

Online Supplementary Appendix

Economists in the 2008 Financial Crisis: Slow to See, Fast to Act

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Abbreviations used to denote the NBER research programs

AE	Development of the American Economy
CH	Children
AG	Aging
ED	Economics of Education
TWP	Technical Working Papers
DEV	Development Economics
PR	Productivity, Innovation, and Entrepreneurship
POL	Political Economy
LE	Law and Economics
HC	Health Care
IO	Industrial Organization
PE	Public Economics
EEE	Environment and Energy Economics
IFM	International Finance and Macroeconomics
HE	Health Economics
IS	Labor Studies
EFG	Economic Fluctuations and Growth
ME	Monetary Economics
IT	International Trade
CF	Corporate Finance
AP	Asset Pricing
All	All NBER WPs

Table A1

NBER WPs: descriptive statistics for 16 non-Macro/Finance NBER programs, 1999–2016.

	DAE	CH	AG	ED	TWP	DEV	PR	POL	LE	EC	IO	PE	EEE	HE	IS	All
Average number of WPs	82	80	71	87	40	63	90	71	68	32	85	188	69	106	187	793
Average number of WPs before 2008	65	52	46	54	26	26	57	36	51	26	58	146	31	76	137	607
Average number of WPs after 2008	99	108	96	119	55	99	122	105	85	38	$\frac{11}{2}$	231	106	135	236	978
<i>t</i> -test for difference in mean	12	21	18	24	11	25	23	26	12	4	20	26	27	20	30	55
Average number of WPs	82	80	71	87	40	63	90	71	68	32	85	188	69	106	187	793

Table A2

The frequency of crisis WPs published by the 16 non-Macro/Finance NBER programs, 1999–2016.

	DAE	CH	AG	ED	TWP	DEV	PR	POL	LE	HC	IO	PE	EEE	HE	IS	All
Average % of crisis WPs	13	3	6	3	5	6	4	6	5	5	4	5	5	4	4	11
Min. % during 1999–2016	5	0	0	0	0	0	0	0	0	0	0	2	0	0	1	6
Max. % during 1999–2016	21	12	17	17	17	17	11	17	15	17	14	11	17	10	8	18
Average % before 2008	10	3	4	3	4	4	3	4	4	4	4	4	5	3	3	8
Average % after 2008	17	4	8	4	5	7	6	9	7	6	5	7	5	5	5	14
(% after)/(% before)	2	2	2	1	1	2	2	2	2	1	2	2	1	2	2	2
<i>z</i> -test for mean-difference	4	2	3	0	1	2	3	3	2	1	2	4	0	2	3	10
% out of all crisis WPs	12	3	5	3	2	4	4	5	4	2	4	11	4	4	7	100
Number of crisis WPs	204	66	88	60	51	75	85	100	79	49	83	188	72	83	128	1,632

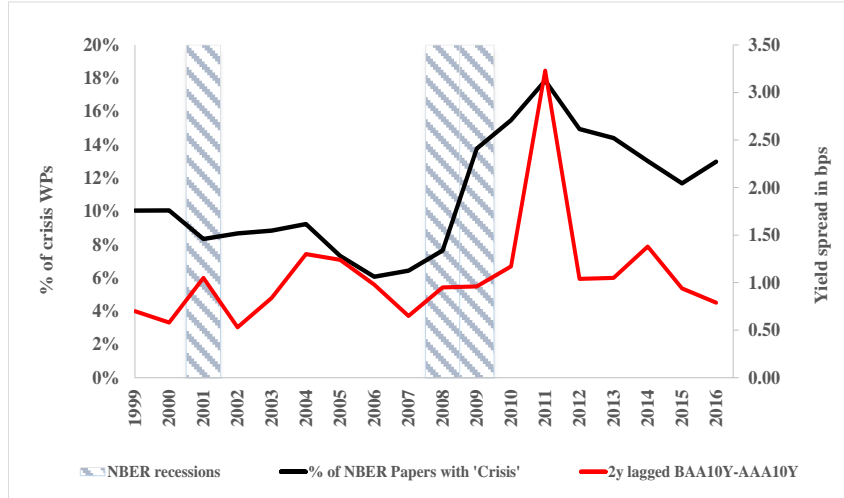


Fig. A3. The % of crisis WPs and 2-year lagged yield spread between the Moody’s BAA10Y index (index of 10y bonds with a rating of BAA) and AAA10Y index (index of 10y bonds with a rating of AAA).

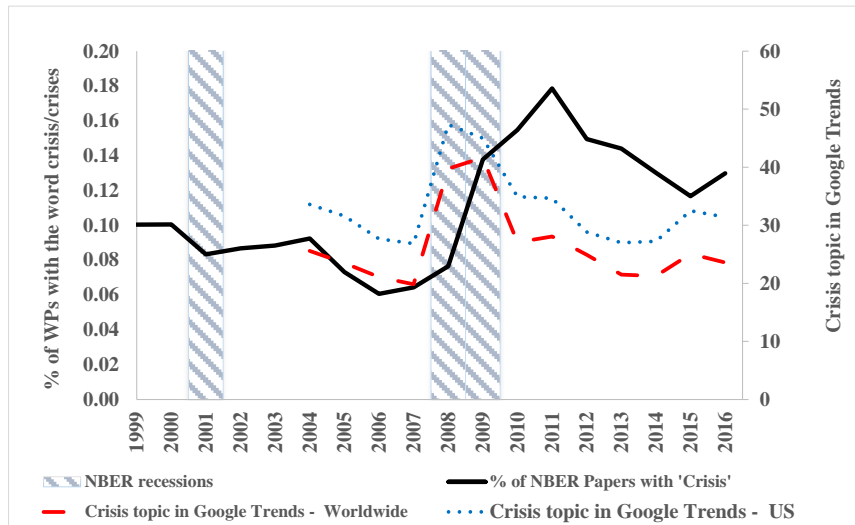


Fig. A3b. The % of crisis WPs and the average frequency of the topic “crisis” in Google Trends in the US and Worldwide.

