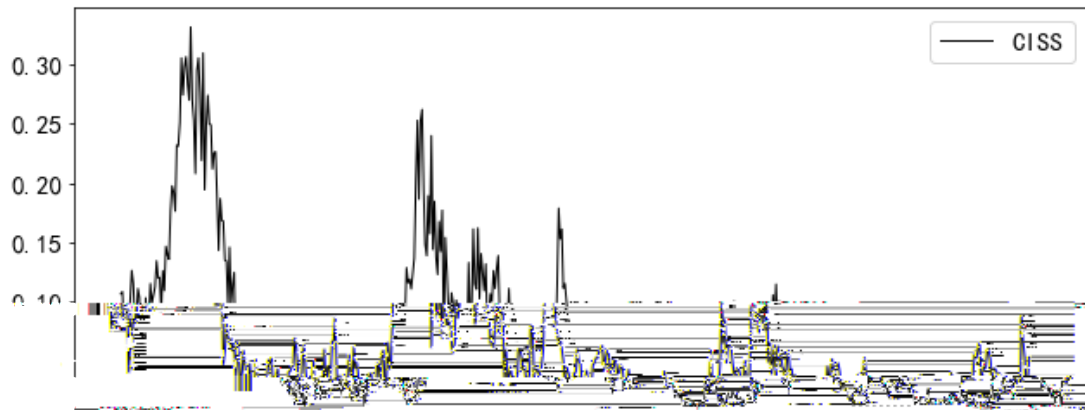
1 2008 2019
 1 2
 3 4 cor_12
 2009 2011 2015 2018

CISS
 0,1 2008 2019
 CISS 2
 1



2 2008-2018

CISS



(Illing Liu, 2006)

