
Current Conditions and Outlook in Global Credit Markets & Pre & Post Default Performance of Corporate Bonds & Loans

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Major Agencies Bond Rating Categories

Moody's

S&P/Fitch

Aaa
Aa1
Aa2
Aa3
A1
A2
A3
Baa1
Baa2
Baa3
Ba1
Ba2
Ba3
B1
B2
B3
Caa1
Caa
Caa3
Ca
C

Investment
Grade

High Yield
("Junk")

AAA
AA+
AA
AA-
A+
A
A-
BBB+
BBB
BBB-
BB+
BB
BB-
B+
B
B-
CCC+
CCC
CCC-
CC
C
D

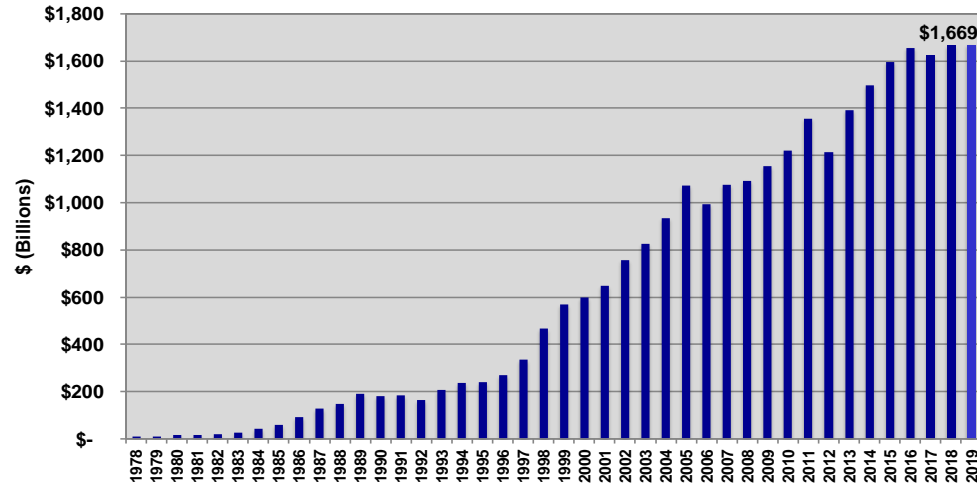


High Yield
Market

Size Of High-Yield Bond Market

1978 – 2019 (Mid-year US\$ billions)

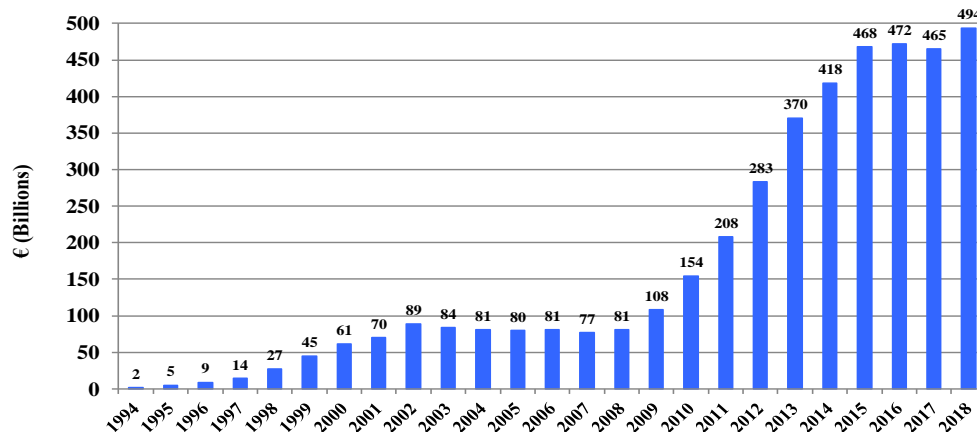
US Market



Source: NYU Salomon Center estimates using Credit Suisse, S&P and Citi data

1994 – 2018*

Western Europe Market

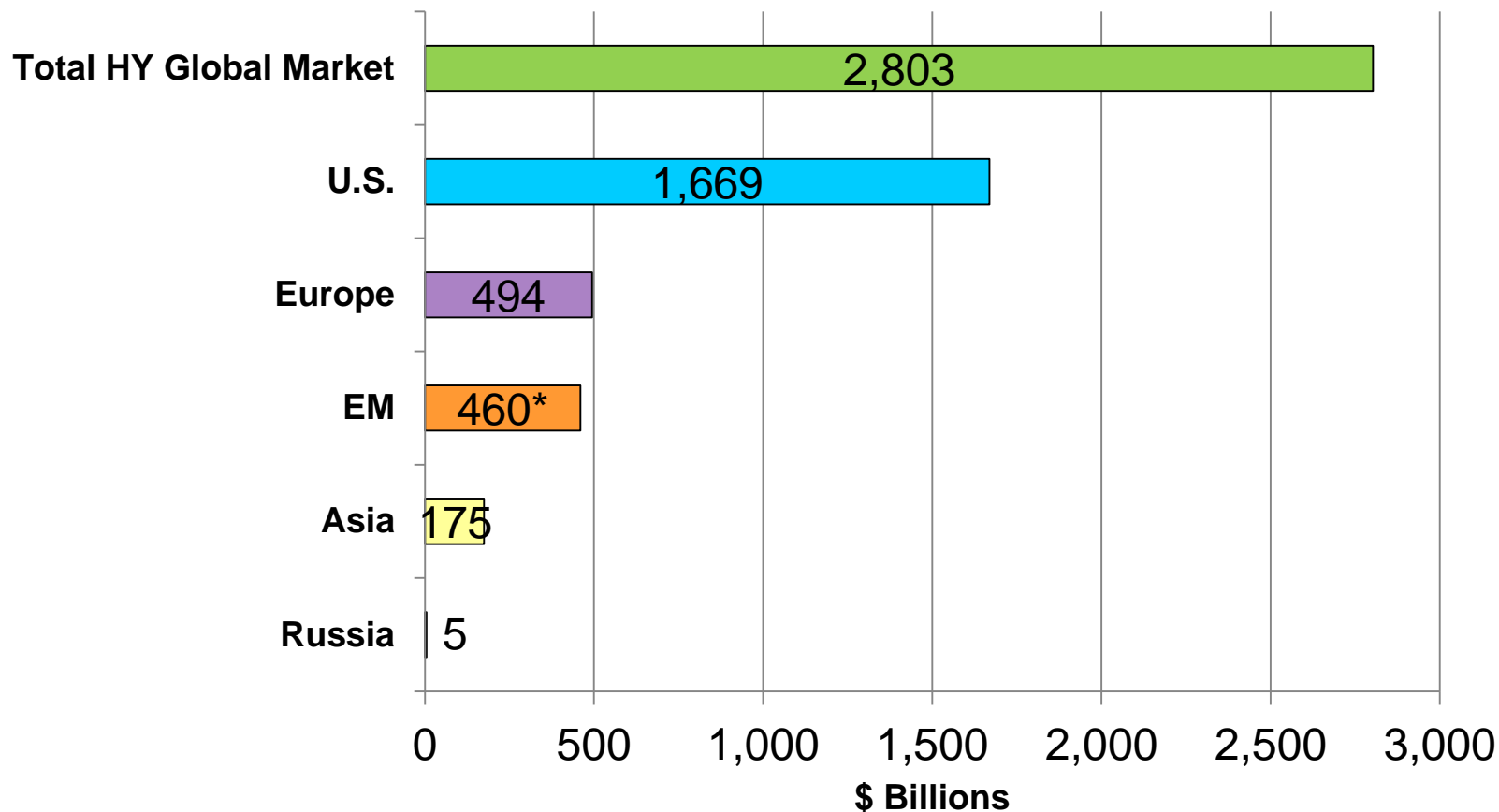


Source: Credit Suisse

* Includes non-investment grade straight corporate debt of issuers with assets located in or revenues derived from Western Europe, or the bond is denominated in a Western European currency. Floating-rate and convertible bonds and preferred stock are not included.

Size of Corporate HY Bond Market: U.S., Europe, Emerging Markets & Asia (ex. Japan) (\$ Billions)

2018

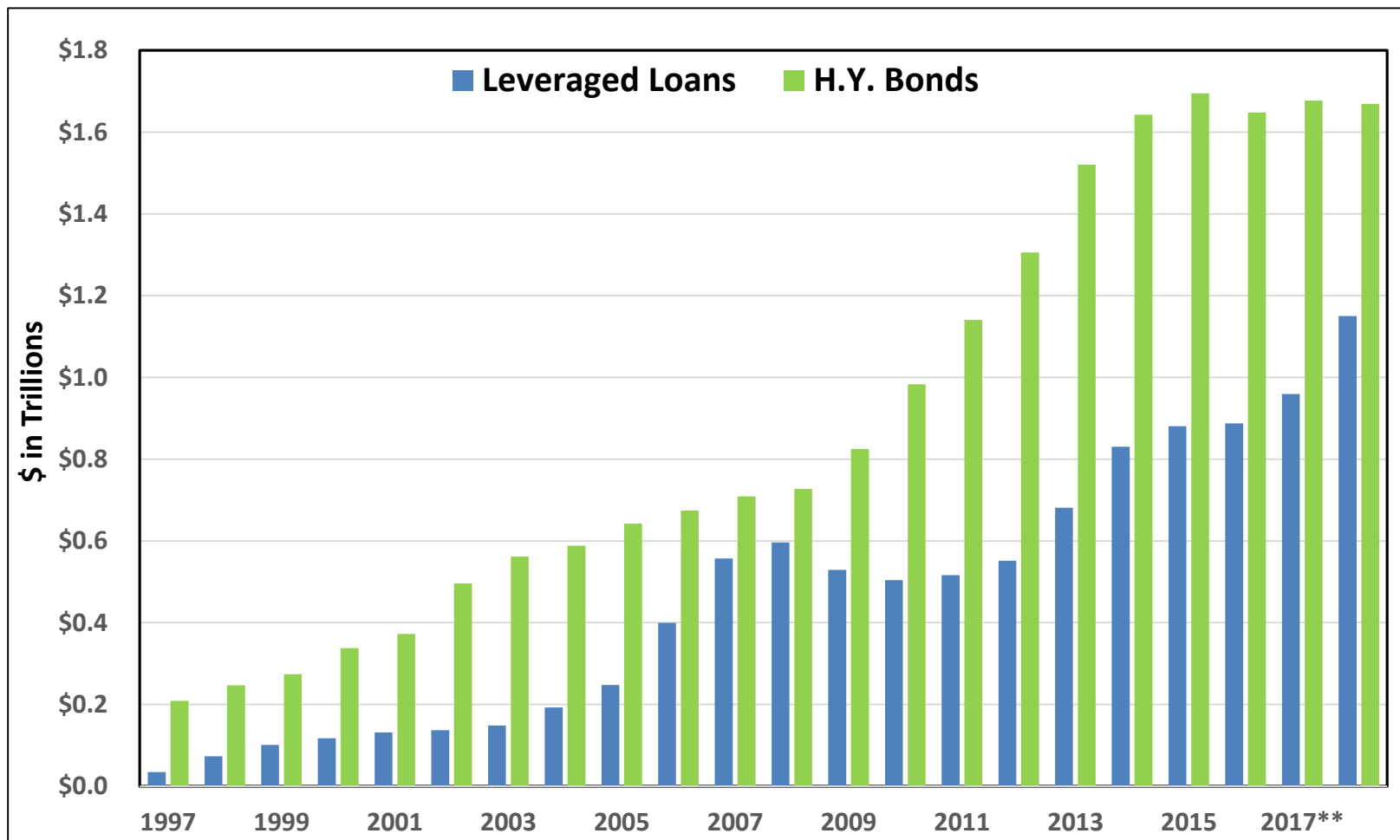


*Mainly Latin America. Note: EM & Asia value as of 2017.

Source: NYU Salomon Center, Credit Suisse, LIM Advisors Ltd.

Size of The U.S. High-Yield and Leveraged Loan* Markets

1997-2018



*Primarily Institutional Tranches. **NYU Salomon Center High-Yield Market Size as of 12/31/17 and 12/31/2018.

Source: S&P Global Market Intelligence.

Benign Credit Cycle: Is It Over?

- **Length of Benign Credit Cycles: Is the Current Cycle Over? No.**
- **Default Rates (no), Default Forecast (no), Recovery Rates (no), Yields (no) & Liquidity (no)**
- **Coincidence with Recessions: U.S. & European Scenarios**
- **Level of Non-financial Debt as a Percent of GDP**
- **Global Debt Levels**
- **Comparative Health of High-Yield Firms (2007 vs. 2017)**
- **High-Yield CCC New Issuance as a Liquidity Measure**
- **LBO Statistics and Trends**
- **Liquidity Concerns (Market and Market-Makers)**
- **Possible Timing of the Bubble Burst (Short-term versus Longer-term)**

Benign Credit Cycle? Is It Over?

- **Length of Benign Credit Cycles: Is the Current Cycle Over? No.**
- **Default Rates (no), but Rising**
- **Default Forecast (no)**
- **Recovery Rates (no)**
- **Yields (no)**
- **Liquidity (no)**

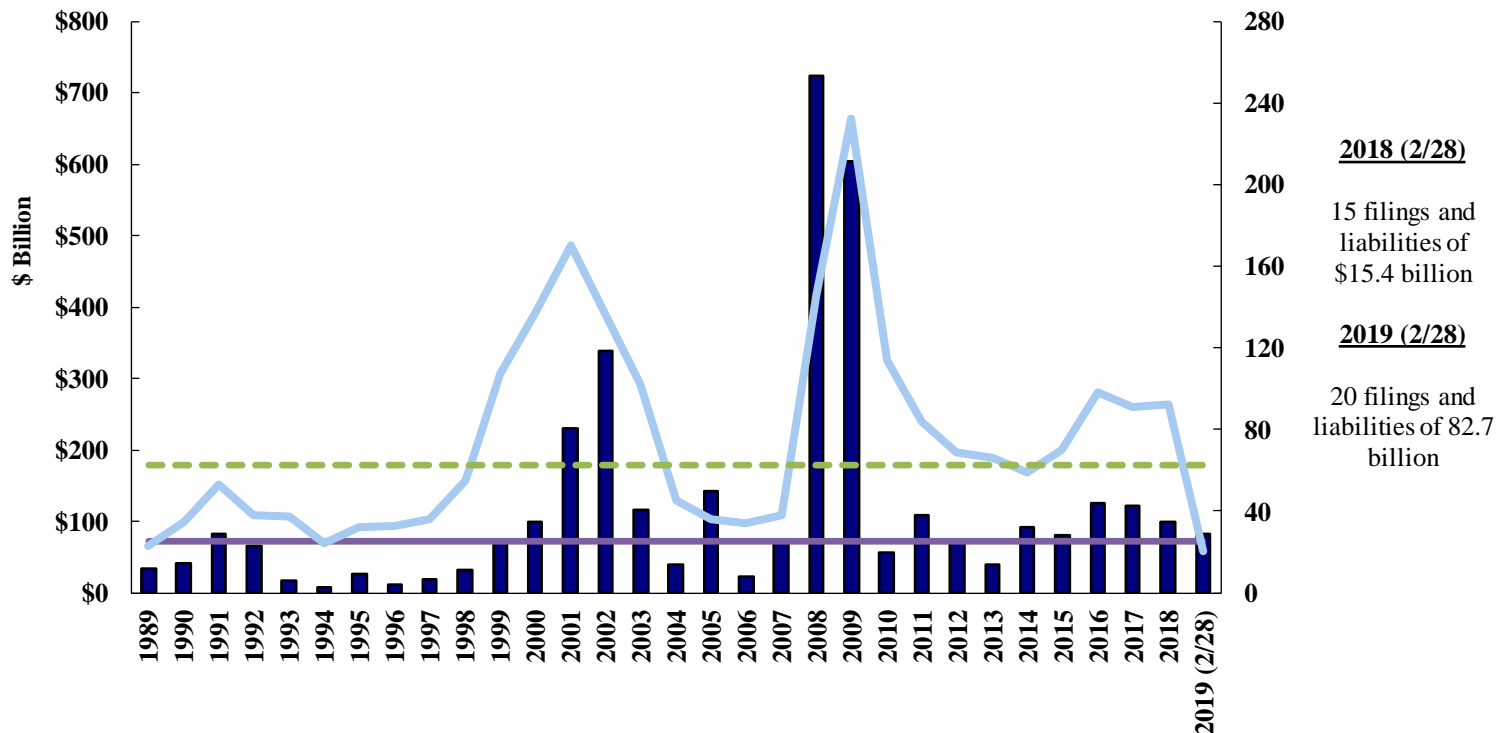
BANKRUPTCY FILINGS

Filings for Chapter 11

Number of Filings and Pre-petition Liabilities of Filing Companies

1989 – 2019 (2/28)

■ Pre-Petition Liabilities, in \$ billions (left axis) — Median Liabilities — Number of Filings (right axis) - - - Median No. of Filings.



2018 (2/28)
15 filings and liabilities of \$15.4 billion

2019 (2/28)
20 filings and liabilities of 82.7 billion

Mean 1989-2018: 76 filings
Median 1989-2018: 63 filings

Note: Minimum \$100 million in liabilities
Source: NYU Salomon Center Bankruptcy Filings Database

Chapter 11 Filing Statistics

Year	Number of Filings	Pre-Petition Liabilities (\$ billions)	Number of Filings ≥ \$1B	≥\$1B/Total Filings (%)
1989	23	34,516	10	43
1990	35	41,115	10	29
1991	53	82,424	12	23
1992	38	64,677	14	37
1993	37	17,701	5	14
1994	24	8,396	1	4
1995	32	27,153	7	22
1996	33	11,949	1	3
1997	36	18,866	5	14
1998	55	31,913	6	11
1999	107	70,516	19	18
2000	137	99,091	23	17
2001	170	229,861	39	23
2002	136	338,176	41	30
2003	102	115,172	26	25
2004	45	40,100	11	24
2005	36	142,950	11	31
2006	34	22,775	4	12
2007	38	72,338	8	21
2008	146	724,222	24	16
2009	232	604,270	49	21
2010	114	56,835	14	12
2011	84	109,119	7	8
2012	69	71,613	14	20
2013	66	39,480	11	17
2014	59	91,992	14	24
2015	70	80,291	20	29
2016	98	125,305	37	38
2017	91	121,079	24	26
2018	92	99,116	21	23
2019 (2/28)	20	82,669	4	20
Mean No. of Filings, 1989-2018	76		16	21%
Median No. of Filings, 1989-2018	63		13	21%
Median No. of Filings, 1998-2018	91		19	
Mean Liabilities, 1989-2018		119,767		
Median Liabilities, 1989-2018		71,976		

Note: Minimum \$100 million in liabilities. Source: NYU Salomon Center Bankruptcy Filings Database

DEFAULT RATES

Historical H.Y. Bond Default Rates

Straight Bonds Only Excluding Defaulted Issues From Par Value Outstanding, (US\$ millions), 1971 – 2019 (2/28)

Year	Par Value Outstanding ^a (\$)	Par Value Defaults (\$)	Default Rates (%)
2019 (2/28)	1,669,171	6,771	0.406
2019 (2/28)*	1,686,748	24,348	1.443
2018	1,664,166	28,994	1.742
2017	1,622,365	29,301	1.806
2016	1,656,176	68,066	4.110
2015	1,595,839	45,122	2.827
2014	1,496,814	31,589	2.110
2013	1,392,212	14,539	1.044
2012	1,212,362	19,647	1.621
2011	1,354,649	17,963	1.326
2010	1,221,569	13,809	1.130
2009	1,152,952	123,878	10.744
2008	1,091,000	50,763	4.653
2007	1,075,400	5,473	0.509
2006	993,600	7,559	0.761
2005	1,073,000	36,209	3.375
2004	933,100	11,657	1.249
2003	825,000	38,451	4.661
2002	757,000	96,855	12.795
2001	649,000	63,609	9.801
2000	597,200	30,295	5.073
1999	567,400	23,532	4.147
1998	465,500	7,464	1.603
1997	335,400	4,200	1.252
1996	271,000	3,336	1.231
1995	240,000	4,551	1.896
1994	235,000	3,418	1.454
1993	206,907	2,287	1.105

Year	Par Value Outstanding* (\$)	Par Value Defaults (\$)	Default Rates (%)
1992	163,000	5,545	3.402
1991	183,600	18,862	10.273
1990	181,000	18,354	10.140
1989	189,258	8,110	4.285
1988	148,187	3,944	2.662
1987	129,557	7,486	5.778
1986	90,243	3,156	3.497
1985	58,088	992	1.708
1984	40,939	344	0.840
1983	27,492	301	1.095
1982	18,109	577	3.186
1981	17,115	27	0.158
1980	14,935	224	1.500
1979	10,356	20	0.193
1978	8,946	119	1.330
1977	8,157	381	4.671
1976	7,735	30	0.388
1975	7,471	204	2.731
1974	10,894	123	1.129
1973	7,824	49	0.626
1972	6,928	193	2.786
1971	6,602	82	1.242

^a Weighted by par value of amount outstanding for each year.