Notes: Google Trends’ data were generated by setting its search parameters to “topic,” “all category,” and “web search.” Google Trends data are available only starting 2004 and onwards and is normalized. The original Google Trend data is monthly, and here we report annual averages. Source: <https://trends.google.com/trends/explore>.

Table A4

Regressions of the annual % of crisis WPs on different indexes of yield spread.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.09*** (6.68)	0.07*** (3.19)	0.08*** (3.13)	0.07*** (4.99)	0.09*** (3.31)	0.07*** (6.53)	0.07*** (9.55)	0.08*** (7.36)
2y lagged 3-month LIBOR/T-Bill spread (TED spread)	0.04 (1.59)							
2y lagged Baa/10-year Treasury spread		0.02** (2.12)				0.01 (1.46)		-0.01 (1.21)
2y lagged Aaa/10-year Treasury spread			0.06 (1.14)					
2y lagged Baa/Aaa spread				0.03** (2.66)			0.02** (2.30)	0.03** (2.07)
2y lagged High-yield bond/Baa spread					0.002 (0.69)	0.002 (0.69)		
Dummy for post-2008						0.06*** (7.00)	0.05*** (7.23)	0.05*** (7.36)
$p > F$, $p > \chi^2$	0.13%	4.98%	27.2%	1.70%	49.8%	0.00%	0.00%	0.00%
R^2	0.14	0.22	0.07	0.31	0.03	0.82	0.85	0.86

Note:

Crisis WPs are defined as the WPs that mention the word ‘crisis/crises’ at least once in the first five paragraphs of the introduction. *t*-test statistics are shown in parentheses. The yield spread indexes are defined as follows:

- 1) 3-month LIBOR/T-Bill spread (TED spread) – the spread between 3-Month LIBOR based on US dollars and 3-Month Treasury Bill, source: <https://fred.stlouisfed.org/series/TEDRATE>.
- 2) Baa/10-year Treasury spread - the spread between Moody's Seasoned Baa Corporate Bond Yield and 10-Year Treasury Constant Maturity, source: <https://fred.stlouisfed.org/series/BAA10Y>.
- 3) Aaa/10-year Treasury spread - the spread between Moody's Seasoned Aaa Corporate Bond Yield and 10-Year Treasury Constant Maturity, source: <https://fred.stlouisfed.org/series/AAA10Y>.
- 4) Baa/Aaa spread – the spread between Moody's Seasoned Baa Corporate Bond Yield and Moody's Seasoned Aaa Corporate Bond Yield, source: the difference between Moody's Seasoned Baa Corporate Bond Yield, <https://fred.stlouisfed.org/series/DBAA>, and Moody's Seasoned Aaa Corporate Bond Yield, <https://fred.stlouisfed.org/series/DAAA>.
- 5) High-yield bond/Baa spread - the spread between ICE Bank of America US High Yield Index Effective Yield and Moody's Seasoned Baa Corporate Bond. Source: computed as a difference between ICE BofA US High Yield Index Effective Yield, <https://fred.stlouisfed.org/series/BAMLH0A0HYM2EY> and Moody's Seasoned Baa Corporate Bond Yield, <https://fred.stlouisfed.org/series/DBAA>.

Table A4b

Regressions of the annual % change of crisis WPs on the change in CISS index of financial stability with leads and lags.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.00 (0.63)	0.00 (0.60)	0.00 (0.55)	0.00 (0.67)	0.00 (0.62)	0.00 (0.94)	-0.00 (0.63)
1-year lead CISS index	-0.00 (0.74)						
CISS index		0.00 (0.82)					
1-year lagged CISS index			0.02* (1.85)			0.01* (2.07)	0.01 (1.49)
2-year lagged CISS index				0.02*** (3.32)		0.02** (3.44)	0.02** (2.32)
3-year lagged CISS index					0.01 (0.63)		
Dummy for post-2008							0.02* (2.11)
$p > F, p > \chi^2$	74.1%	82.3%	8.72%	0.55%	62.5%	0.48%	0.31%
R^2	0.01	0.00	0.21	0.46	0.02	0.62	0.74

Note: Crisis WPs are defined as the WPs that mention the word ‘crisis/crises’ at least once in the first five paragraphs of the introduction. *t*-test statistics are shown in parentheses. We estimate the regression in first differences because the series may contain unit root as ADF tests results were sensitive to specification (drift, trend, number of lags) and thus we could not rule out a possibility of a unit root.