CISS

CISS

0.195

2008

2018

CISS

2008

2011

2013

2015

2016

CISS

CISS

CMAX

T CISS T 104

104

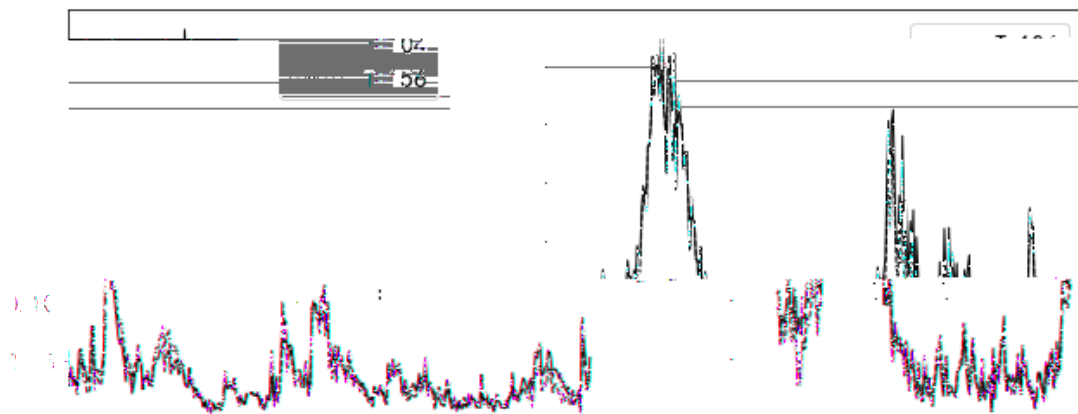
3 T T=156 CISS

T CISS

CISS

3

T CISS



CISS

2007 2 1

2017 1 31

10

1

2017 2 1

2

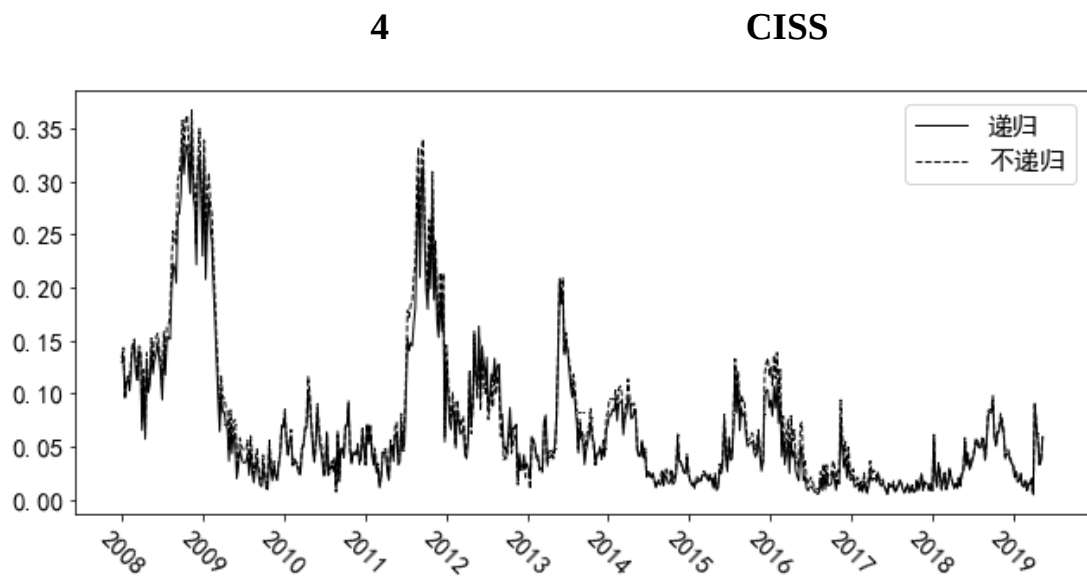
2007 2 1

4 CISS

0.006

2016 1 0.041

CISS



CISS

1-

0.86 0.93 CISS 5

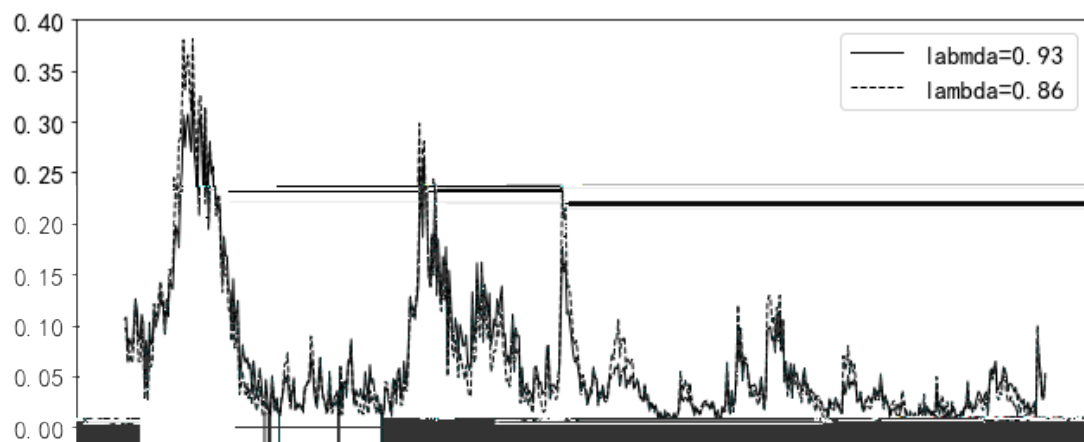
CISS

CISS

CISS

5

CISS



CISS

6

CISS

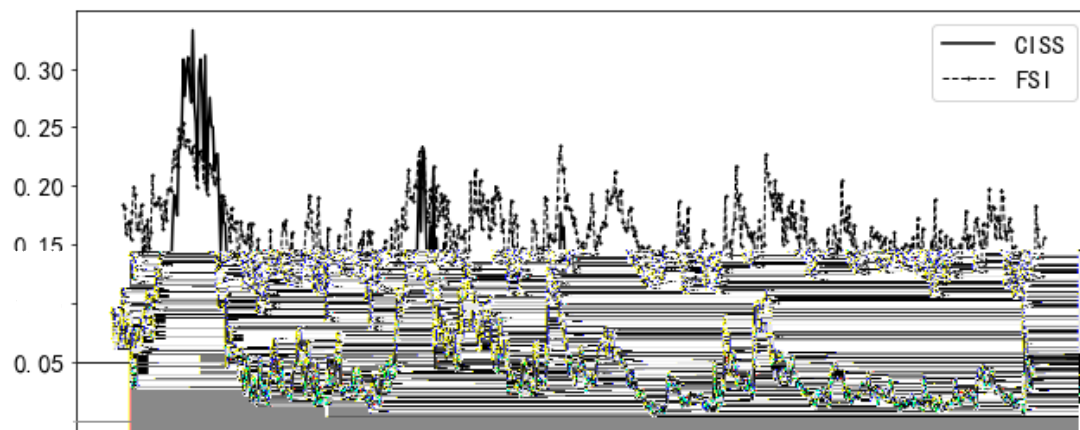
FSI

FSI

CISS

6 CISS

FSI



CISS

CISS

CISS

CISS

CISS

CISS

CISS

Can It be Measured, and Why Does It Matter?", *Economic Review*, 94(2): 5-50.

[19]Hollo, D., Kremer, M. and Lo Duca, M., 2012, "CISS-a Composite Indicator of Systemic Stress in the Financial System".

[20]Idierb, J., G. Lamé and J. Mésonnierb. 2014. "How useful is the Marginal Expected Shortfall for the measurement of systemic exposure? A practical assessment" *Journal of Banking & Finance*, Volume 47, October 2014, Pages 134-146

[21]Illing, M. and Liu, Y., 2006, "Measuring Financial Stress in a Developed Country: An Application to Canada", *Journal of Financial Stability*, 2(3): 243-265.

[22]Kliesen, K. L. and Smith, D. C., 2010, "Measuring Financial Market Stress", *Economic Synopses*.

[23]Kremer, M., 2016, "Macroeconomic Effects of Financial Stress and the Role of Monetary Policy: A VAR Analysis for the Euro Area", *International Economics and Economic Policy*, 13(1): 105-138.

[24]Louzis, D. P. and Vouldis, A. T., 2013, "A Financial Systemic Stress Index for Greece".

[25]Nelson, W. R. and Perli, R., 2007, "Selected Indicators of Financial Stability", *Risk Measurement and Systemic Risk*, 4: 343-372.

[26]Van Roye, B., 2011, "Financial Stress and Economic Activity in Germany and the Euro Area", *Kiel Working Paper*.

[27]Wold, S., Esbensen, K. and Geladi, P., 1987, "Principal Component Analysis", *Chemometrics and Intelligent Laboratory Systems*, 2(1-3): 37-52.

[28]Yiu, M. S., Ho, W. A. and Jin, L., 2010, "A Measure of Financial Stress in Hong Kong Financial Market the Financial Stress Index", *Hong Kong Monetary Authority Research Note*, 2: 2010.