		Standard Deviation (%)
Arithmetic Average Default Rate (%)		
1971 to 2018	3.076	2.981
1978 to 2018	3.270	3.131
1985 to 2018	3.699	3.249
Weighted Average Default Rate (%)		
1971 to 2018	3.273	
1978 to 2018	3.276	
1985 to 2018	3.287	
Median Annual Default Rate (%)		
1971 to 2018	1.774	

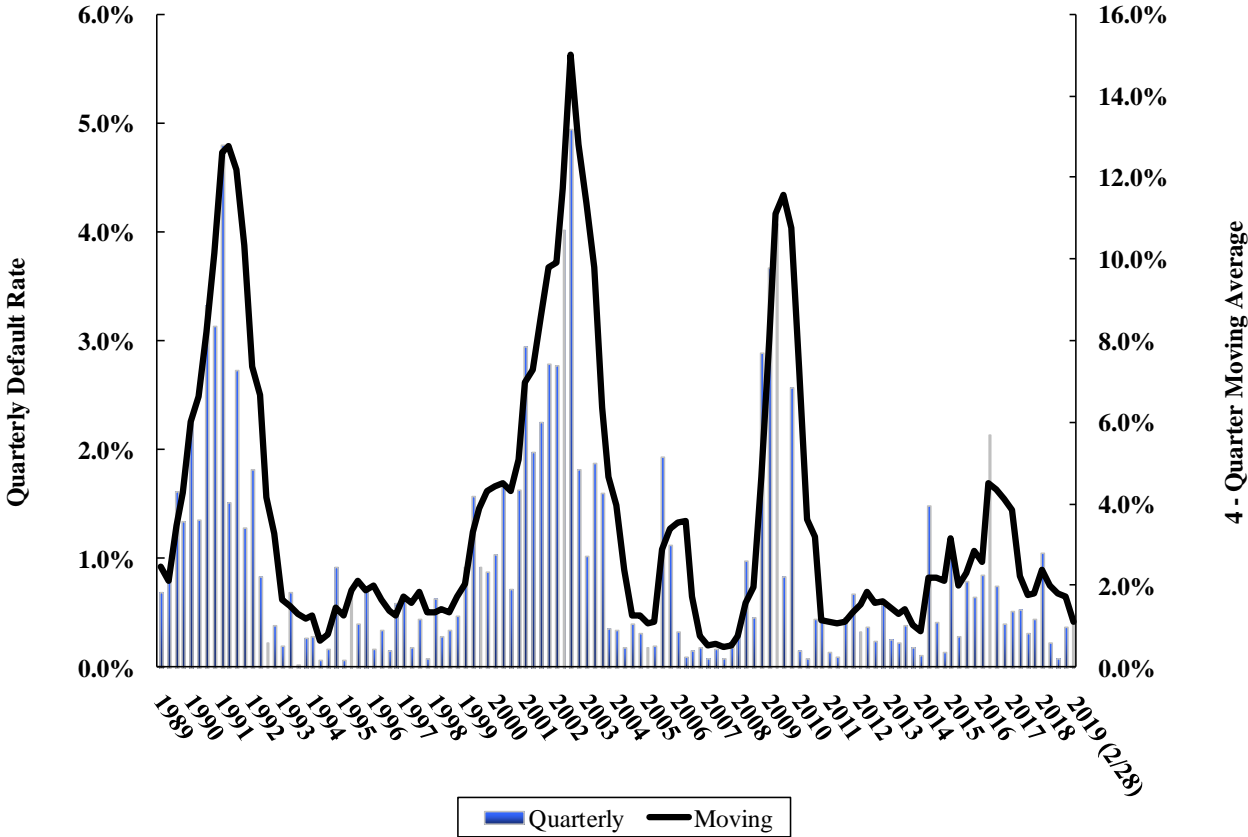
*Includes PG&E defaults in both Par Value Outstanding and Par Value Defaults.

Source: NYU Salomon Center and Citigroup/Credit Suisse estimates

Default Rates on High-Yield Bonds

Quarterly Default Rate and Four-Quarter Moving Average

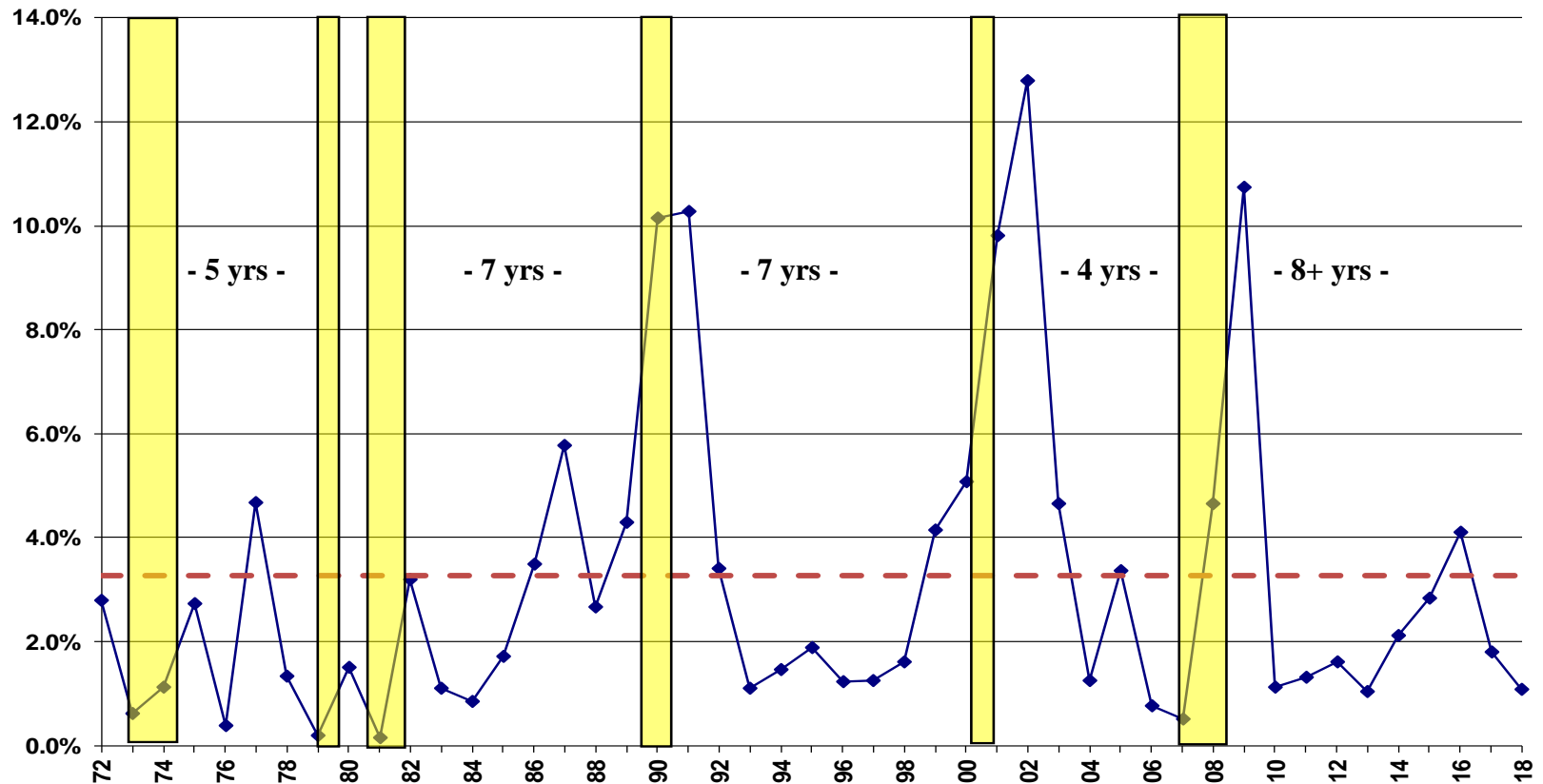
1989 – 2019 (2/28)



Source: Author's Compilations

Historical Default Rates, Benign Credit Cycles and Recession Periods in the U.S.*

High-Yield Bond Market (1972 – 2018)



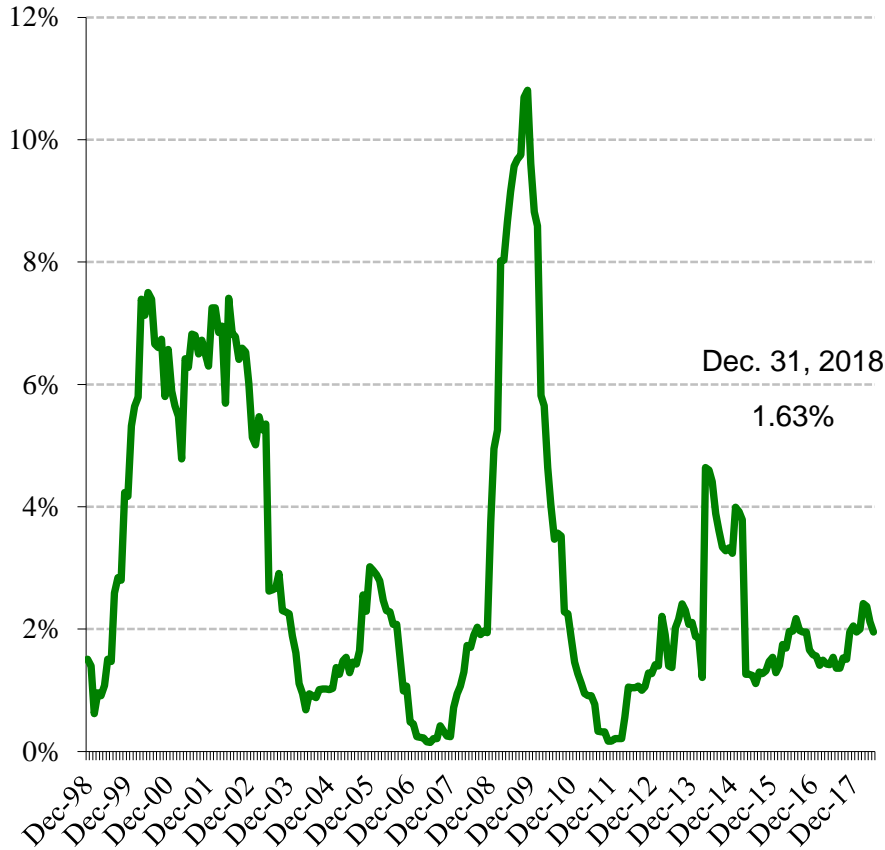
Periods of Recession: 11/73 - 3/75, 1/80 - 7/80, 7/81 - 11/82, 7/90 - 3/91, 4/01 - 12/01, 12/07 - 6/09

*Benign credit cycles are approximated.

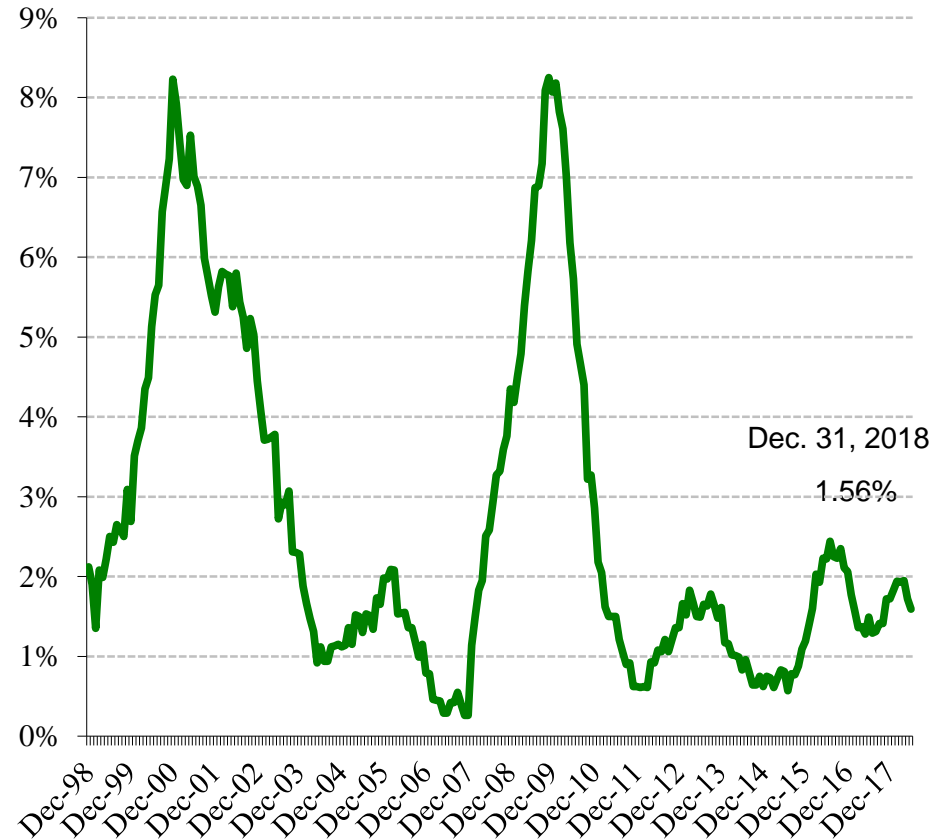
Source: E. Altman (NYU Salomon Center) & National Bureau of Economic Research

Lagging Twelve-Month Leveraged Loan Default Rate by Principal Amount & Number of Issuers

Lagging 12-months Default Rate by Principal Amount^a



Lagging 12-months Default Rate by Number of Issuers^b



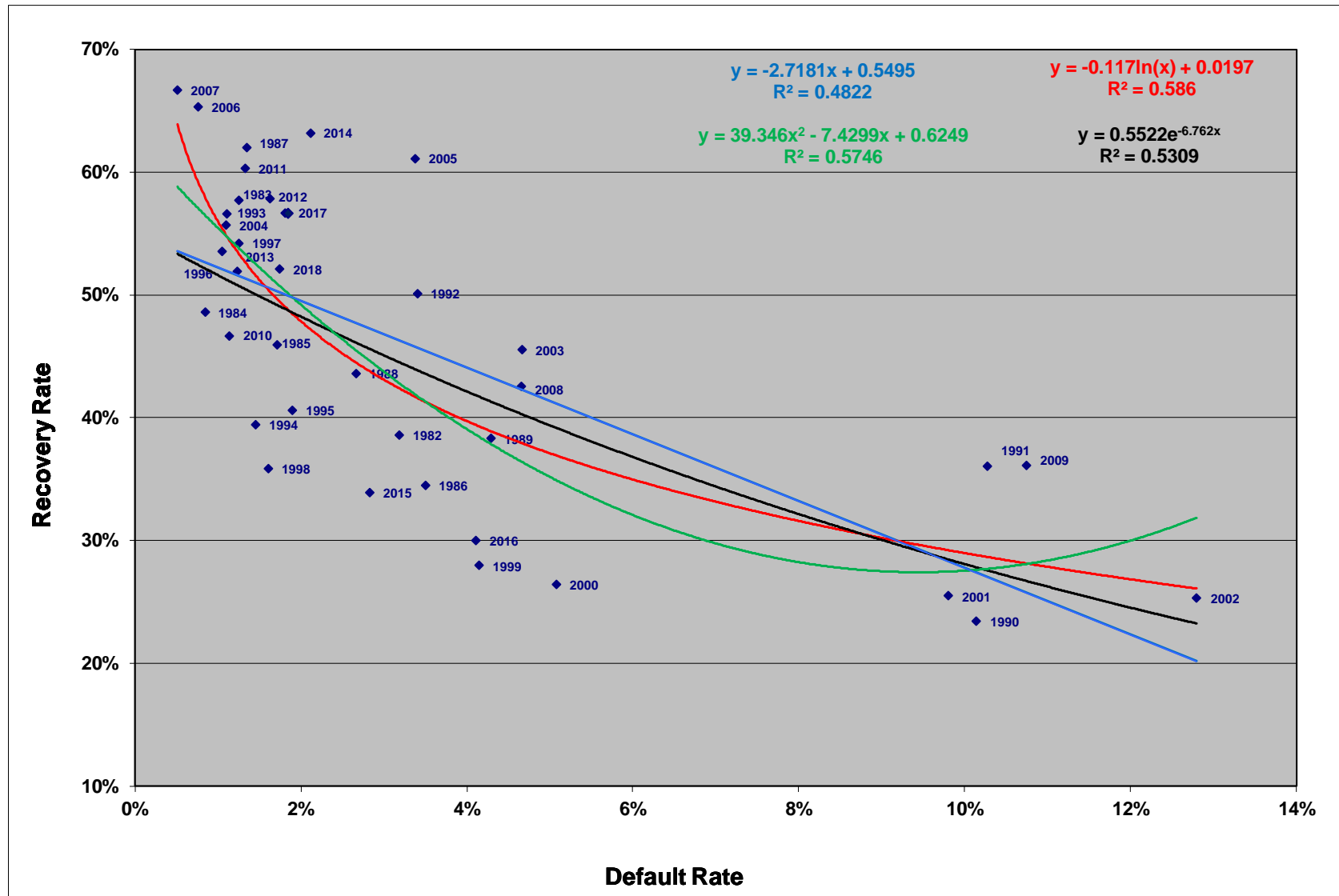
^aDefault rate is calculated as the amount defaulted over the last twelve months divided by the amount outstanding at the beginning of the twelve-month period. ^bDefault rate is calculated as the number of defaults over the last twelve months divided by the number of issuers in the Index at the beginning of the twelve-month period.