Table A4c

Regressions of the annual % change of crisis WPs on the change in KCFSI index of financial stability with leads and lags.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.00 (0.42)	0.00 (0.52)	0.00 (0.44)	0.00 (0.67)	0.00 (0.88)	0.00 (.112)	-0.00 (0.59)
1-year lead KCFSI index	-0.01 (1.73)						
KCFSI index		-0.00 (0.09)					
1-year lagged KCFSI index			0.01** (2.07)			0.01** (1.99)	0.00 (0.28)
2-year lagged KCFSI index				0.06** (2.47)		0.01** (2.44)	0.01* (2.06)
3-year lagged KCFSI index					0.01 (.125)		
Dummy for 2008-2012							0.03** (2.71)
$p > F, p > \chi^2$	10.6%	92.9%	5.8%	2.96%	23.6%	1.67%	0.34%
R^2	0.19	0.00	0.19	0.34	0.11	0.49	0.69

Note: Crisis WPs are defined as the WPs that mention the word 'crisis/crises' at least once in the first five paragraphs of the introduction. *t*-test statistics are shown in parentheses. We estimate the regression in first differences because the series may contain unit root as ADF tests results were sensitive to specification (drift, trend, number of lags) and thus we could not rule out a possibility of a unit root.

Table A7

Twenty topics we have identified in 612 crisis WPs.

International Finance		Sudden Stops		Repo and Securitization		Liquidity		Crisis Event	
Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.
differ	0.08	sudden	0.14	loan	0.12	liquid	0.26	failur	0.08
find	0.08	stop	0.12	market	0.11	asset	0.11	event	0.08
data	0.06	account	0.10	secur	0.08	market	0.10	lehman	0.06
recent	0.06	current	0.09	credit	0.07	trade	0.05	view	0.06
literatur	0.06	countri	0.05	securit	0.06	risk	0.05	led	0.06
studi	0.06	capit	0.05	collater	0.06	demand	0.04	caus	0.05
measur	0.05	larg	0.04	mortgag	0.05	illiquid	0.04	hous	0.05
import	0.05	revers	0.04	lend	0.05	investor	0.04	septemb	0.05
evid	0.05	deficit	0.04	bond	0.05	money	0.04	mani	0.05
empir	0.05	emerg	0.04	rate	0.05	time	0.04	start	0.05
time	0.05	net	0.04	repo	0.04	secur	0.03	effect	0.05
countri	0.05	economi	0.03	corpor	0.04	increas	0.03	bankruptci	0.04
effect	0.04	asset	0.03	agenc	0.03	suppli	0.02	time	0.04
sever	0.04	global	0.03	borrow	0.03	treasuri	0.02	octob	0.04
impact	0.04	extern	0.03	structur	0.03	bond	0.02	believ	0.04
perform	0.04	imbal	0.03	fund	0.03	hold	0.02	feder	0.04
relat	0.04	collaps	0.03	role	0.03	yield	0.02	rescu	0.04
term	0.04	price	0.03	inform	0.03	spread	0.02	belief	0.04
factor	0.04	adjust	0.02	origin	0.03	agent	0.02	bernank	0.04
larg	0.04	market	0.02	subprim	0.03	particip	0.02	interest	0.04

Government Bailout		History of Crisis		International Reserves		Fiscal and Monetary Policy		Systemic Risk	
Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.
borrow	0.08	system	0.13	reserv	0.22	polic	0.22	risk	0.15
govern	0.08	state	0.11	countri	0.12	monetari	0.13	firm	0.11
guarante	0.07	unit	0.07	intern	0.11	fiscal	0.09	system	0.09
bailout	0.06	world	0.06	china	0.05	central	0.07	credit	0.09
reform	0.06	gold	0.06	accumul	0.04	inflat	0.05	sector	0.08
polic	0.06	histor	0.05	increas	0.04	stabil	0.05	regul	0.06
imf	0.06	centuri	0.05	hold	0.04	respons	0.04	institut	0.05
intern	0.06	histori	0.05	trade	0.04	union	0.04	market	0.05
hazard	0.05	standard	0.04	global	0.03	target	0.04	govern	0.04
privat	0.05	recent	0.04	foreign	0.03	credibl	0.04	measur	0.03
moral	0.04	year	0.04	hoard	0.03	inat	0.03	economi	0.03
problem	0.04	global	0.04	export	0.03	rule	0.03	corpor	0.03
issu	0.04	depress	0.04	adjust	0.03	area	0.03	bank	0.03
institut	0.04	bubbl	0.04	larg	0.03	euro	0.02	manag	0.02
commit	0.04	great	0.04	cost	0.03	govern	0.02	claim	0.02
intervent	0.04	center	0.03	extern	0.03	time	0.02	liabil	0.02
lender	0.03	discuss	0.03	exchang	0.03	countri	0.02	analysi	0.02
cost	0.03	section	0.03	associ	0.03	forecast	0.02	capit	0.02
provid	0.03	event	0.03	asian	0.03	provid	0.02	inform	0.02
program	0.03	today	0.03	develop	0.02	scal	0.02	contract	0.02

Table A7

(Cont.) Twenty topics we have identified in 612 crisis WPs.

Exchange Rates		Great Recession		Economic Shocks		Economic Growth		Sovereign Debt	
Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.
rate	0.29	recess	0.15	model	0.28	growth	0.19	debt	0.36
exchang	0.11	great	0.12	shock	0.10	develop	0.12	default	0.10
interest	0.10	recoveri	0.07	equilibrium	0.05	economi	0.09	govern	0.08
polic	0.09	declin	0.06	constraint	0.04	countri	0.08	sovereign	0.07
economi	0.05	output	0.06	product	0.04	gdp	0.06	public	0.05
regim	0.05	percent	0.05	trade	0.04	sector	0.06	bond	0.04
real	0.05	unemploy	0.05	show	0.04	advanc	0.05	matur	0.03
increas	0.03	depress	0.05	optim	0.04	year	0.04	countri	0.03
monetari	0.03	labor	0.05	friction	0.04	world	0.04	domest	0.03
higher	0.03	period	0.04	studi	0.04	rate	0.03	borrow	0.03
macroeconom	0.02	market	0.04	economi	0.04	percent	0.03	extern	0.03
low	0.02	follow	0.03	effect	0.04	decad	0.03	risk	0.02
inflat	0.02	downturn	0.03	invest	0.03	level	0.02	shortterm	0.02
effect	0.02	year	0.03	dynam	0.03	increas	0.02	fiscal	0.02
open	0.02	episod	0.03	literatur	0.03	sinc	0.02	ratio	0.02
currenc	0.02	shock	0.03	lead	0.03	period	0.02	privat	0.02
peg	0.02	employ	0.03	gener	0.03	averag	0.02	level	0.02
stabil	0.02	chang	0.03	theori	0.03	invest	0.02	creditor	0.02
combin	0.02	real	0.03	develop	0.03	share	0.02	spread	0.01
level	0.02	rate	0.03	agent	0.03	neg	0.02	tax	0.01

Banks		Household Credit		Asset Pricing		Emerging Market		Currency Market	
Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.	Words	Freq.
bank	0.48	credit	0.19	asset	0.16	capit	0.17	market	0.16
central	0.05	boom	0.11	price	0.15	countri	0.11	currenc	0.14
deposit	0.04	household	0.10	market	0.10	market	0.10	countri	0.12
fund	0.04	incom	0.08	investor	0.06	intern	0.08	global	0.09
lend	0.04	hous	0.05	capit	0.05	emerg	0.07	emerg	0.08
reserv	0.03	show	0.04	fund	0.05	flow	0.06	shock	0.05
feder	0.03	mortgag	0.04	equiti	0.04	trade	0.04	dollar	0.04
run	0.03	busi	0.04	stock	0.04	develop	0.04	contagion	0.04
institut	0.03	cycl	0.04	return	0.04	domest	0.04	foreign	0.03
loan	0.03	increas	0.03	valu	0.03	foreign	0.03	intern	0.03
provid	0.03	aggreg	0.03	larg	0.03	global	0.03	period	0.03
system	0.02	leverag	0.03	risk	0.03	control	0.03	integr	0.03
swap	0.02	borrow	0.03	sale	0.03	economi	0.03	spread	0.02
oper	0.02	larg	0.03	expect	0.03	inflow	0.03	bank	0.02
balanc	0.02	data	0.03	invest	0.03	latin	0.03	factor	0.02
line	0.02	expans	0.03	portfolio	0.03	liber	0.03	exposur	0.02
fed	0.02	save	0.03	crash	0.02	asian	0.03	origin	0.02
insur	0.02	invest	0.03	increas	0.02	open	0.02	develop	0.02
failur	0.02	tax	0.03	manag	0.02	extern	0.02	devalu	0.02
larg	0.02	rise	0.02	sell	0.02	argentina	0.02	sever	0.02

Note: The table presents the words of the 20 topics we have identified in the 612 crisis WPs. We define a WP as a 'crisis WP' if (1) it includes the word crisis at least once in the first five paragraphs of the introduction, (2) crisis topics comprise at least 10% of the paper, and (3) crisis topics are among the top-three topics of the paper. Applying this definition, we identified 612 WPs, where 189 WPs were written in the pre-crisis period 1999–2009, 226 during the crisis period 2009–2012, and 197 in the post-crisis period 2008–2016.

Table A7b

Bigram-LDA Analysis: Seven crisis topics we have identified, and the 10 most frequent words in each topic.

Crisis Topics	The most frequent words in the topic									
Financial & Global Crisis	Finance							global		
	crisi	crisi	bank	countri	financi	credit	recent	global	financi	show
	719	180	119	99	98	82	59	51	46	43
Liquidity	liquid	market	asset	illiquid	price	model	investor	increas	capit	crisi
	550	159	157	73	64	63	55	55	52	45 (12)
International Reserves	Intern							centrl		Develop
	reserv	reserv	manag	hold	accumul	countri	crisi	bank	swap	countri
	303	54	49	47	42	42	36	33	29	25
Banks						feder		deposit		
	bank	deposit	lend	liquid	fund	reserv	run	insur	panic	Crisi
	1,024	114	92	78	74	59	54	49	49	45 (12)
Credit Risk	bank	risk	credit	asset	market	collater	deriv	crisi	fund	requir
	455	171	79	65	64	61	49	46	45	44
Emerging Markets & Sudden Stops	emerg					Sudden				
	countri	market	crisi	economi	intern	currenc	extern	stop	domest	financi
	282	183	144	121	96	90	87	84	83	78
Latin America	latin									
	brazil	chile	countr	american	crisi	mexico	argentina	region	emerg	reform
	74	54	45	43	43	33	31	20	15	12