Recovery Rates

Default & Recovery Rates for High-Yield Bond Defaults, 2014 – 2018

	Default Rate	Overall Recovery Rate	Energy/Mining Recovery Rate	All Other Recovery Rate
2014	2.11%	63.19	n/a	63.19
2015	2.83%	33.91	25.64	46.78
2016	4.11%	29.99	27.33	40.03
2017	1.81%	56.68	57.97	57.47
2018	1.74%	52.10	48.8	53.0
Weighted Average Default Rate (1971-2018)			3.27%	
Arithmetic Average Recovery Rate (1978-2018)			46.03	

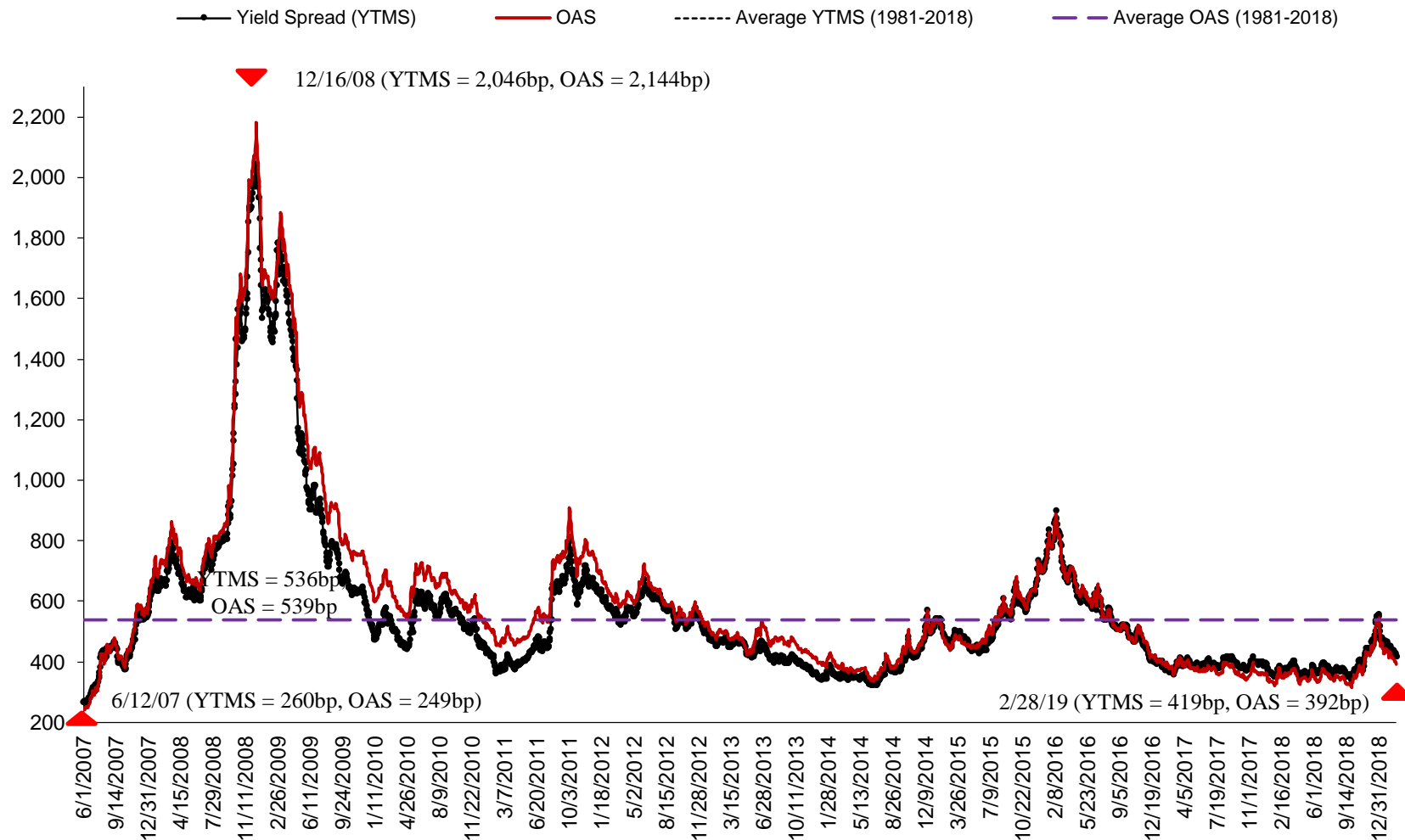
Recovery Rate/Default Rate Association: Dollar-Weighted Average Recovery Rates to Dollar Weighted Average Default Rates, 1982 – 2018



Source: E. Altman, et. al., "The Link Between Default and Recovery Rates", NYU Salomon Center, S-03-4.

YTM & Option-Adjusted Spreads Between High Yield Markets & U.S. Treasury Notes

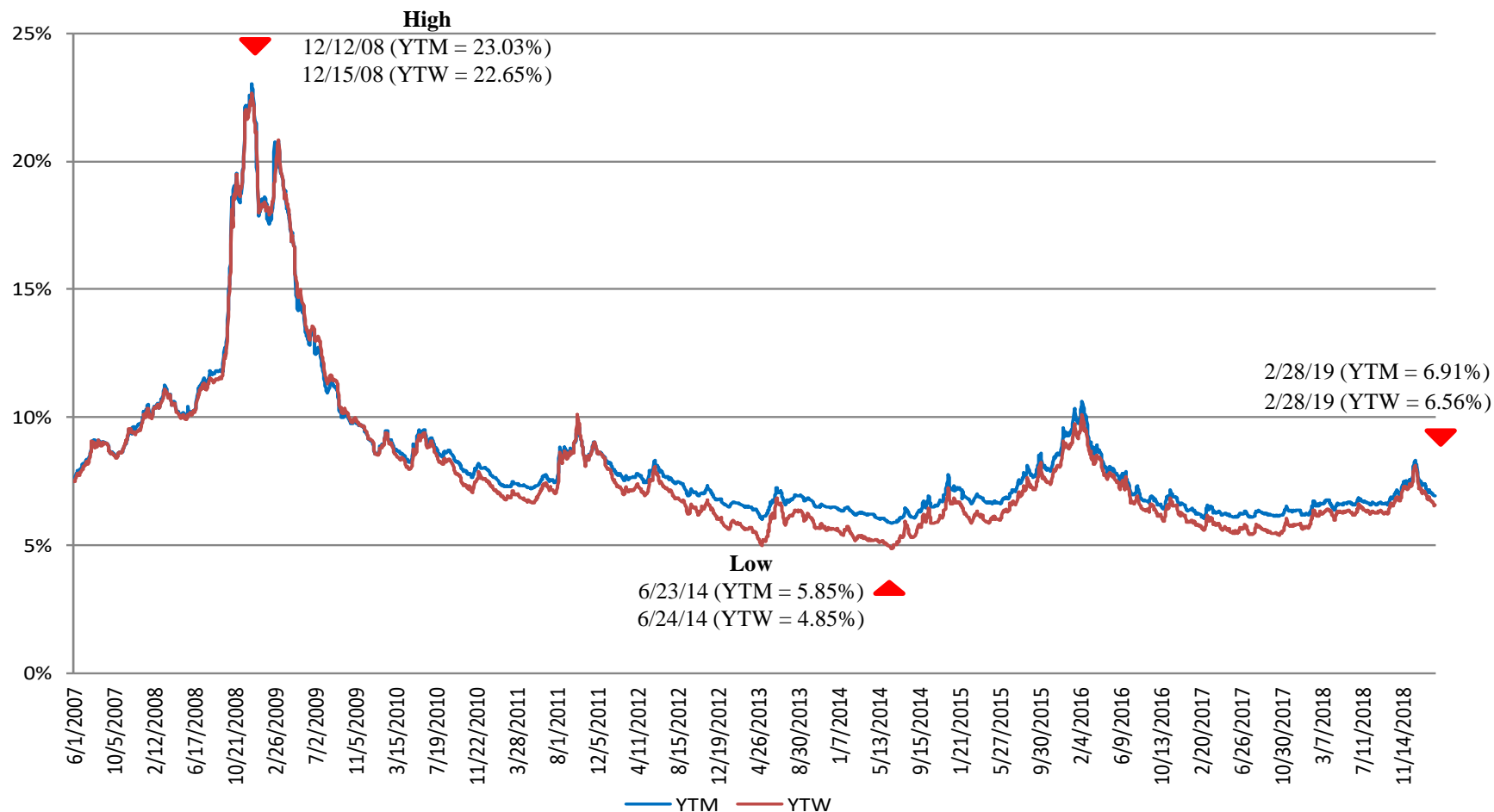
June 01, 2007 – February 28, 2019



Sources: FTSE Yield Book Index Data and Bank of America Merrill Lynch.

High Yield Bonds - Yield to Maturity vs. Yield to Worst

June 01, 2007 – February 28, 2019



Sources: FTSE Yield Book Index Data

Annual Returns (1978 – 2018)

Yields and Spreads on 10-Year Treasury (Treas) and High Yield (HY) Bonds^a

Year	Return (%)			Promised Yield (%)		
	HY	Treas	Spread	HY	Treas	Spread
2019 (2/28)	6.34	0.23	6.11	6.91	2.72	4.19
2018	(2.13)	(0.02)	(2.11)	8.16	2.69	5.47
2017	7.05	2.13	4.92	6.35	2.41	3.95
2016	17.83	(0.14)	17.96	6.55	2.43	4.12
2015	(5.56)	0.90	(6.46)	9.27	2.27	7.00
2014	1.83	10.72	(8.89)	7.17	2.17	5.00
2013	7.22	(7.85)	15.06	6.45 ^b	3.01	3.45
2012	15.17	4.23	10.95	6.80	1.74 ^b	5.06
2011	5.52	16.99	(11.47)	8.41	1.88	6.54
2010	14.32	8.10	6.22	7.87	3.29	4.58
2009	55.19	(9.92)	65.11	8.97	3.84	5.14
2008	(25.91)	20.30	(46.21)	19.53	2.22	17.31
2007	1.83	9.77	(7.95)	9.69	4.03	5.66
2006	11.85	1.37	10.47	7.82	4.70	3.11
2005	2.08	2.04	0.04	8.44	4.39	4.05
2004	10.79	4.87	5.92	7.35	4.21	3.14
2003	30.62	1.25	29.37	8.00	4.26	3.74
2002	(1.53)	14.66	(16.19)	12.38	3.82	8.56
2001	5.44	4.01	1.43	12.31	5.04	7.27
2000	(5.68)	14.45	(20.13)	14.56	5.12	9.44
1999	1.73	(8.41)	10.14	11.41	6.44	4.97
1998	4.04	12.77	(8.73)	10.04	4.65	5.39
1997	14.27	11.16	3.11	9.20	5.75	3.45
1996	11.24	0.04	11.20	9.58	6.42	3.16
1995	22.40	23.58	(1.18)	9.76	5.58	4.18
1994	(2.55)	(8.29)	5.74	11.50	7.83	3.67
1993	18.33	12.08	6.25	9.08	5.80	3.28
1992	18.29	6.50	11.79	10.44	6.69	3.75
1991	43.23	17.18	26.05	12.56	6.70	5.86
1990	(8.46)	6.88	(15.34)	18.57	8.07	10.50
1989	1.98	16.72	(14.74)	15.17	7.93	7.24
1988	15.25	6.34	8.91	13.70	9.15	4.55
1987	4.57	(2.67)	7.24	13.89	8.83	5.06
1986	16.50	24.08	(7.58)	12.67	7.21	5.46
1985	26.08	31.54	(5.46)	13.50	8.99	4.51
1984	8.50	14.82	(6.32)	14.97	11.87	3.10
1983	21.80	2.23	19.57	15.74	10.70	5.04
1982	32.45	42.08	(9.63)	17.84	13.86	3.98
1981	7.56	0.48	7.08	15.97	12.08	3.89
1980	(1.00)	(2.96)	1.96	13.46	10.23	3.23
1979	3.69	(0.86)	4.55	12.07	9.13	2.94
1978	7.57	(1.11)	8.68	10.92	8.11	2.81
Arithmetic Annual Average						
1978-2018	10.08	7.37	2.72	11.17	5.99	5.19
Compound Annual Average						
1978-2018	9.21	6.84	2.36			

^a End-of-year yields. ^b Lowest yield in time series. Source: FTSE's High Yield Composite Index

FORECASTING DEFAULT RATES

Mortality Rate Approach (1989)

Yield-Spread vs. Default Rate Method (2008)

Distress Ratio vs. Default Rate Method (2008)

Mortality Rates by Original Rating

All Rated Corporate Bonds*
1971-2018

Years After Issuance

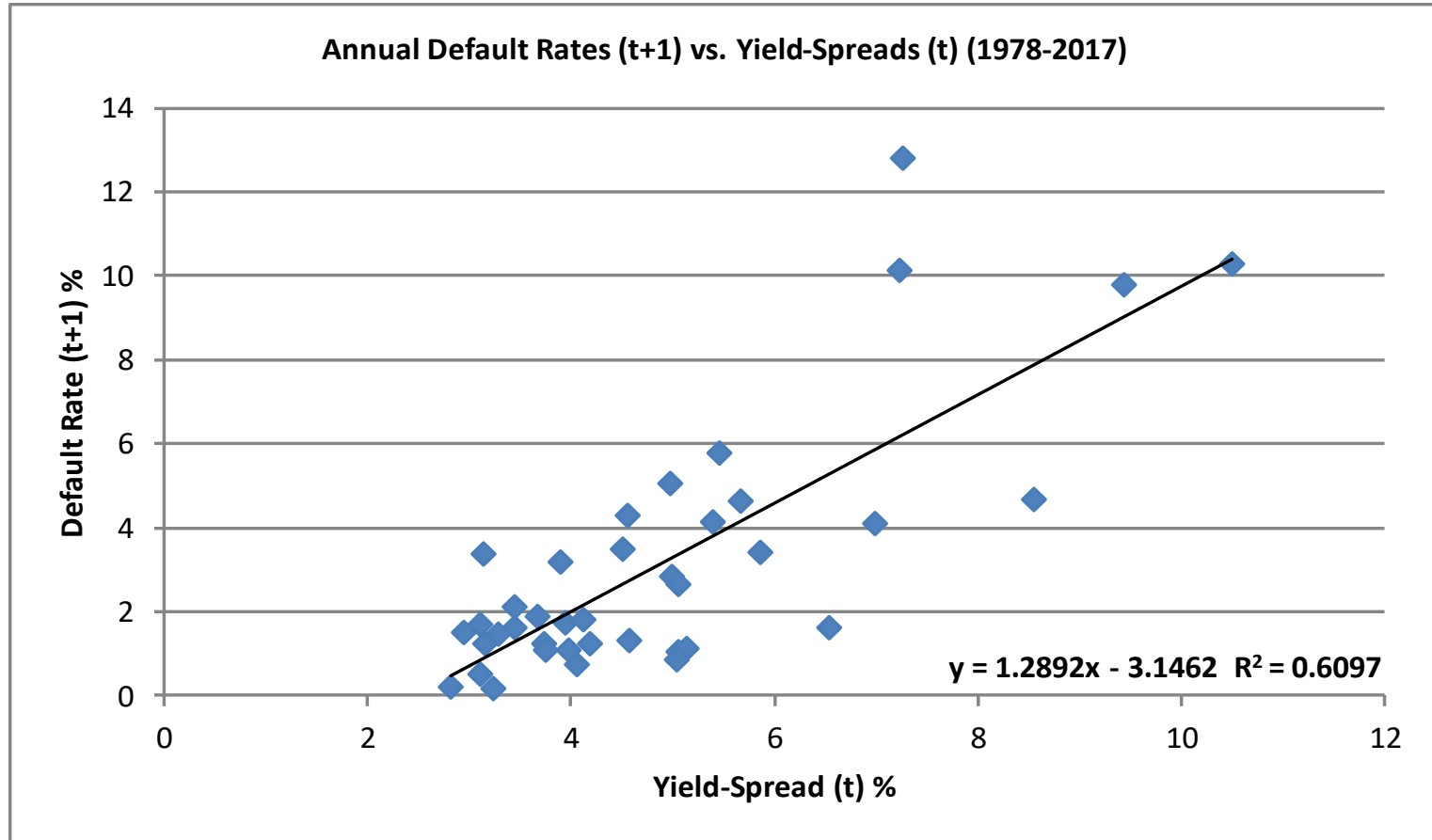
		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.04%	0.04%	0.04%	0.04%
AA	Marginal	0.00%	0.00%	0.18%	0.05%	0.02%	0.01%	0.03%	0.04%	0.03%	0.04%
	Cumulative	0.00%	0.00%	0.18%	0.23%	0.25%	0.26%	0.29%	0.33%	0.36%	0.40%
A	Marginal	0.01%	0.02%	0.09%	0.10%	0.07%	0.04%	0.02%	0.22%	0.05%	0.03%
	Cumulative	0.01%	0.03%	0.12%	0.22%	0.29%	0.33%	0.35%	0.57%	0.62%	0.65%
BBB	Marginal	0.29%	2.26%	1.20%	0.95%	0.46%	0.20%	0.21%	0.15%	0.15%	0.31%
	Cumulative	0.29%	2.54%	3.71%	4.63%	5.07%	5.26%	5.46%	5.60%	5.74%	6.03%
BB	Marginal	0.89%	2.01%	3.79%	1.95%	2.38%	1.52%	1.41%	1.07%	1.38%	3.07%
	Cumulative	0.89%	2.88%	6.56%	8.38%	10.57%	11.92%	13.17%	14.10%	15.28%	17.88%
B	Marginal	2.84%	7.62%	7.71%	7.73%	5.71%	4.44%	3.58%	2.03%	1.70%	0.71%
	Cumulative	2.84%	10.24%	17.16%	23.57%	27.93%	31.13%	33.60%	34.94%	36.05%	36.50%
CCC	Marginal	8.05%	12.36%	17.66%	16.21%	4.87%	11.58%	5.38%	4.76%	0.61%	4.21%
	Cumulative	8.05%	19.42%	33.65%	44.40%	47.11%	53.23%	55.75%	57.86%	58.11%	59.88%

*Rated by S&P at Issuance
Based on 3,454 issues

Source: S&P Global Ratings and Author's Compilation

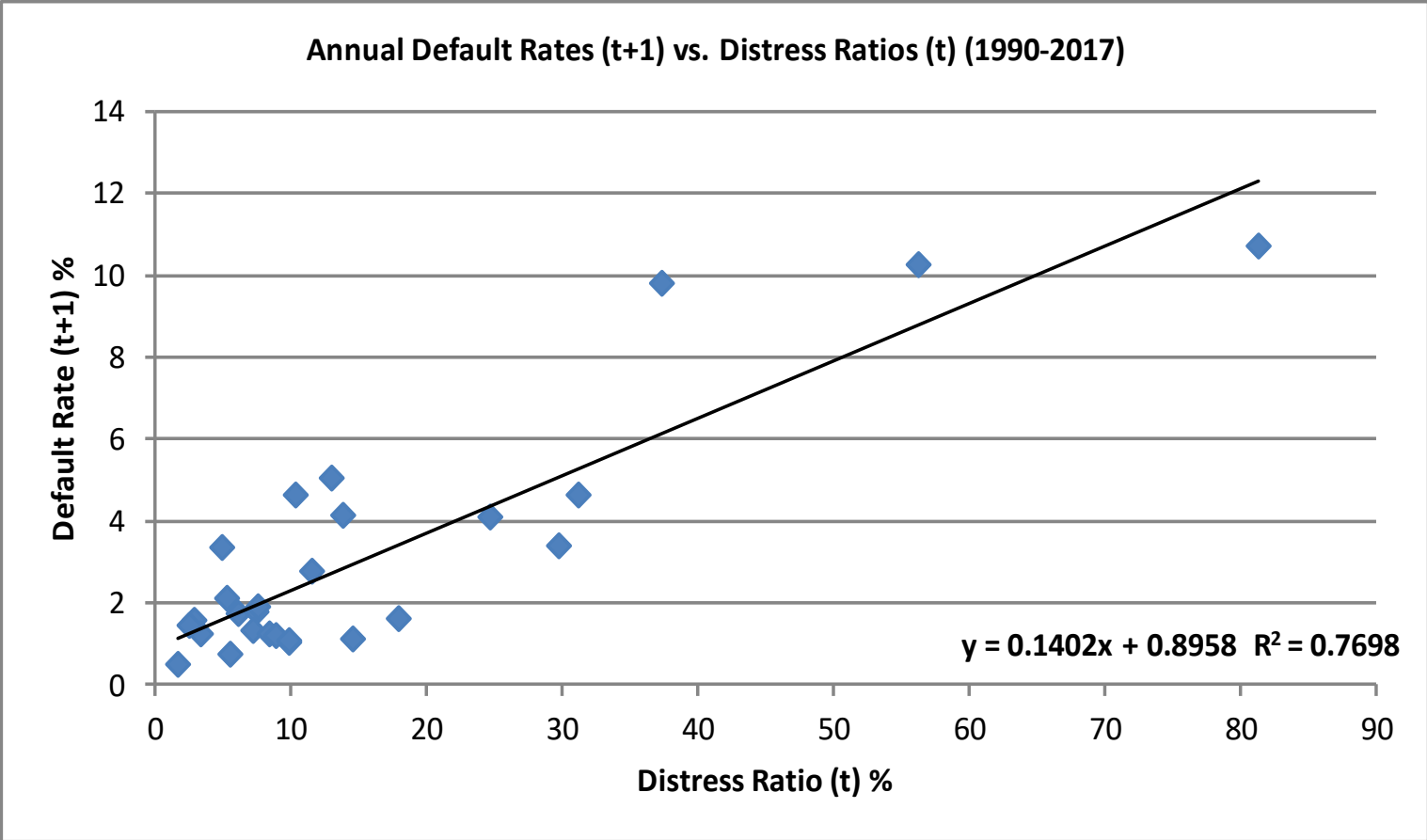
Updated Market-Based Annual Default Rate Forecast

Annual Default Rate (t+1) versus High-Yield Spreads (t)



Updated Market-Based Annual Default Rate Forecast

Annual Default Rate (t+1) versus Annual Distressed Ratio (t)