Note: The table presents the 10 most frequent words in crisis' topics we have identified for a corpus that includes the abstracts of all the NBER WPs published in 1999–2016. First, the abstracts of the WPs that were published between 1999 and 2016 were analyzed using Bigram LDA, yielding 500 topics, where each topic contains 20 words. Out of the 500 topics, 7 topics contain the word 'crisis' or a combination of crisis and one other word such as 'financial crisis,' 'global crisis,' etc. The table shows the most frequent words in each topic along with the frequency of each word. In case that the word 'crisis' is not a part of the 10 most frequent words, we replace the 10th word with the word "crisis" and indicate in brackets the rank of the word "crisis" within the topics.

Table A16

The average weights of 20 topics we have identified in the crisis WPs during the pre-crisis period (2005–2008), across NBER research programs.

Topic Name	Monetary Economics	Int. Trade	Corporate Finance	Asset Pricing	Int. Finance and Macro	Econ. Fluct. and Growth
International Finance	6.7	5.7	5.4	6.0	9.4	6.8
Sudden Stop	3.4	6.4	1.7	1.4	12.7	9.3
Repo & Securitization	3.7	1.5	5.4	6.7	1.4	2.0
Liquidity	3.3	1.8	8.4	20.8	2.5	3.6
Crisis Event	5.0	0.7	6.4	3.7	2.6	3.8
Government Bailout	2.2	6.7	5.8	1.8	5.2	4.6
History of Crisis	11.4	1.2	3.8	6.1	5.6	4.6
International Reserves	1.5	32.5	1.6	1.6	7.3	2.4
Monetary Policy	3.2	2.4	4.6	2.7	2.5	4.1
Systemic Risk	8.9	3.0	8.0	4.4	4.0	6.1
Exchange Rates	8.5	7.4	1.4	2.1	6.9	7.0
Great Recessions	2.7	0.4	1.0	1.4	2.4	4.3
Economic Shocks	6.4	8.4	7.0	9.5	7.7	13.4
Economic Growth	4.4	5.4	5.3	4.1	5.7	5.2
Sovereign Debt	4.4	3.1	3.7	1.5	5.5	7.0
Banks	7.0	1.5	11.8	4.1	2.5	2.5
Household Credit	2.4	1.6	2.9	2.7	2.3	2.4
Asset Pricing	5.1	2.2	8.8	18.8	3.6	5.5
Emerging Markets	6.0	11.6	9.3	4.8	13.4	8.7
Currency Markets	10.3	2.2	3.3	1.9	6.4	3.5

Note: The table presents the average weights of the topics we have identified in the 189 crisis WPs that were published in 1999–2008 by selected NBER programs. Here we follow a stricter definition of a crisis WP, than the one we used in the previous sections of the paper: a WP is a ‘crisis WP’ if (1) it includes the word crisis at least once in the first five paragraphs of the introduction, (2) crisis topics comprise at least 10% of the paper, and (3) crisis topics are among the three topics with the highest weight in the paper.

Table A16b

The average weights of 20 topics we have identified in crisis WPs published during the crisis period (2009–2012) across NBER research programs.

Topic Name	Monetary Economics	Int. Trade	Corporate Finance	Asset Pricing	Int. Finance and Macro	Econ. Fluct. and Growth
International Finance	8.6	9.3	12.2	8.3	10.6	6.3
Sudden Stop	2.5	4.3	2.3	2.5	5.0	3.0
Repo & Securitization	8.4	2.1	26.6	14.5	2.0	5.6
Liquidity	4.7	2.3	3.8	11.1	4.0	4.1
Crisis Event	6.5	4.6	3.3	5.4	4.0	5.5
Government Bailout	2.1	2.6	3.6	2.3	3.0	3.2
History of Crisis	9.8	4.0	4.5	5.9	7.4	4.7
International Reserves	2.4	18.1	2.1	1.4	6.6	1.9
Monetary Policy	5.5	2.6	1.6	1.5	4.5	5.8
Systemic Risk	5.4	5.8	7.2	7.1	5.3	6.7
Exchange Rates	4.9	2.3	2.1	2.3	4.5	3.9
Great Recessions	8.1	6.3	2.1	4.2	6.4	10.1
Economic Shocks	8.0	5.4	0.8	9.9	7.2	13.7
Economic Growth	4.9	8.7	2.4	2.4	7.1	4.4
Sovereign Debt	5.6	4.8	3.0	3.1	6.0	3.4
Banks	6.4	4.3	21.0	7.7	4.1	6.5
Household Credit	4.1	2.0	2.5	2.2	3.3	4.6
Asset Pricing	4.2	3.9	6.7	11.8	4.4	6.4
Emerging Markets	2.6	9.4	1.9	1.1	6.3	4.1
Currency Markets	3.9	6.4	2.5	3.8	8.9	2.5

Note: The table presents the average weights of the topics we have identified in the 423 crisis WPs that were published in 2009–2016 by selected NBER programs. Here we follow a stricter definition of a crisis WP, than the one we used in the previous sections of the paper: a WP is a ‘crisis WP’ if (1) it includes the word crisis at least once in the first five paragraphs of the introduction, (2) crisis topics comprise at least 10% of the paper, and (3) crisis topics are among the three topics with the highest weight in the paper.