Default and Recovery Forecasts: Summary of Forecast Models

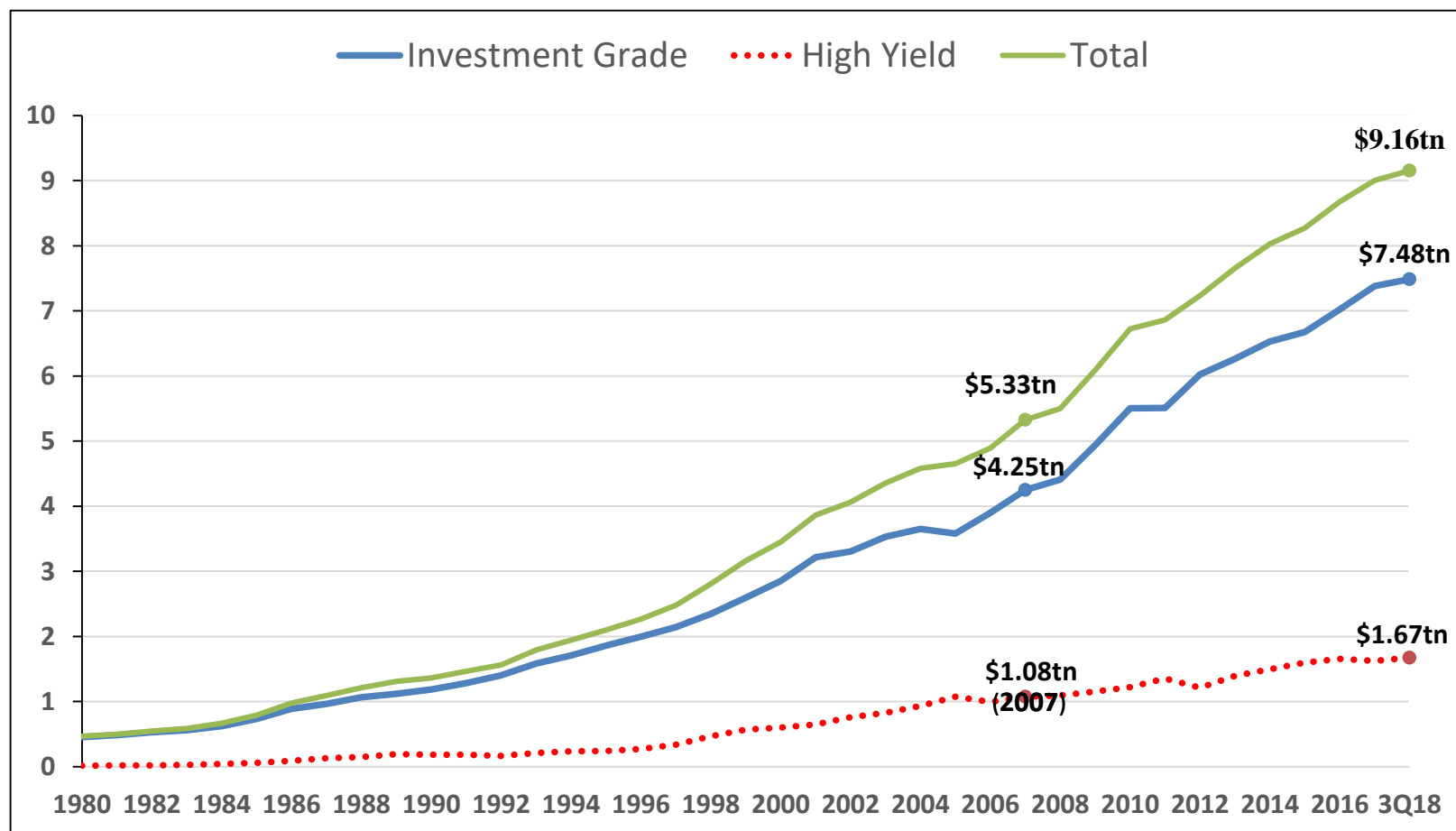
Model	2018 (12/31) Default Rate Forecast as of 12/31/2017	2019 (12/31) Default Rate Forecast as of 12/31/2018	2020 (2/28) Default Rate Forecast as of 2/28/2019
Mortality Rate	3.90%	4.20%	4.20%
Yield-Spread	1.95% ^a	3.91% ^c	2.26% ^e
Distress Ratio	1.75% ^b	2.28% ^d	1.76% ^f
Average of Models Recovery Rates*	2.53% 45.1%	3.46% 41.3%	2.74% 44.1%

* Recovery rate based on the log Linear equation between default and recovery rates, see Altman, et al (2005) Journal of Business, November and Slide 37. ^a Based on Dec. 31, 2017 yield-spread of 394.6bp. ^b Based on Dec. 31, 2017 Distress Ratio of 6.11%. ^c Based on Dec. 31, 2018 yield-spread of 547.2bp. ^d Based on Dec. 31, 2018 Distress Ratio of 9.91%. ^e Based on Feb. 28, 2019 yield-spread of 419.4bp. ^f Based on Feb. 28, 2019 Distress Ratio of 6.19%.

Some Concerns About the Benign Credit Cycle

U.S. Corporate Leverage Surges to Almost \$10 Trillion

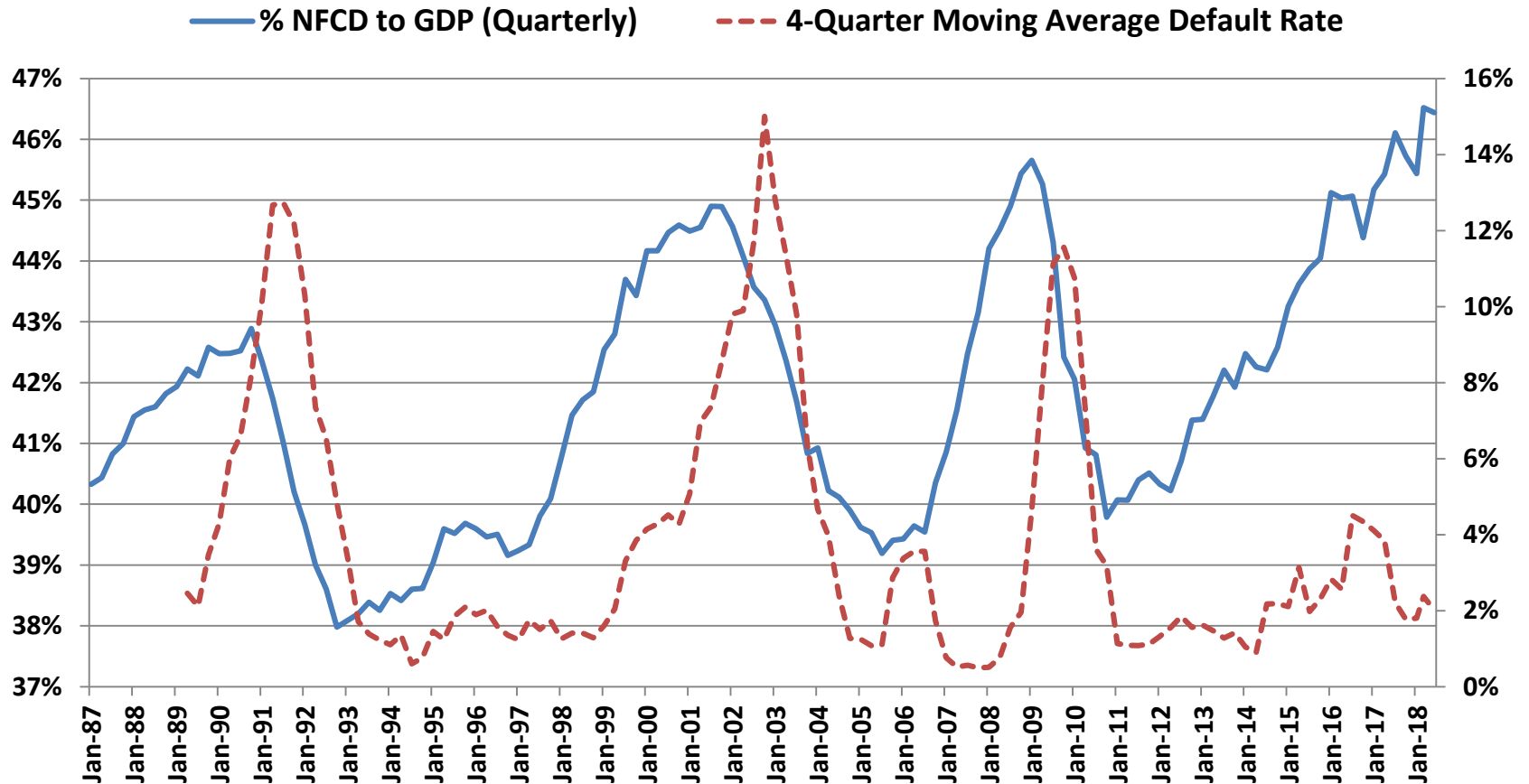
Outstanding Corporate Bonds, by Rating (\$tn)



Sources: SIFMA and NYU Salomon Center.

U.S. Non-financial Corporate Debt (Credit Market Instruments) to GDP: Comparison to 4-Quarter Moving Average Default Rate

January 1, 1987 – June 30, 2018



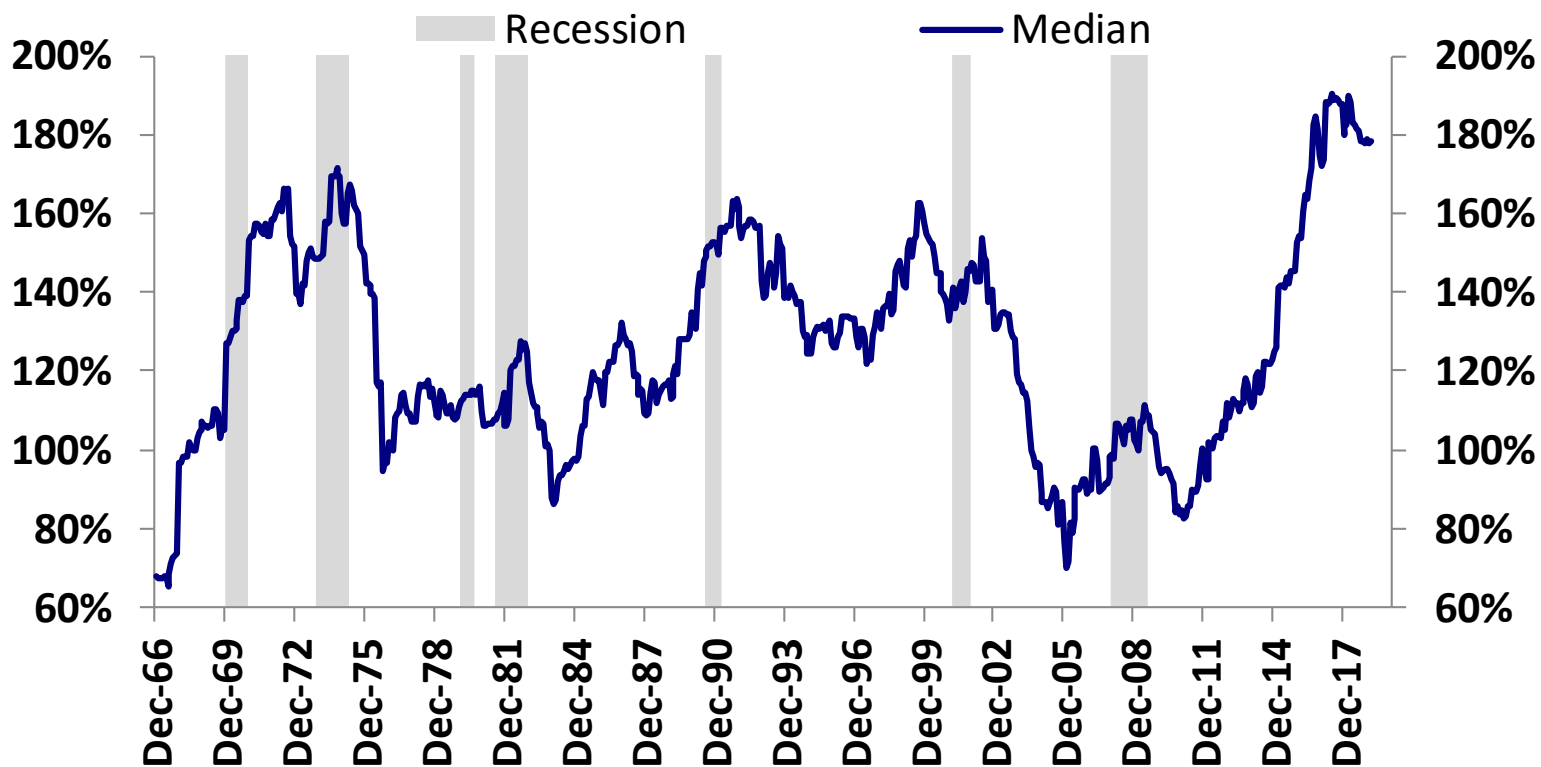
Sources: FRED, Federal Reserve Bank of St. Louis and Altman/Kuehne High-Yield Default Rate data.

U.S. BBB Rated Bonds Outstanding, 2005-2018



Source: Bloomberg-Barclays U.S. Corporate Investment Grade Index

S&P 500 Ex-Financials Net Debt to EBITDA, 1966-2018

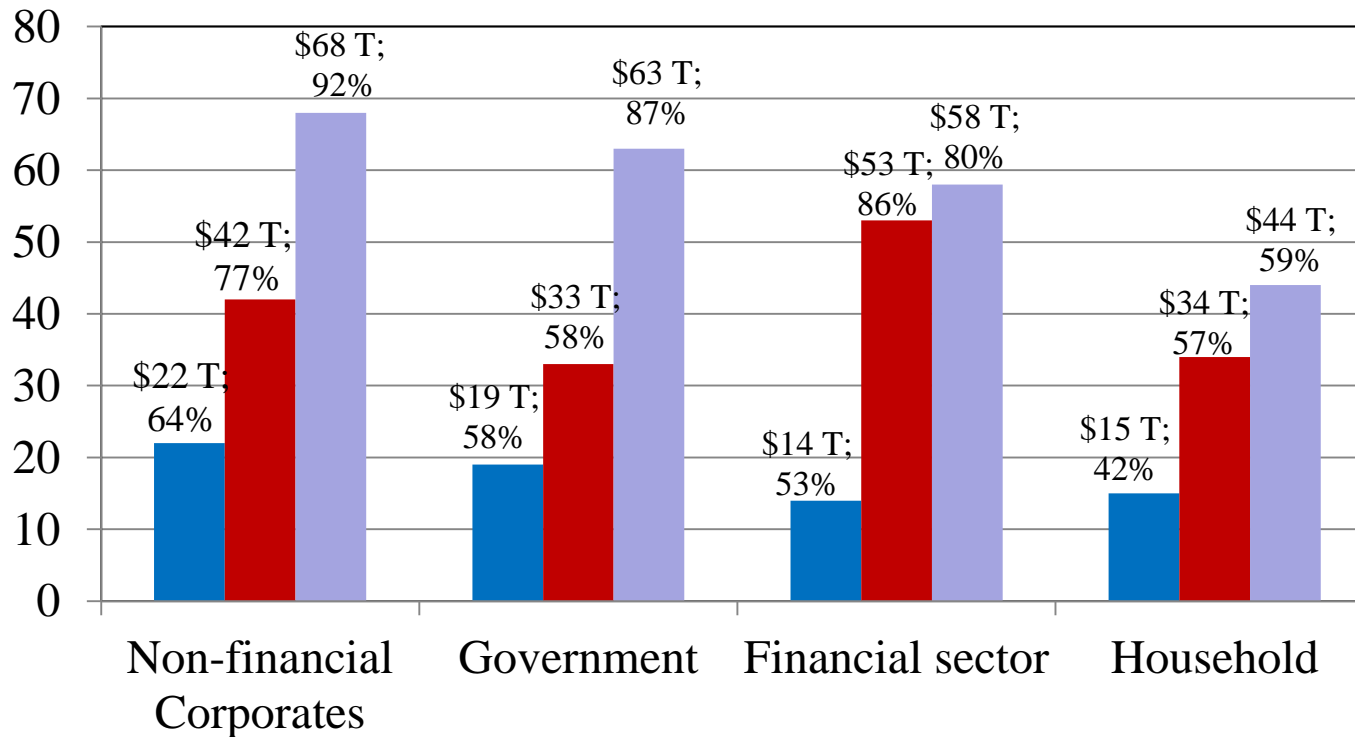


Source: DB Global Asset Allocation from Haver and Clarifi

Global Sectoral Indebtedness

\$ Trillion; % GDP; end of each Q3

■ 1997 ■ 2007 ■ 2017



Year	% of GDP	Total \$ Amt. (\$ T)
1997	217%	70
2007	278%	162
2017	318%	233

Sources: Chart from *Independent UK* using IIF, BIS, IMF and Haver data.

Comparative Health of High-Yield Firms (2007 vs. 2017)

Z-Score Component Definitions and Weightings

<u>Variable</u>	<u>Definition</u>	<u>Weighting Factor</u>
X_1 - - - - -	$\frac{\text{Working Capital}}{\text{Total Assets}}$	1.2
X_2 - - - - -	$\frac{\text{Retained Earnings}}{\text{Total Assets}}$	1.4
X_3 - - - - -	$\frac{\text{EBIT}}{\text{Total Assets}}$	3.3
X_4 - - - - -	$\frac{\text{Market Value of Equity}}{\text{Book Value of Total Liabilities}}$	0.6
X_5 - - - - -	$\frac{\text{Sales}}{\text{Total Assets}}$	1.0

Z" Score Model for Manufacturers, Non-Manufacturer Industrials; Developed and Emerging Market Credits (1995)

$$Z'' = 3.25 + 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

$$X_1 = \frac{\text{Current Assets} - \text{Current Liabilities}}{\text{Total Assets}}$$

$$X_2 = \frac{\text{Retained Earnings}}{\text{Total Assets}}$$

$$X_3 = \frac{\text{Earnings Before Interest and Taxes}}{\text{Total Assets}}$$

$$X_4 = \frac{\text{Book Value of Equity}}{\text{Total Liabilities}}$$

Comparing Financial Strength of High-Yield Bond Issuers in 2007 & 2012/2014/2017

Number of Firms		
	Z-Score	Z''-Score
2007	294	378
2012	396	486
2014	577	741
2017	529	583

Year	Average Z-Score/ (BRE)*	Median Z-Score/ (BRE)*	Average Z''-Score/ (BRE)*	Median Z''-Score/ (BRE)*
2007	1.95 (B+)	1.84 (B+)	4.68 (B+)	4.82 (B+)
2012	1.76 (B)	1.73 (B)	4.54 (B)	4.63 (B)
2014	2.03 (B+)	1.85 (B+)	4.66 (B+)	4.74 (B+)
2017	2.08 (B+)	1.98 (B+)	5.08 (BB-)	5.09 (BB-)

*Bond Rating Equivalent

Source: Authors' calculations, data from Altman and Hotchkiss (2006) and S&P Global Market Intelligence's S&P *Capital IQ* platform/Compustat database.

New Issuance: U.S. High-Yield Bond Market (\$ millions)

2005 – 2018

Ratings

Annual	Total	BB	B	CCC	(CCC % H.Y.)	NR
2005	81,541.8	18,615.0	45,941.2	15,750.9	(19.3%)	1,234.7
2006	131,915.9	37,761.2	67,377.3	25,319.2	(19.2%)	1,458.2
2007	132,689.1	23,713.2	55,830.8	49,627.6	(37.4%)	3,517.5
2008	50,747.2	12,165.0	25,093.1	11,034.4	(21.7%)	2,454.6
2009	127,419.3	54,273.5	62,277.4	10,248.4	(8.0%)	620.0
2010	229,307.4	74,189.9	116,854.7	35,046.8	(15.3%)	3,216.1
2011	184,571.0	54,533.8	105,640.4	21,375.0	(11.6%)	3,021.8
2012	280,450.3	71,852.1	153,611.1	48,690.2	(17.4%)	6,297.0
2013	270,334.8	103,347.3	108,495.9	57,641.6	(21.3%)	850.0
2014 (1Q)	51,634.7	17,585.0	25,792.2	7,842.5	(15.2%)	415.0
(2Q)	74,629.6	23,893.7	30,852.3	19,363.6	(25.9%)	520.0
(3Q)	59,777.3	25,537.3	22,550.0	10,875.0	(18.2%)	815.0
(4Q)	52,721.1	21,975.0	28,906.1	1,840.0	(3.5%)	0.0
2014 Totals	238,762.7	88,991.0	108,100.6	39,921.1	(16.7%)	1,750.0
2015 (1Q)	76,059.5	23,184.2	44,785.3	8,090.0	(10.6%)	0.0
(2Q)	73,428.4	21,219.0	40,037.3	12,052.1	(16.4%)	120.0
(3Q)	31,740.0	14,770.0	12,675.0	4,295.0	(13.5%)	0.0
(4Q)	34,584.1	20,500.9	13,100.0	660.0	(1.9%)	323.2
2015 Totals	215,812.0	79,674.2	110,597.5	25,097.1	(11.6%)	443.2
2016 (1Q)	34,665.0	19,325.0	11,070.0	4,270.0	(12.3%)	0.0
(2Q)	63,490.4	31,427.4	26,043.0	6,020.0	(9.5%)	0.0
(3Q)	56,403.6	21,614.6	28,788.9	5,650.0	(10.0%)	0.0
(4Q)	40,509.1	13,610.7	20,763.4	4,960.0	(12.2%)	1,175.0
2016 Totals	194,718.0	85,977.7	86,665.3	20,900.0	(10.7%)	1,175.0
2017 (1Q)	72,673.9	33,327.5	29,802.4	9,544.0	(13.1%)	0.0
(2Q)	50,342.4	18,531.3	23,366.0	7,895.1	(15.7%)	550.0
(3Q)	57,157.3	19,639.7	27,699.3	9,818.3	(17.2%)	0.0
(4Q)	60,515.0	23,877.5	27,050.0	9,587.5	(15.8%)	0.0
2017 Totals	240,688.7	95,376.0	107,917.8	36,844.9	(15.3%)	550.0
2018 (1Q)	56,602.2	23,067.5	27,229.7	6,305.0	(11.1%)	0.0
(2Q)	38,800.7	11,877.4	19,850.8	7,072.5	(18.4%)	0.0
(3Q)	36,150.6	10,130.0	16,472.6	9,548.0	(26.4%)	0.0
(4Q)	12,049.0	6,004.0	4,150.0	1,895.0	(15.7%)	0.0
2018 Totals	143,602.5	51,078.9	67,703.2	24,820.5	(17.3%)	0.0

Source: Bank of America Merrill Lynch

New Issuance: European High-Yield Bond Market

Face Values (US\$)

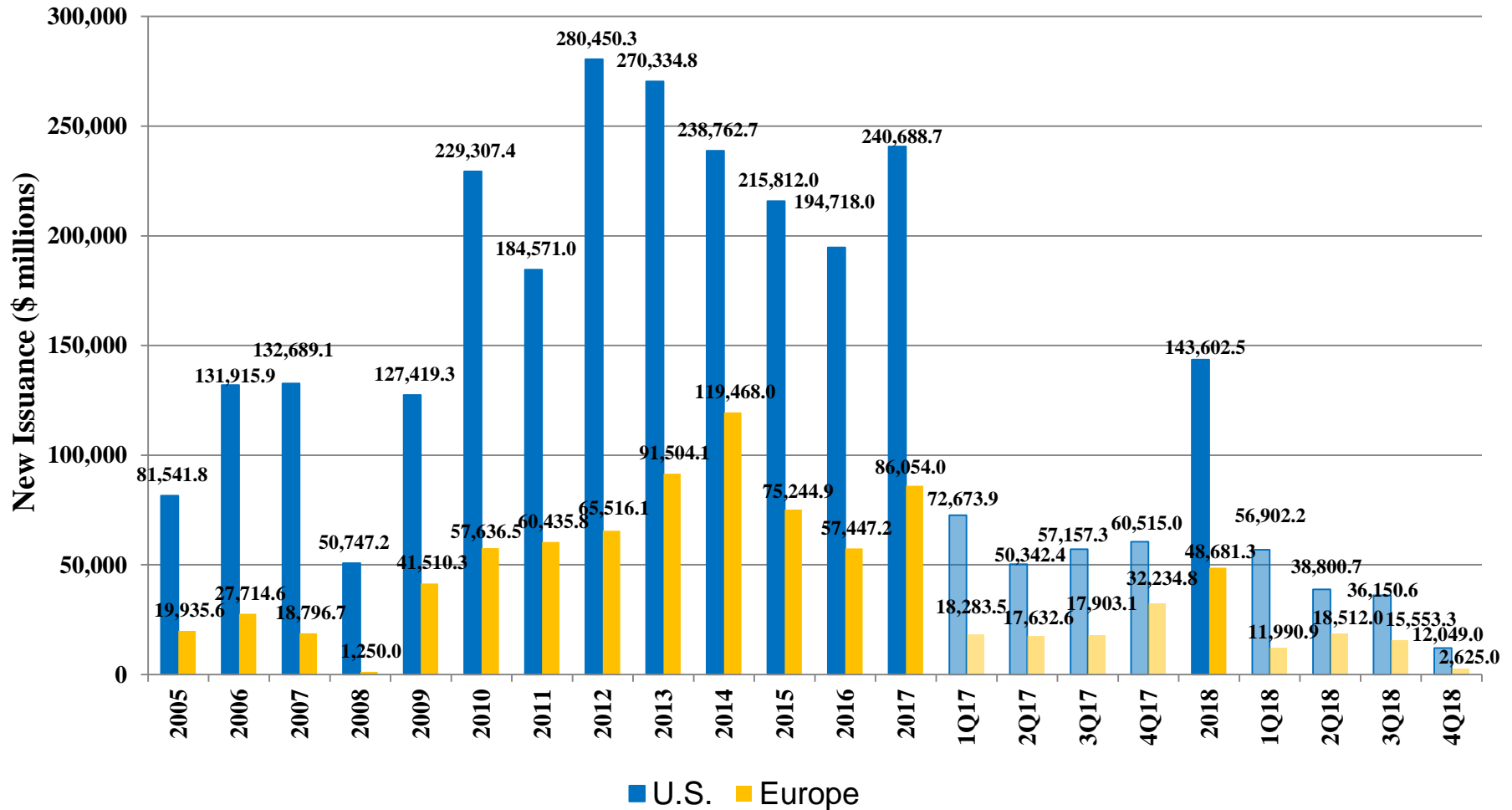
2005 – 2018

Annual	Total	Ratings					Currency		
		BB	B	CCC	(CCC % HY)	NR	USD	EUR	GBP
2005	19,935.6	1,563.3	11,901.0	5,936.6	(29.8%)	534.8	2,861.0	15,080.3	1,668.3
2006	27,714.6	5,696.2	16,292.1	5,020.5	(18.1%)	705.9	7,657.8	19,935.7	121.1
2007	18,796.7	5,935.3	11,378.5	562.0	(3.0%)	920.9	4,785.5	12,120.9	1,890.3
2008	1,250.0	1,250.0	25,093.1				1,250.0		
2009	41,510.3	18,489.4	16,697.4	4,771.3	(11.5%)	1,552.2	12,315.0	28,696.9	498.3
2010	57,636.5	22,751.3	29,050.5	2,170.7	(3.8%)	3,663.9	12,775.0	43,147.7	1,403.3
2011	60,435.8	24,728.9	29,919.7	4,108.7	(6.8%)	1,678.6	16,720.0	33,758.0	8,842.4
2012	65,516.1	27,001.7	29,013.0	7,186.7	(11.0%)	2,314.6	28,198.0	32,270.4	2,929.3
2013	91,504.1	19,607.3	54,435.2	13,972.9	(15.3%)	3,353.2	30,483.0	44,125.6	15,875.3
2014 (1Q)	27,169.2	12,565.7	11,685.2	1,230.0	(4.5%)	1,688.3	7,315.0	16,352.8	3,501.4
(2Q)	65,671.4	13,730.1	45,808.3	4,111.1	(6.2%)	2,021.9	23,150.0	36,009.0	6,096.7
(3Q)	15,980.5	3,586.3	10,593.2	1,241.3	(7.8%)	559.7	2,750.0	8,216.2	4,744.6
(4Q)	10,646.9	3,893.7	4,288.8	654.5	(6.1%)	1,810.0	6,305.0	4,341.9	
2014 Totals	119,468.0	33,775.8	72,375.4	7,236.9	(5.1%)	6,080.0	39,520.0	64,919.9	14,342.7
2015 (1Q)	30,535.5	15,387.8	10,054.6	938.7	(3.1%)	4,154.3	10,225.0	17,149.0	2,622.0
(2Q)	26,458.3	11,282.6	12,253.2	2,334.6	(8.8%)	587.8	12,465.0	11,744.4	1,782.2
(3Q)	12,605.5	2,068.1	10,125.9	411.5	(3.2%)		5,850.0	5,170.1	1,585.4
(4Q)	5,645.5	3,032.2	2,350.9	262.4	(4.6%)		2,050.0	3,169.1	426.4
2015 Totals	75,244.9	31,770.8	34,784.6	3,947.3	(5.2%)	4,742.1	30,590.0	37,232.6	6,416.0
2016 (1Q)	2,771.6	334.7	2,280.6	156.2	(5.6%)		1,675.0	1,096.6	
(2Q)	22,337.5	6,553.8	13,629.8	2,153.8	(9.6%)		14,590.0	7,115.4	569.8
(3Q)	23,206.6	12,240.5	8,745.2	2,220.8	(9.6%)		10,565.0	10,590.8	2,050.8
(4Q)	9,131.6	600.0	7,316.5	1,215.1	(13.3%)		2,595.0	6,268.6	268.0
2016 Totals	57,447.2	19,729.1	31,972.2	5,745.9	(10.0%)		29,425.0	25,071.3	2,888.6
2017 (1Q)	18,283.5	6,094.4	7,805.9	4,133.3	(22.6%)	250.0	7,665.0	7,074.9	3,543.7
(2Q)	17,632.6	9,117.5	6,702.3	1,812.7	(10.3%)		4,920.0	8,513.8	3,854.3
(3Q)	17,903.1	5,868.7	9,002.3	2,278.4	(12.7%)	753.7	4,200.0	11,879.6	1,823.5
(4Q)	32,234.8	9,888.6	19,561.6	2,784.6	(8.6%)		6,355.0	24,302.5	1,381.9
2017 Totals	86,054.0	30,969.2	43,072.2	11,008.9	(12.8%)	1,003.7	23,140.0	51,770.7	10,603.3
2018 (1Q)	11,990.9	4,585.1	6,520.1	885.7	(7.4%)		3,375.0	6,682.2	1,659.2
(2Q)	18,512.0	2,229.0	13,558.9	300.0	(1.6%)	2,424.1	7,935.0	9,861.1	715.9
(3Q)	15,553.3	5,965.0	5,283.9	4,041.4	(26.0%)	263.0	6,850.0	7,476.4	1,226.9
(4Q)	2,625.0	1,450.0	700.0	700.0	(26.7%)	475.0	1,910.0	715.0	38
2018 Totals	48,681.3	12,779.1	26,813.0	5,927.0	(12.2%)	3,162.2	20,070.0	24,734.8	3,601.9

Source:
BoAML

U.S. & European High-Yield Bond Market: New Issuance (\$ millions)

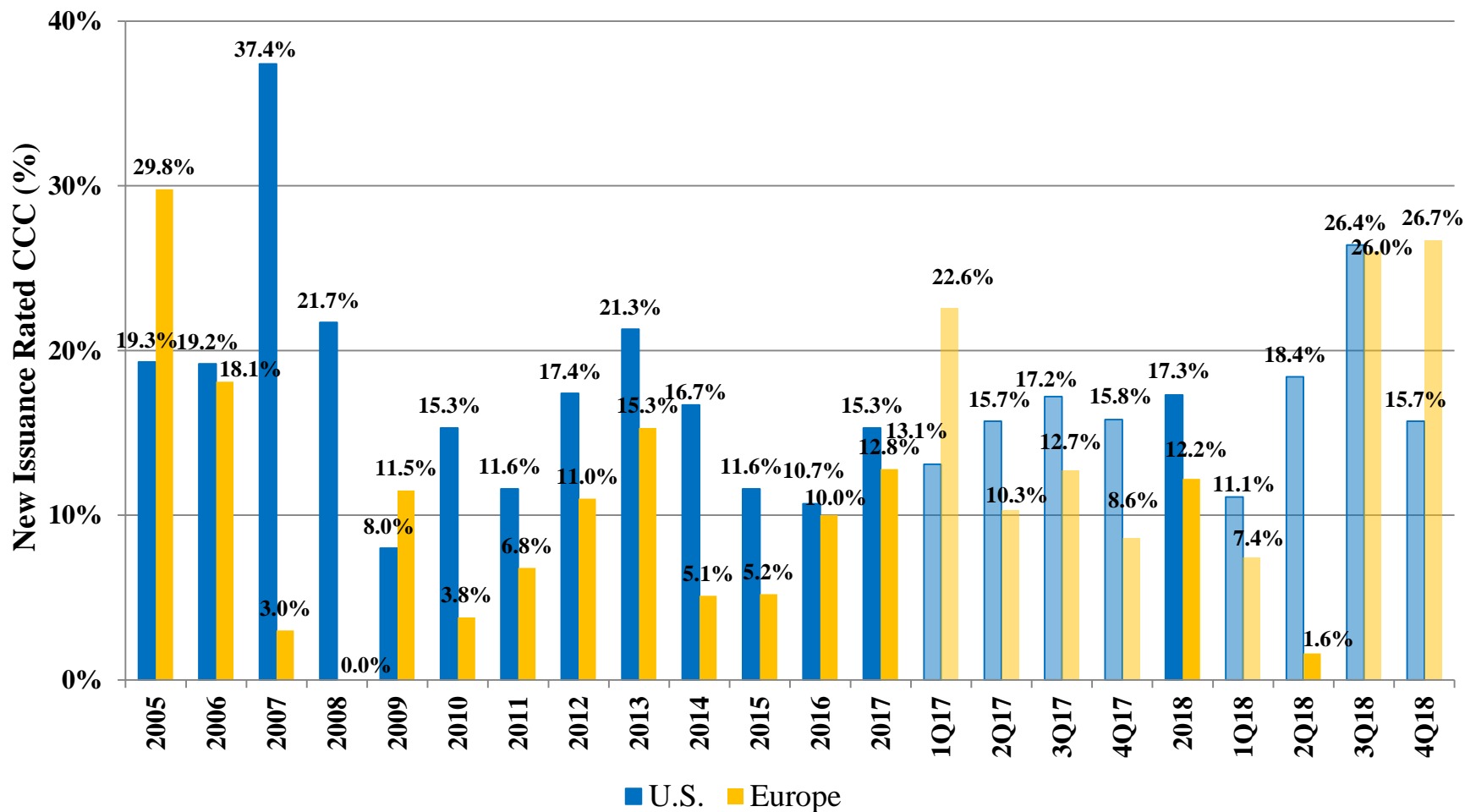
2005 – 2018



Source: Bank of America Merrill Lynch

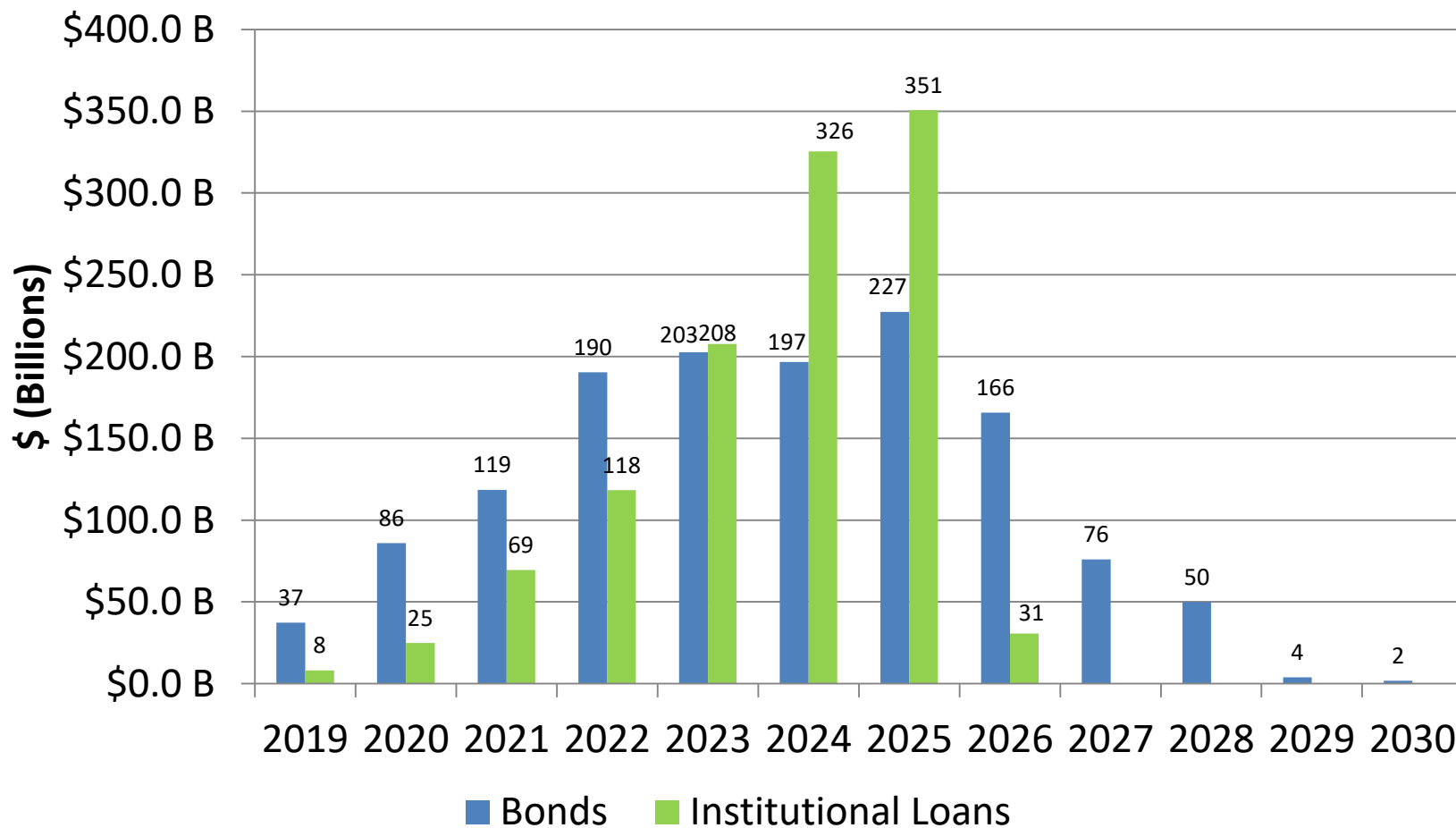
A Measure of Liquidity: U.S. & European High-Yield Bond Market, CCC Rated New Issuance (%)