Table A16c

The average weights of 20 topics we have identified in crisis WPs during the post-crisis period (2013–2016) across NBER research programs.

Topic Name	Monetary Economics	Int. Trade	Corporate Finance	Asset Pricing	Int. Finance and Macro	Econ. Fluct. and Growth
International Finance	7.8	14.8	8.8	7.6	8.1	8.3
Sudden Stop	2.6	5.2	1.6	2.0	3.6	1.9
Repo & Securitization	3.9	0.7	14.1	8.4	1.2	2.8
Liquidity	5.5	0.6	6.3	14.2	3.2	4.2
Crisis Event	6.1	1.2	6.0	4.8	3.0	5.1
Government Bailout	4.5	3.9	6.6	3.3	4.5	5.9
History of Crisis	6.5	6.3	2.6	4.2	6.2	5.2
International Reserves	2.1	1.8	1.7	1.4	5.3	2.1
Monetary Policy	8.8	0.2	2.1	4.0	8.2	7.0
Systemic Risk	4.0	6.6	11.1	5.9	4.5	5.8
Exchange Rates	5.2	1.0	1.7	2.5	5.1	3.5
Great Recessions	7.3	2.0	4.3	4.7	4.9	9.4
Economic Shocks	11.3	36.8	9.1	11.2	8.4	12.6
Economic Growth	3.8	3.7	2.8	3.4	6.8	5.5
Sovereign Debt	7.4	9.3	3.5	4.0	13.9	10.2
Banks	8.3	2.6	12.2	5.7	3.5	5.4
Household Credit	4.3	0.2	3.8	4.8	3.3	5.7
Asset Pricing	3.7	2.1	6.9	11.2	3.1	3.4
Emerging Markets	2.7	11.6	2.1	2.1	5.7	2.1
Currency Markets	2.0	3.9	1.6	2.2	5.6	2.3

Note: The table presents the average weights of the topics we have identified in the 423 crisis WPs that were published in 2009–2016 by selected NBER programs. Here we follow a stricter definition of a crisis WP, than the one we used in the previous sections of the paper: a WP is a ‘crisis WP’ if (1) it includes the word crisis at least once in the first five paragraphs of the introduction, (2) crisis topics comprise at least 10% of the paper, and (3) crisis topics are among the three topics with the highest weight in the paper.

Table A18

The correlation between the annual weights of the 9 crisis topics and the annual weights of the three most correlated topics out of the 500 topics.

Crisis Topics	Topic 1	Topic 2	Topic 3
International Reserves	Default Risk (0.79)	CEO Turnover (0.67)	Protecting Intellectual Property (0.63)
Financial Intermediaries	Religions (0.67)	Pension Plans (0.65)	Mergers and Acquisitions (0.63)
Sudden Stop	Artist Life Cycle (0.80)	Financial Liberalization and Trade (0.77)	Corporate Governance (0.68)
Liquidity	Oil Price and Inventories (0.69)	Carbon Emission Policy (0.67)	Healthcare Spending (0.61)
Sovereign Debt	Public Programs Subsidy (0.69)	Federal Taxation (0.59)	Biased Estimates (0.56)
Emerging Markets	Consumption habitat (0.79)	Stock Returns (0.77)	Tariff Policy (0.73)
Great Recession	School achievements (0.86)	Treatment Effect (0.83)	Bank Lending (0.81)
Global Crisis	Estimation methods (0.66)	Product Quality (0.63)	Carbon Emission Policy (0.61)
Repo and Securitization	Literature Review (0.83)	Credit Cycle (0.79)	Government Spending (0.77)

Note: The table presents correlations between the annual weights of the 9 crisis topics and the annual weights of the three most correlated topics out of the 500 topics. It should be noted that there is no correlation between the weights of these topics in the NBER WPs, which means that the correlated topics did not appear in the same papers, rather in different papers, but during the same periods. We label and list in the corresponding cell each one of the top-3 correlated topics, and in parentheses we indicate their correlation with the corresponding crisis topic.

Table A20

Percentage of NBER WPs that were published between 1999 and 2016 by the two NBER finance programs (Asset Pricing, and Corporate Finance) in the top-3 finance journals.

Journal	Percentage	Number
<i>Journal of Finance</i>	6.6%	153
<i>Journal of Financial Economics</i>	8.2%	189
<i>Review of Financial Studies</i>	6.6%	154
Total	21.4%	524

According to the top table, the average percentage of NBER WPs that were published in the top-3 finance journals in 2010–2016 is 11%. According to the bottom table, 21% of the NBER WPs published between 1999 and 2016 by the two NBER finance programs were published in the top-3 journals. These averages are lower bounds because sometimes paper's titles are changed upon publication, or some authors merge two papers, etc.

Table A21

Percentage of NBER WPs published in the top-3 finance journals in the total number of publications in these journals.