2005 – 2018



Source: Bank of America Merrill Lynch

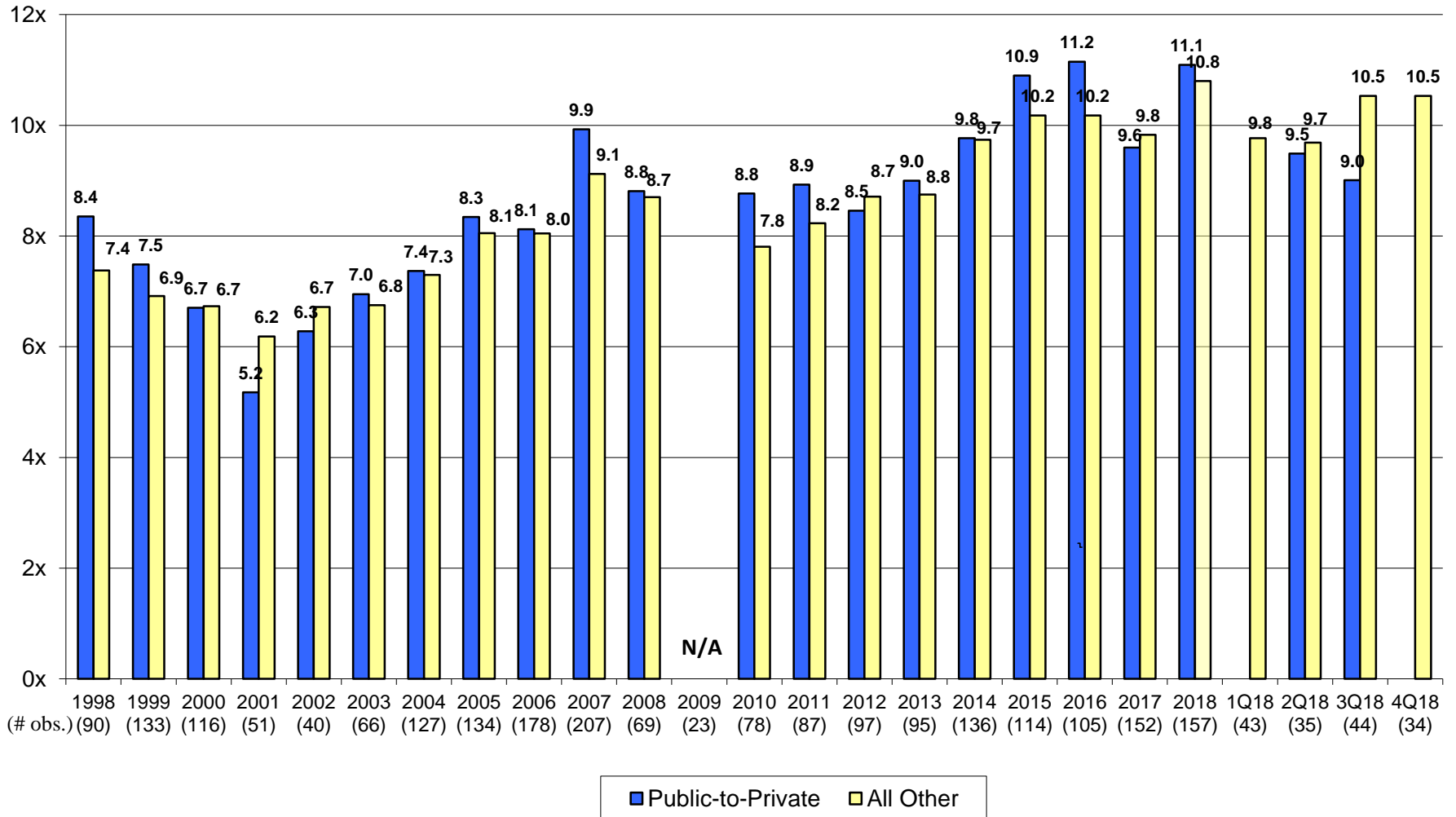
Maturity Profile of Leveraged Debt – As of 12/31/18



Source: S&P Global Market Intelligence

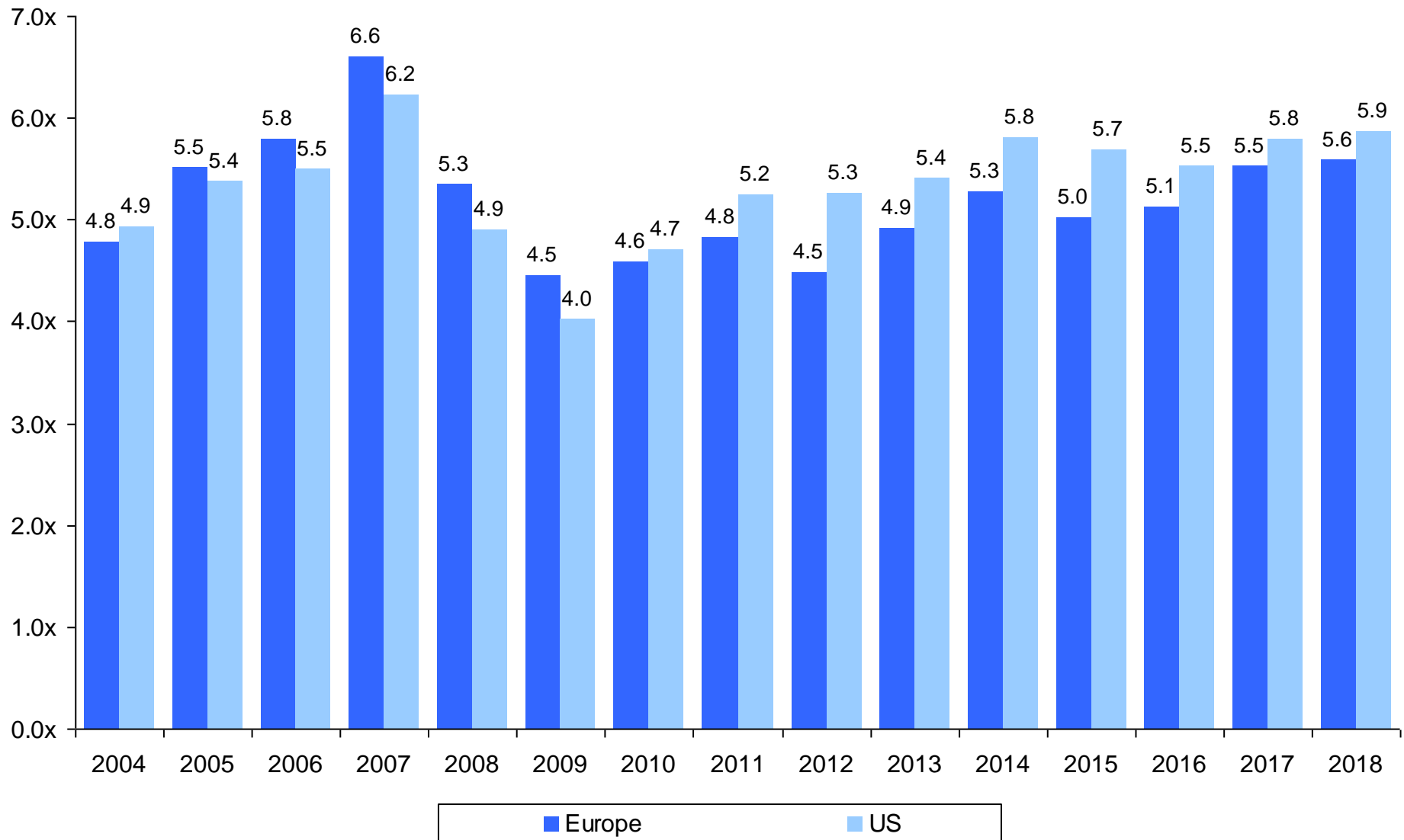
Purchase Price Multiples

Purchase Price Multiple excluding Fees for LBO Transactions



Source: S&P Global Market Intelligence

Average Total Debt Leverage Ratio for LBO's: Europe and US with EBITDA of €/\$50M or More



Source: S&P Global Market Intelligence

LBO Statistics & Ratios: 2007 vs. 2014 (update 2018)

	2007	2014	2018
M&A/LBO as a % of Total Issuance	62%	48%	56%
Purchase Multiple	9.1-9.9x	9.7-9.8x	10.8-11.1x
Debt to EBITDA @ Inception	6.2x	5.8x	5.9x
EBITDA to Cash Interest	2.1x	3.4x	2.8x
Equity Contribution	30%	36%	40%

Source: Guggenheim Investments and S&P Global Market Intelligence

Major Risks Going Forward

- Global Economic Performance – Primarily U.S., China and Europe: Impact on Default Rates, Credit Availability and Quality
- Global Debt Excess and Increasing Interest Rates
- High-Yield Fundamentals Still Fairly Weak
- Falling Oil Prices (No Current Major Concern)
- Contagion Between Markets – Risky Debt and Equity
- Interest Rates and Inflation – Reduced Importance of the Search-for-Yield
- LBO, Covenant-Lite and CCC New Issuance
- Sovereign Debt Crisis – Asia (1997), Europe (2009-13), Emerging Markets?, Europe (again)
- Uncertainties (non-quantifiable) – e.g. Political, Trade, Other

Size of Defaulted and Distressed Bond Market

Estimated Face And Market Values Of Defaulted And Distressed Debt (\$ Billions)

2016 – 2018

	Face Value			Market Value			Market/Face Ratio
	12/31/2016	12/31/2017	12/31/2018	12/31/2016	12/31/2017	12/31/2018	
<u>Public Debt</u>							
Defaulted	298.03	270.91	258.15 ⁽¹⁾	119.21	94.82	77.44	0.30
Distressed	119.78	102.49	165.35 ⁽²⁾	77.86	66.62	107.48	0.65
Total Public	417.81	373.40	423.49	197.07	161.44	184.92	
<u>Private Debt</u>							
Defaulted	298.03	270.91	258.15 ⁽³⁾	193.72	176.09	167.79	0.65
Distressed	119.78	102.49	165.35 ⁽³⁾	89.83	76.87	124.01	0.75
Total Private	417.81	373.40	423.49	283.56	252.96	291.81	
Total Public and Private	835.63	746.80	846.99	480.63	414.40	476.72	

¹ Calculated using: (2017 defaulted population) + (2018 Defaults) - (2018 Emergences) - (2018 Distressed Exchanges).

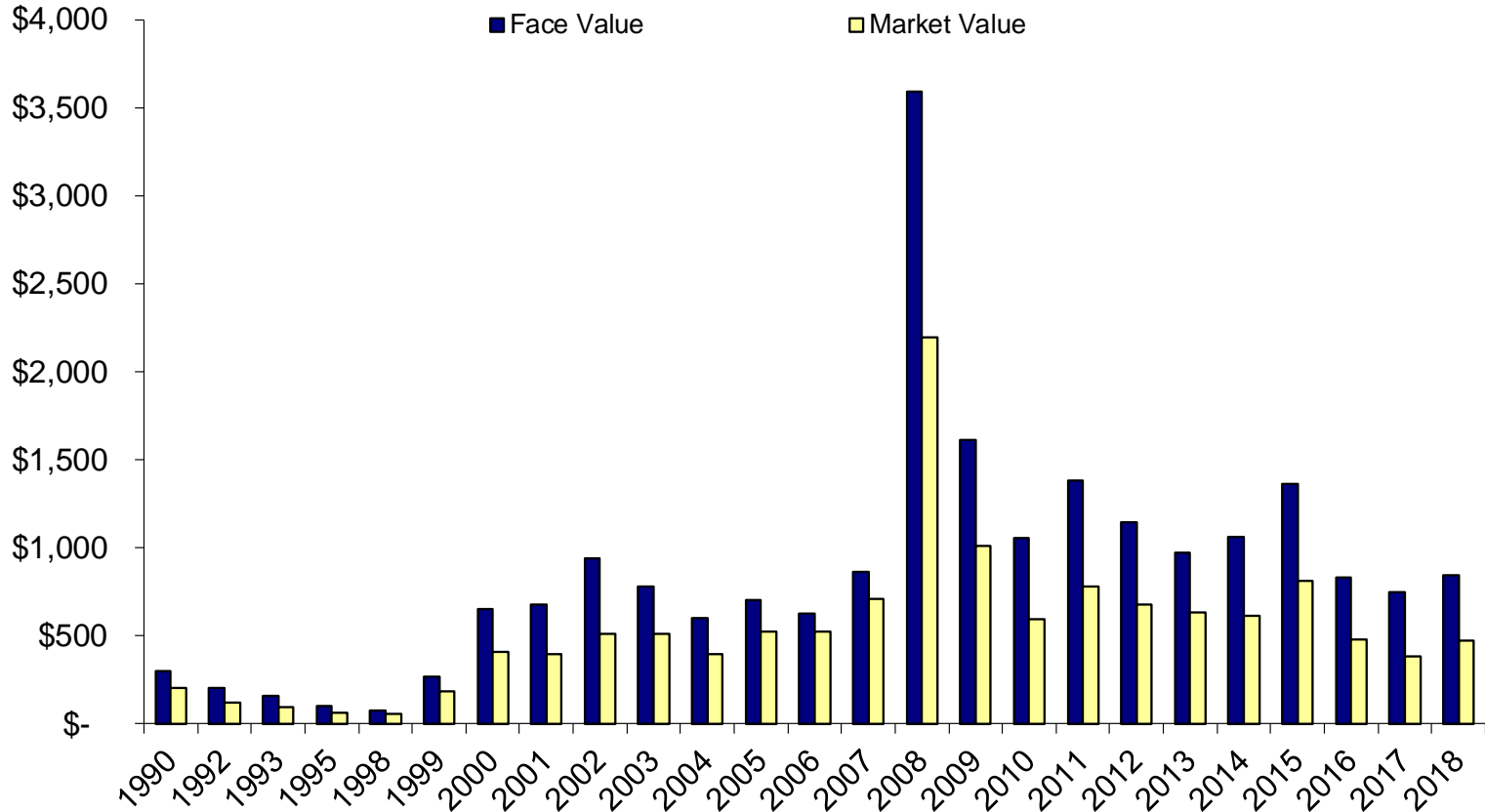
² Based on 9.91% of the high-yield bond market (\$1.669 trillion) as of 31 Dec. 18.

³ Based on a private/public ratio of 1:1.

Source: NYU Salomon Center and estimates by Professor Edward I. Altman.

Size Of The US Defaulted And Distressed Debt Market (\$ Billions)

1990 – 2018



Source: Author's Compilations

RETURNS AND CORRELATIONS OF THE DEFAULTED & DISTRESSED DEBT MARKETS

Altman-Kuehne Defaulted Securities Indexes

February 2019 & 2019 Year-to-Date Performance

Index (December 1986 = 100)	Feb-19 Level	Feb-19 Return	2019 Ytd Return
Altman-Kuehne Index of Defaulted Public Bonds	563.7	(0.89%)	2.55%
S&P 500 (Dividends Reinvested)	2,367.3	3.21%	11.48%
Citigroup High-Yield Index	1,227.8	1.60%	6.34%

Index (December 1995 = 100)	Feb-19 Level	Feb-19 Return	2019 Ytd Return
Altman-Kuehne Index of Defaulted Bank Loans	202.5	2.29%	(1.69%)
Altman-Kuehne Index of Defaulted Public Bonds	201.4	(0.89%)	2.55%
Altman-Kuehne Combined Bank Loan-Public Bond Index	223.5	0.52%	1.04%
S&P 500 (Dividends Reinvested)	701.5	3.21%	11.48%
Citigroup High-Yield Index	473.0	1.60%	6.34%

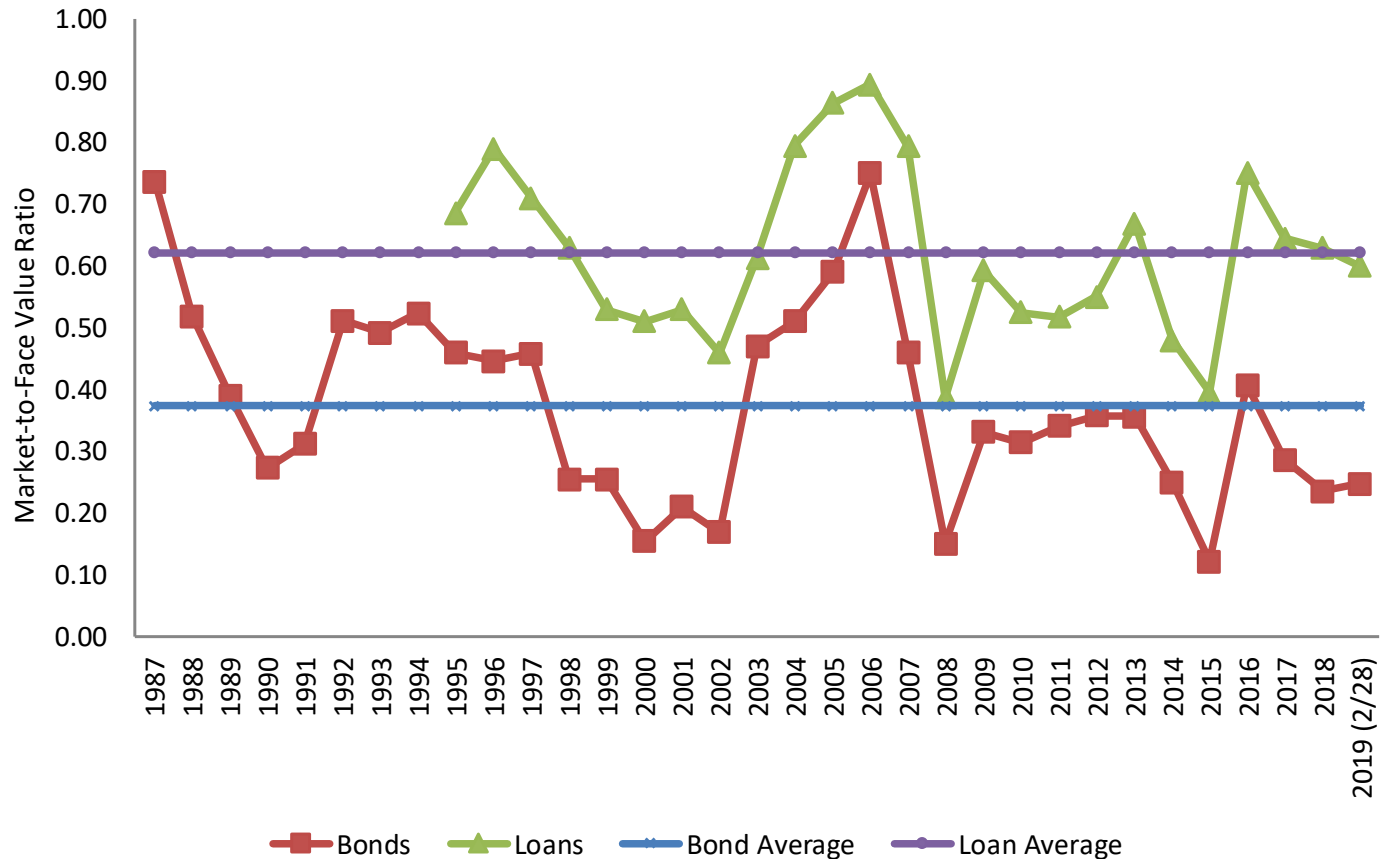
Hedge Fund & Other Distressed Debt Index Returns

2003 – 2018

Calendar Year	Dow Jones/ Credit Suisse	HFR	GAI	BoAML Distressed	Altman-Kuehne Combined
2003	25.12%	29.58%	27.42%	78.71%	49.30%
2004	15.60%	18.89%	18.19%	24.78%	15.14%
2005	11.75%	8.25%	9.34%	-15.95%	1.73%
2006	15.58%	15.95%	15.33%	42.80%	23.38%
2007	8.28%	5.07%	7.37%	-12.07%	-3.30%
2008	-20.48%	-25.21%	-21.05%	-44.91%	-47.52%
2009	20.95%	28.54%	24.69%	116.67%	55.99%
2010	10.26%	12.12%	16.35%	25.41%	17.70%
2011	-4.24%	-2.42%	-1.9%	-6.61%	-3.02%
2012	11.77%	10.40%	13.8%	24.10%	7.63%
2013	16.00%	14.04%	18.4%	11.66%	19.37%
2014	2.55%	-1.00%	-1.13%	-20.18%	-6.45%
2015	-5.30%	-11.14%	-6.0%	-37.99%	-30.94%
2016	6.38%	14.34%	16.2%	54.25%	43.90%
2017	7.27%	7.58%	8.36%	7.01%	1.50%
2018	-1.59%	-1.64%	n/a	-8.68%	-3.25%
2003-18 Compounded Average (Annual) Rate	6.89%	6.80%	n/a	7.95%	5.31%

Defaulted Debt Indexes: Market-to-Face Value Ratios

(1987 – 2019 (2/28))



Loans Median Market-to-Face value is 0.61 and Average Market-to-Face value is 0.62

Bonds Median Market-to-Face value is 0.36 and Average Market-to-Face value is 0.37

Source: Altman-Kuehne Defaulted Debt Indexes

Total Monthly Return Correlations on Various Asset Class Indexes During Stressed and Recovery Credit Cycles

		Citi HY Index	S&P 500 Stock Index
Stressed Cycle I ^a 01/1990 – 12/1991 (24 obs.)	Defaulted Bond Index	68%	12%
	S&P 500 Stock Index	48%	
Stressed Cycle II ^b 01/2001 – 12/2002 (24 obs.)	Defaulted Bond and Bank Loan Index	76%	23%
	S&P 500 Stock Index	54%	
Stressed Cycle III 01/2008 – 03/2009 (15 obs.)	Defaulted Bond and Bank Loan Index	80%	73%
	S&P 500 Stock Index	73%	
Recovery Cycle 04/2009 – 04/2011 (25 obs.)	Defaulted Bond and Bank Loan Index	71%	65%
	S&P 500 Stock Index	67%	
Full Sample Period 01/1987 – 02/2019 (386 obs.)	Defaulted Bond and Bank Loan Index ^c	62%	39%
	S&P 500 Stock Index	60%	
Most Recent Period 01/2010 – 02/2019 (110 obs.)	Defaulted Bond and Bank Loan Index	52%	39%
	S&P 500 Stock Index	73%	

^aCorrelation between Defaulted Bond Index and S&P 500 was -16% during recovery period. ^bCorrelation between Defaulted Bond and Bank Loan Index and S&P 500 was 43% during recovery period. ^cBased on only the Defaulted Bond Index from 01/1987 – 12/1995. Source: E. Altman & B. Kuehne, NYU Salomon Center

PRE & POST DEFAULT PERFORMANCE OF CORPORATE BONDS & LOANS

Number of Issuers, Corporate Bonds (1987-2Q 2016) and Loans (1996-2Q 2016)

BONDS	Number of Issuers	Number of Issues
1987-2Q16	803	1,727
1987-2Q16, no '15-'16 energy	766	1,624
2006-2Q16	245	635
2006-2Q16, no '15-'16 energy	208	532
LOANS	Number of Issuers	Number of Issues
1996-2Q16	398	730
1996-2Q16, no '15-'16 energy	372	689
2006-2Q16	201	354
2006-2Q16, no '15-'16 energy	175	313

Source: Altman/Kuehne NYU Salomon Center Defaulted Bond and Loan Pricing Databases

**What Was the Average Number of Months for the
Period “Default to Emergence From Chapter 11” for
Corporate Bonds in the Periods:**

1987-2005?

2006-2016?

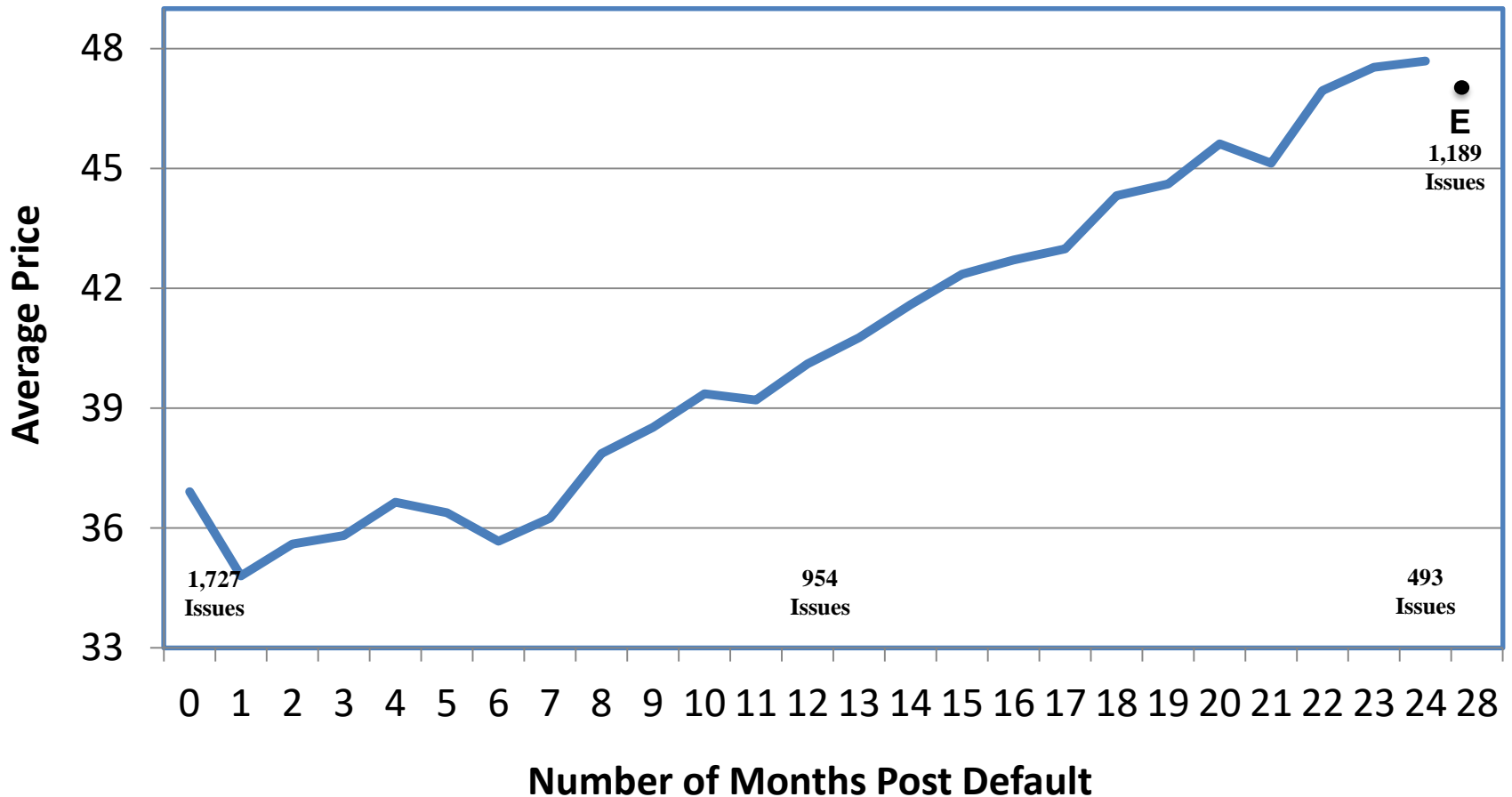
Average Time from Default until Emergence on Defaulted Corporate Bonds (1987-2Q 2016) and Loans (1996-2Q 2016)

BONDS	Months Until Emergence	
Default Period	Mean	Median
1987-2Q16	27.70	19.40
1987-2005	33.56	24.17
2006-2Q16	16.18	11.20

LOANS	Months Until Emergence	
Default Period	Mean	Median
1996-2Q16	20.01	14.37
1996-2005	27.43	18.50
2006-2Q16	12.97	9.60

Source: Altman/Kuehne NYU Salomon Center Defaulted Bond and Loan Pricing Databases

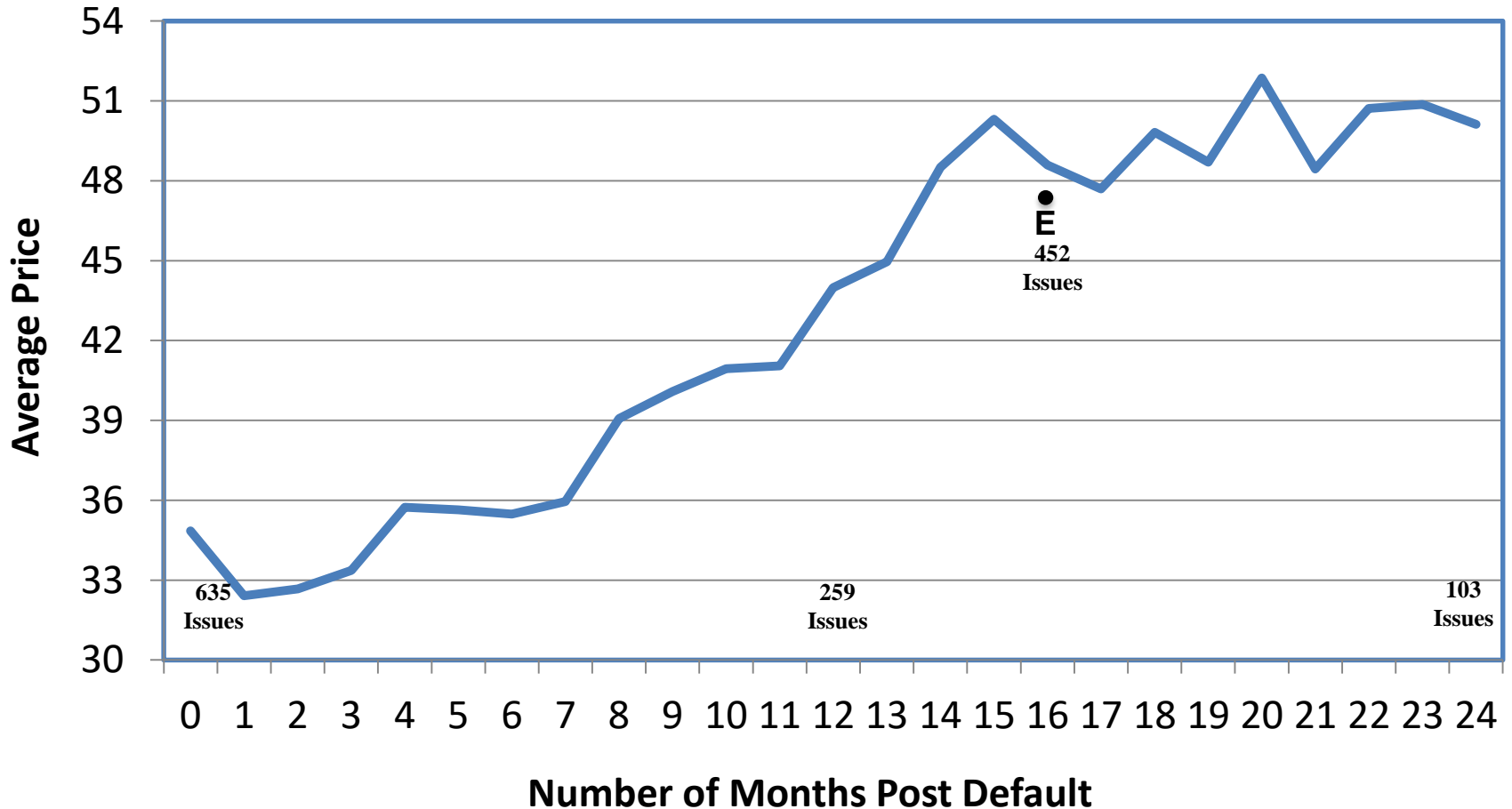
Defaulted Bond Pricing Trends (1987-2Q16)



*E = Emergence Price. Average bankruptcy period was 28 months.

Source: Altman-Kuehne/NYU Salomon Center Defaulted Bond Index

Defaulted Bond Pricing Trends (2006-2Q16)



*E = Emergence Price. Average bankruptcy period was 16 months.

Source: Altman-Kuehne/NYU Salomon Center Defaulted Bond Index

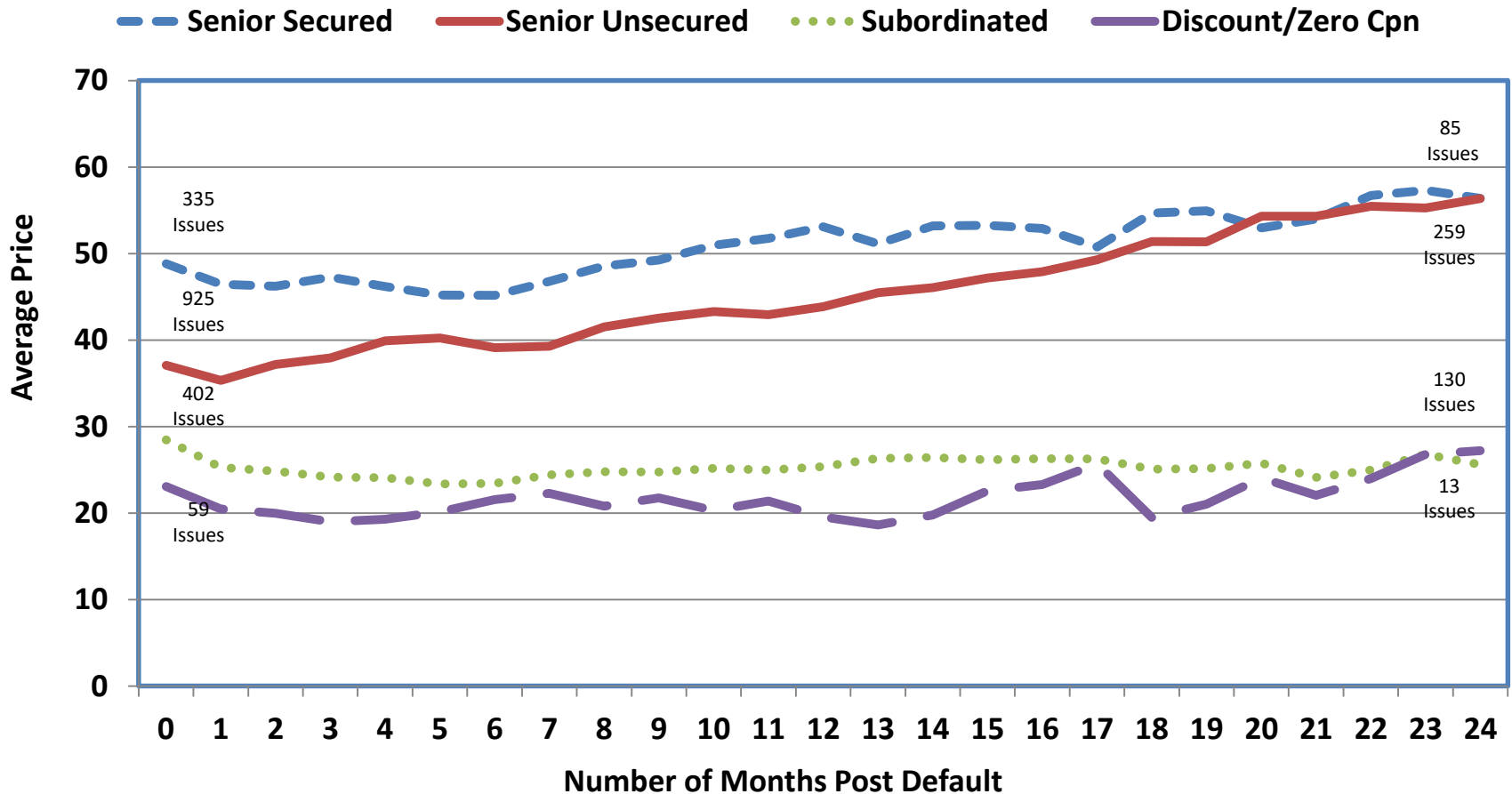
Post-Default Price Changes on Defaulted Corporate Bonds (1987-2Q 2016)

Default to Emergence							
	Avg. Px at Default	# Issues	Avg. Px at Emerge.	# Issues	Avg. # Months in Default	Avg. Annual Px Change	St. Dev. Return/St. Dev. Ratio
1987-2Q16	36.92	1,727	47.18	1,189	28	11.08%	<u>70.76%</u> 0.16
2006-2Q16	34.85	635	47.09	452	16	25.34%	<u>106.64%</u> 0.24
1987-2Q16, no '15-'16 energy	38.20	1,624	48.20	1,151	28	10.48%	<u>68.89%</u> 0.15
2006-2Q16, no '15-'16 energy	38.37	532	49.93	414	17	20.44%	<u>50.00%</u> 0.41

Default to Other Time Periods										
	Avg. Px 12 mo. Post Default	# Issues	Avg. Annual Px Change 1-12 mo.	St. Dev. Return/St. Dev. Ratio	Avg. Px 24 mo. Post Default	# Issues	Avg. Annual Px Change 12-24 mo.	St. Dev. Return/St. Dev. Ratio	Avg. Annual Px Change 1-24 mo.	St. Dev. Return/St. Dev. Ratio
1987-2Q16	40.05	954	8.49%	<u>81.46%</u> 0.10	47.62	493	18.91%	<u>52.84%</u> 0.36	13.58%	<u>45.54%</u> 0.30
2006-2Q16	43.98	259	26.20%	<u>147.45%</u> 0.18	50.12	103	13.96%	<u>109.10%</u> 0.13	19.92%	<u>81.26%</u> 0.25
1987-2Q16, no '15-'16 energy	40.62	939	6.34%	<u>81.15%</u> 0.08	47.62	493	17.23%	<u>52.34%</u> 0.33	11.65%	<u>45.27%</u> 0.26
2006-2Q16, no '15-'16 energy	46.43	244	21.00%	<u>160.05%</u> 0.13	50.12	103	7.95%	<u>109.69%</u> 0.07	14.29%	<u>80.63%</u> 0.18

Source: Altman/Kuehne NYU Salomon Center Defaulted Bond Pricing Database

Defaulted Bond Pricing Trends by Seniority (1987-2Q16)



Note: Average bankruptcy period was 28 months.

Source: Altman-Kuehne/NYU Salomon Center Defaulted Bond Index

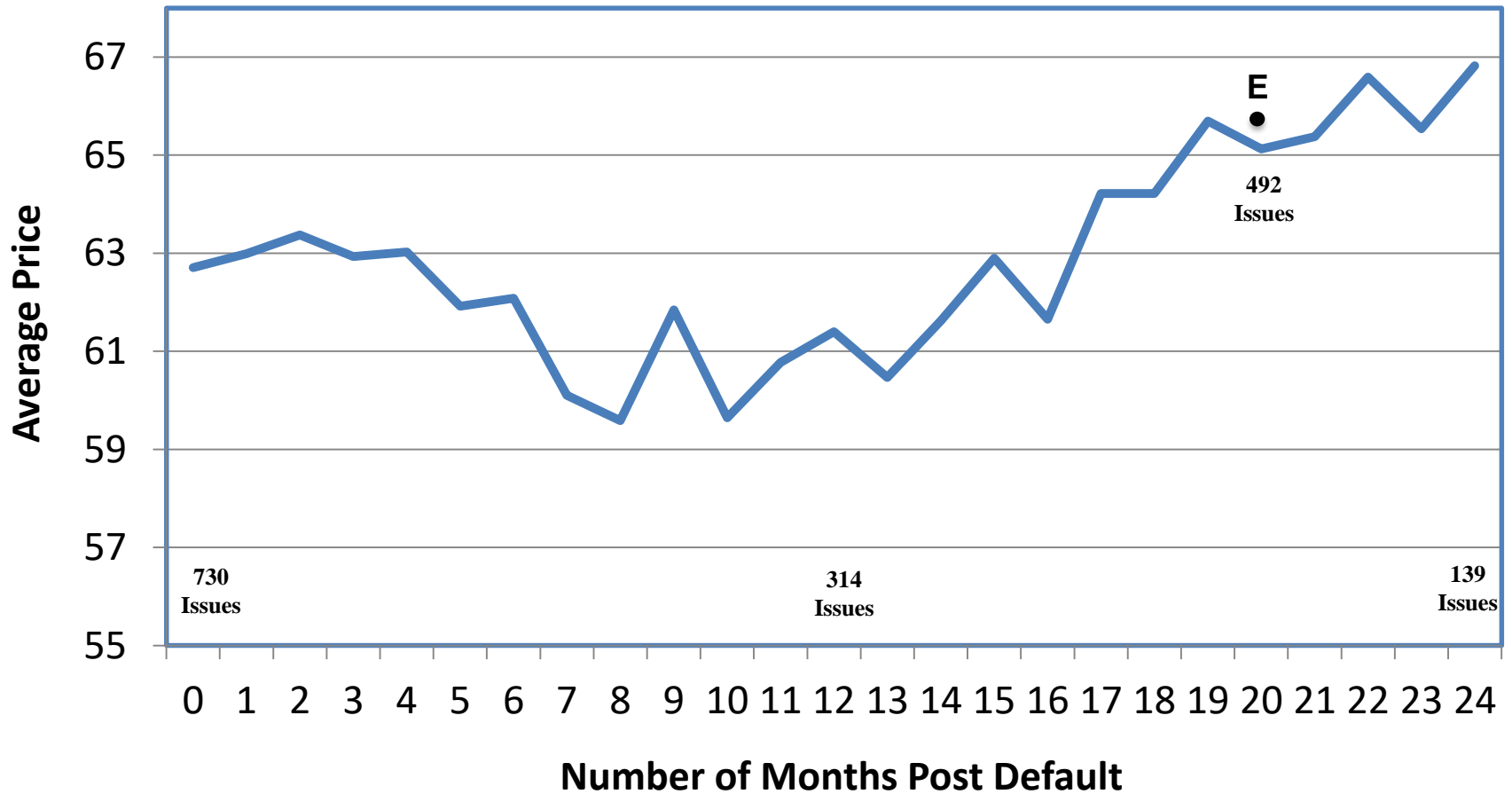
Post-Default Price Changes on Defaulted Corporate Bonds by Seniority (1987-2Q 2016)

Default to Emergence							
	Avg. Px at Default	# Issues	Avg. Px at Emerge.	# Issues	Avg. # Months in Default	Avg. Annual Px Change	St. Dev. Return/St. Dev. Ratio
Senior Secured	48.81	335	55.26	236	22	6.92%	<u>66.93%</u> 0.10
Senior Unsecured	37.07	925	53.96	631	28	17.39%	<u>68.87%</u> 0.26
Subordinated	28.46	402	26.71	287	32	2.35%	<u>75.61%</u> 0.03
Discount	23.06	59	29.91	33	22	14.90%	<u>74.22%</u> 0.20

Default to Other Time Periods										
	Avg. Px 12 mo. Post Default	# Issues	Avg. Annual Px Change 1-12 mo.	St. Dev. Return/St. Dev. Ratio	Avg. Px 24 mo. Post Default	# Issues	Avg. Annual Px Change 12-24 mo.	St. Dev. Return/St. Dev. Ratio	Avg. Annual Px Change 1-24 mo.	St. Dev. Return/St. Dev. Ratio
Senior Secured	53.09	176	8.76%	<u>61.27%</u> 0.14	56.38	85	6.21%	<u>40.67%</u> 0.15	7.48%	<u>39.13%</u> 0.19
Senior Unsecured	43.87	496	18.34%	<u>93.42%</u> 0.20	56.35	259	28.46%	<u>39.20%</u> 0.73	23.30%	<u>52.03%</u> 0.45
Subordinated	25.37	241	-10.85%	<u>66.49%</u> -0.16	25.59	130	0.86%	<u>44.52%</u> 0.02	-5.17%	<u>58.28%</u> 0.09
Discount	19.53	32	-15.29%	<u>55.65%</u> -0.27	27.22	13	39.33%	<u>58.37%</u> 0.67	8.64%	<u>101.22%</u> 0.09

Source: Altman/Kuehne NYU Salomon Center Defaulted Bond Pricing Database

Defaulted Loan Pricing Trends (1996-2Q16)



*E = Emergence Price. Average bankruptcy period was 20 months.