	% of NBER WPs out of total publications			
	<i>Journal of Finance</i>	<i>Journal of Financial Economics</i>	<i>Review of Financial Studies</i>	Total
2004	5%	11%	0%	7%
2005	9%	9%	8%	9%
2006	8%	6%	12%	8%
2007	8%	8%	6%	8%
2008	8%	9%	12%	10%
2009	10%	7%	11%	10%
2010	13%	8%	10%	10%
2011	14%	13%	11%	12%
2012	11%	11%	9%	10%
2013	10%	14%	8%	11%
2014	11%	16%	11%	12%
2015	16%	8%	8%	10%
2016	7%	15%	11%	11%
Average 2010–2016	11.2%	11.7%	9.9%	10.8%
Average 2004–2009	8.0%	8.3%	10.1%	8.7%
Average 2004–2016	9.8%	10.8%	9.8%	10.1%

Kansas City Financial Stress Index (KCFSI)

The goal of KCFSI is to give policymakers a single comprehensive index of financial stress.

Financial Stress Features

According to Hakkio and Keeton (2009), every episode of financial stress involves at least one of the following phenomena:

1. Increased uncertainty about fundamental value of assets
2. Increased uncertainty about behavior of other investors
3. Increased asymmetry of information
4. Decreased willingness to hold risky assets (flight to quality)
5. Decreased willingness to hold illiquid assets (flight to liquidity)

Variables Used in Constructing the Index

To construct an index that captures all the above five features of a financial stress, the following variables are used:

1. 3-month LIBOR/T-Bill spread (TED spread)
2. 2-year swap spread
3. Off-the-run/on-the-run 10-year Treasury spread
4. Aaa/10-year Treasury spread
5. Baa/Aaa spread
6. High-yield bond/Baa spread
7. Consumer ABS/5-year Treasury spread
8. Correlation between returns on stocks and Treasury bonds
9. Implied volatility of overall stock prices (VIX)
10. Idiosyncratic volatility of bank stock prices
11. Cross-section dispersion of bank stock returns

Table A22 lists these variables and the corresponding financial stress attributes they capture.

Table A22

Variables and the Financial Stress Aspects They Represent.

Variable	Aspects of financial stress represented by variable
3-month LIBOR/3-month T-bill spread (TED)	Flight to quality, flight to liquidity, increased asymmetry of information
2-year swap spread	Flight to liquidity, flight to quality
Off-the-run/on-the run 10-year Treasury spread	Flight to liquidity
Aaa/10-year Treasury spread	Flight to liquidity
Baa/Aaa spread	Flight to quality, increased asymmetry of information
High-yield bond/Baa spread	Flight to quality, flight to liquidity, increased asymmetry of information
Consumer ABS/ 5-year Treasury spread	Flight to quality, increased asymmetry of information
Negative value of correlation between stock and Treasury returns	Flight to quality
Implied volatility of overall stock prices (VIX)	Uncertainty about fundamentals and behavior of other investors
Idiosyncratic volatility (IVOL) of bank stock prices	Uncertainty about fundamentals and behavior of other investors
Cross-section dispersion (CSD) of bank stock returns	Increased asymmetry of information

Combining the Variables in an Index of Financial Stress

Financial stress is assumed to be the factor most responsible for the co-movement of the above variables. This factor is then identified by the method of principal components, using the following steps:

1. Express the 11 variables in the same units by subtracting the sample mean and dividing by the standard deviation.
2. Choose the coefficients of the variables in the index so that the index explains the maximum possible amount of the total variation in the 11 variables.

3. Scale the coefficients so that the standard deviation of the index equals 1.

KCFSI – Example

Figure A9 shows the value of the KCFSI index from February 1990 to March 2009. The figure reflects nicely the effect of the 2008 financial crisis.

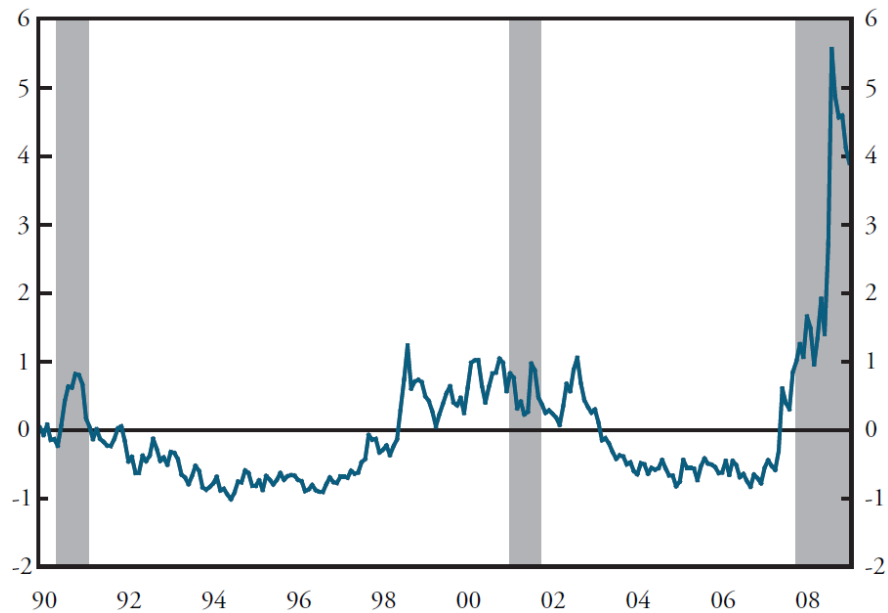


Fig. A9. KCFSI, February 1990 – March 2009.

Note: Shaded areas indicate recessions.

More details about the KCFSI can be found in:

Hakkio, C. and W. Keeton (2009), “Financial Stress: What Is It, How Can It Be Measured, and Why Does It Matter?” *Federal Reserve Bank of Kansas City Economic Review*, 2nd Quarter, 5–50.

Composite Indicator of Systemic Stress (CISS)

The goal of the CISS is to capture the extent of financial stress using a methodology that is based on portfolio theory. It emphasizes the systemic nature of existing stresses, interpreting it as an ex-post measure of systemic risk, i.e. risk which has already materialized.

The CISS permits real time monitoring and assessment of the stress level in the financial system and gauging the impact of policy measures directed towards mitigating systemic stress. It can also help in delineating historical episodes of “financial crises” which might then be better compared and studied empirically in the context of early warning signal models.

The key advantage of CISS over alternative indicators is its explicit foundation on standard definitions of systemic risk and the adoption of a statistical measurement framework suitable to capture some of the main symptoms characterizing systemic crises.

Segments of the Financial System CISS Captures

The CISS comprises the five most important segments of the financial system of an economy:

1. Bank financial intermediaries
2. Non-bank financial intermediaries
3. Money markets
4. Securities (equities and bonds) markets
5. Foreign exchange markets

The current level of stress in each of these five segments is measured on the basis of three raw stress indicators capturing certain symptoms of financial stress such as increases in agents’ uncertainty, investor disagreement or information asymmetries. Thus, in total 15 individual financial stress measures are employed. Some of the raw stress indicators capture flight-to-quality and flight-to-liquidity effects, respectively.

The CISS measures such stress symptoms mainly based on securities market indicators such as volatilities, risk spreads and cumulative valuation losses, which according to Holló et al. (2012), are quite standard in the literature.

Key Requirements

The key requirements are as follows:

1. The data should be available on a daily or weekly basis with a short publication lag.
2. The stress indicators should represent market-wide developments.
3. The index should be computable for a wide range of countries and be based on a comparable set of indicators.
4. The index should be available for sufficiently long data samples so as it comprises several episodes of financial stress.

Individual Stress Indicators

The individual stress indicators that comprise the index are as follows:

Money Market

- Realized volatility of the 3-month Euribor rate
- Interest rate spread between 3-month Euribor and 3-month French T-bills
- Monetary Financial Institution's emergency lending at Eurosystem central banks

Bond Market

- Realized volatility of the German 10-year benchmark government bond index
- Yield spread between A-rated non-financial corporations and government bonds (7-year maturity)
- 10-year interest rate swap spread

Equity Market

- Realized volatility of the Datastream non-financial sector stock market index
- CMAX for the Datastream non-financial sector stock market index
- Stock-bond correlation

Financial Intermediaries

- Realized volatility of the idiosyncratic equity return of the Datastream bank sector stock market index

- over the total market index
- Yield spread between A-rated financial and non-financial corporations (7-year maturity)
- CMAX as defined above interacted with the inverse price-book ratio (book-price ratio) for the
- financial sector equity market index

Foreign Exchange Market

- Realized volatility of the euro exchange rate vis-à-vis the US dollar, the Japanese Yen and the British Pound

Aggregation of Sub-Indexes

The main methodological innovation of the CISS compared to alternative financial stress indicators is the application of standard portfolio theory to the aggregation of subindices. The subindices are aggregated analogously to the aggregation of individual asset risks into overall portfolio risk by considering the cross-correlations between all individual asset returns and not only their variances. It is essential for our purpose that we allow for time-variation in the cross-correlation structure between subindices. In this case, the CISS puts more weight on situations in which high stress prevails in several market segments at the same time. The stronger financial stress is correlated across subindices, the more widespread is the state of financial instability.

Figure A10 shows, as an example, a plot of the CISS index from January 1999 to June 2011, based on weekly Euro area data.

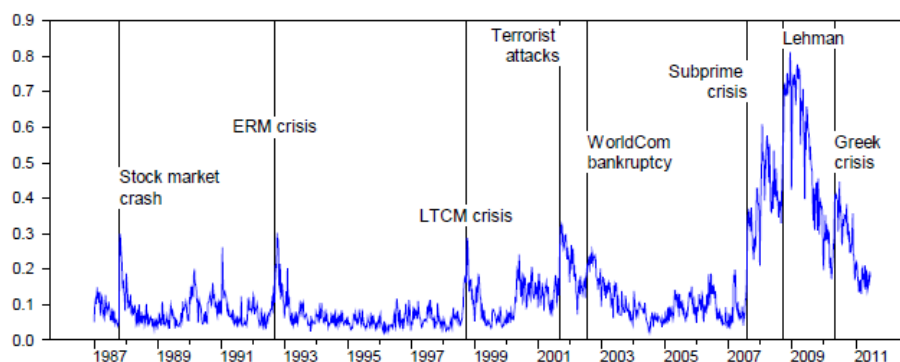


Fig. A10. CISS Index for the Euro Area, January 1999 – June 2011.

More details about the CISS index can be found in:

Holló, D., M. Kremer, and M. Lo Duca (2012), “CISS - A Composite Indicator of Systemic Stress in the Financial System,” Working Paper No. 1426, European Central Bank.