Source: Altman-Kuehne/NYU Salomon Center Defaulted Loan Index

Post-Default Price Changes on Defaulted Corporate Loans (1996-2Q 2016)

Default to Emergence							
	Avg. Px at Default	# Issues	Avg. Px at Emerge.	# Issues	Avg. # Months in Default	Avg. Annual Px Change	St. Dev. Return/St. Dev. Ratio
1996-2Q16	62.71	730	65.62	492	20	2.76%	<u>38.19%</u> 0.07
2006-2Q16	59.53	354	62.41	252	13	4.45%	<u>40.71%</u> 0.11
1996-2Q16, no '15-'16 energy	63.11	689	66.44	475	20	3.14%	<u>36.23%</u> 0.09
2006-2Q16, no '15-'16 energy	59.99	313	63.84	235	13	5.91%	<u>37.57%</u> 0.16

Default to Other Time Periods										
	Avg. Px 12 mo. Post Default	# Issues	Avg. Annual Px Change 1-12 mo.	St. Dev. Return/St. Dev. Ratio	Avg. Px 24 mo. Post Default	# Issues	Avg. Annual Px Change 12-24 mo.	St. Dev. Return/St. Dev. Ratio	Avg. Annual Px Change 1-24 mo.	St. Dev. Return/St. Dev. Ratio
1996-2Q16	61.40	314	-2.09%	<u>42.02%</u> -0.05	66.82	139	8.83%	<u>27.90%</u> 0.32	3.23%	<u>23.29%</u> 0.14
2006-2Q16	59.97	139	0.73%	<u>57.84%</u> 0.01	60.62	67	1.09%	<u>25.16%</u> 0.04	0.91%	<u>29.61%</u> 0.03
1996-2Q16, no '15-'16 energy	61.00	290	-3.33%	<u>43.05%</u> -0.08	66.65	117	9.26%	<u>31.11%</u> 0.30	2.77%	<u>25.26%</u> 0.11
2006-2Q16, no '15-'16 energy	58.67	115	-2.19%	<u>63.37%</u> -0.03	57.15	45	-2.59%	<u>29.98%</u> -0.09	-2.39%	<u>36.03%</u> -0.07

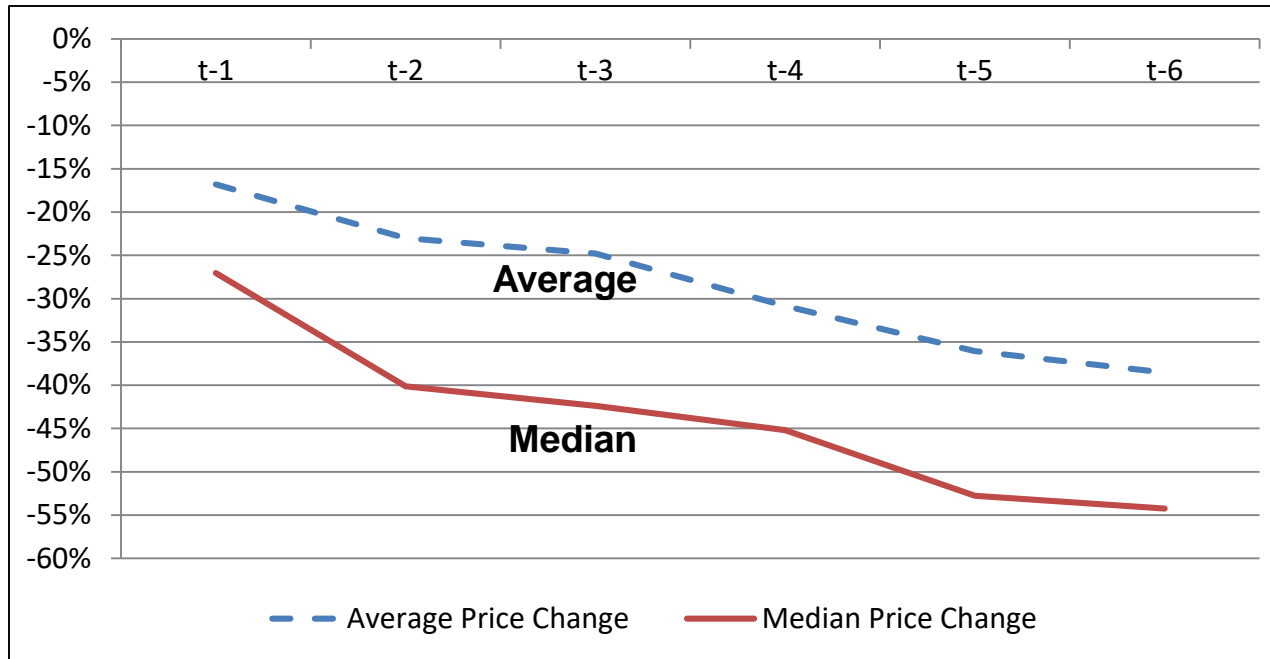
Source: Altman/Kuehne NYU Salomon Center Defaulted Loan Pricing Database

Analysis of Price Movements in Corporate Bonds Prior to Default

What Do You Think the Average Change in Price Was:

- From Six Months Prior to Default to Default Date?**
- From One Month Prior to Default to Default Date?**

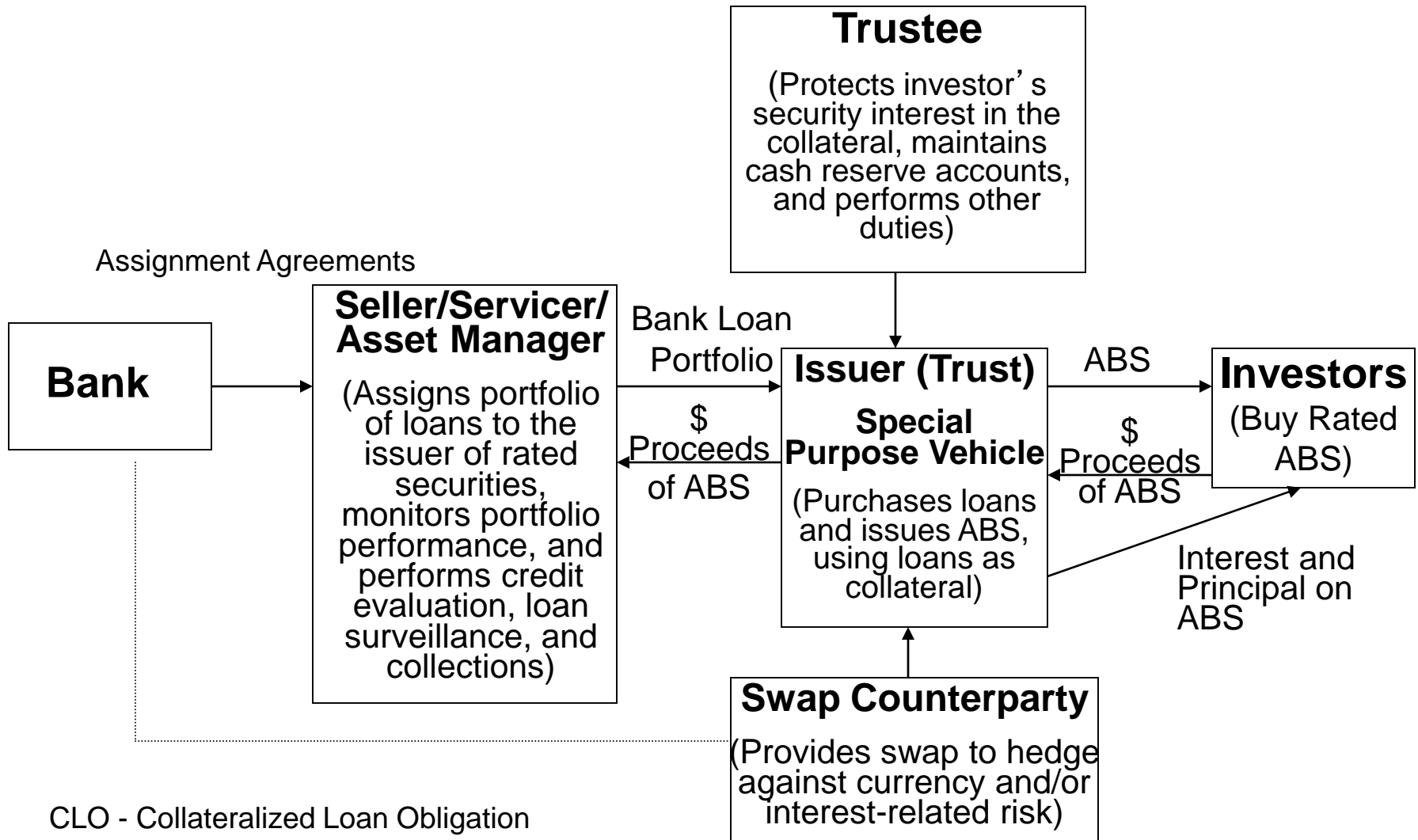
Price Changes on Defaulted Corporate Bonds Prior to Default (2002-2Q 2016)



Holding Period (Months) Prior to Default (t)						
	t-1	t-2	t-3	t-4	t-5	t-6
Number of Bonds	513	527	523	522	517	510
Average Change	-16.81%	-23.03%	-24.77%	-30.85%	-36.06%	-38.52%
Median Change	-27.03%	-40.13%	-42.39%	-45.19%	-52.77%	-54.24%
Standard Deviation	34.62%	35.18%	39.32%	34.71%	33.11%	33.52%

Sample CLO Transaction Structure

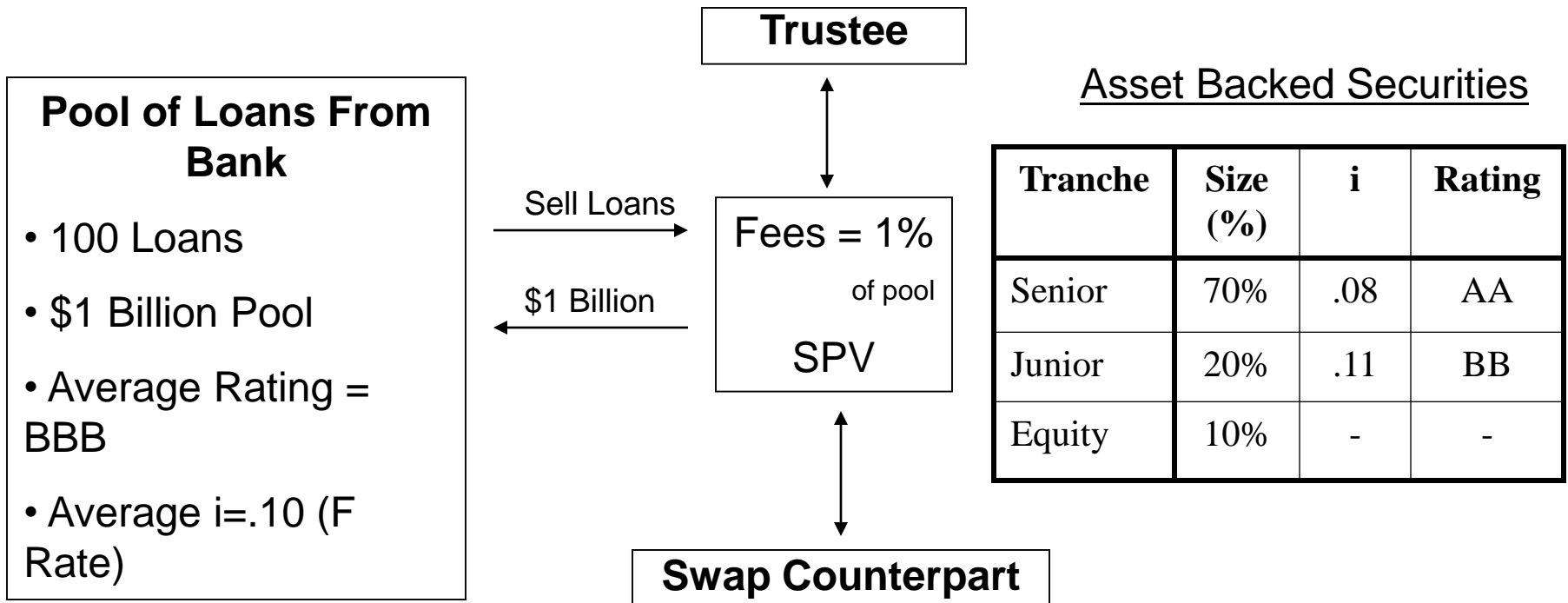
Sample CLO Transaction Structure



CLO - Collateralized Loan Obligation

ABS - Asset-backed Securities

CLO Example



CLO Example

Returns with No Defaults: Returns to ABS

		<u>First Year</u>	<u>Second Year</u>
Total Interest	=	\$100 million	\$100 million
Interest to Senior	=	\$56 million	\$56 million
Fees	=	\$10 million	-----
Net From Jr.		\$34 million	\$44 million
Interest to Jr.	=	\$22 million	\$22 million
Net to Equity	=	\$12 million	\$22 million
ROE	=	???	???

Major Risks Going Forward

- Global Economic Performance – Primarily U.S., China and Europe: Impact on Default Rates, Credit Availability and Quality
- Global Debt Excess and Increasing Interest Rates
- High-Yield Fundamentals Still Fairly Weak
- Falling Oil Prices (No Current Major Concern)
- Contagion Between Markets – Risky Debt and Equity
- Interest Rates and Inflation – Reduced Importance of the Search-for-Yield
- LBO, Covenant-Lite and CCC New Issuance
- Sovereign Debt Crisis – Asia (1997), Europe (2009-13), Emerging Markets?, Europe (again)
- Uncertainties (non-quantifiable) – e.g. Political, Trade, Other

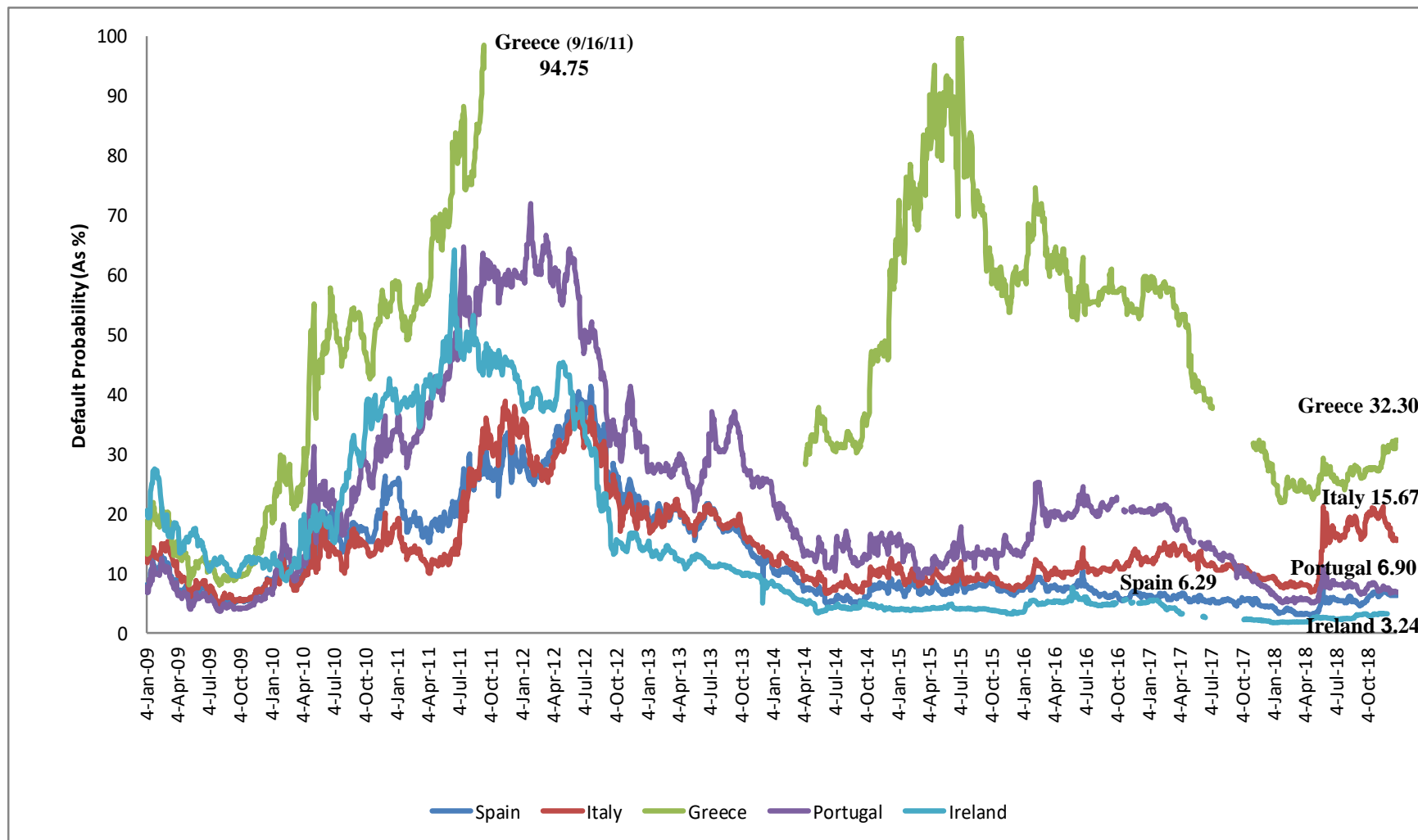
A Novel Approach to Assessing Sovereign Debt Default Risk

Measuring and Assessing Sovereign Default Risk

- Traditional and Market Indicators of Risk of Default (PDs)
 - Macroeconomic Related Variables
 - Credit Default Swaps (CDS) and their Implied Probability of Default (PDs)
- Traditional Default Prediction Models
 - Statistical and Aggregative Techniques for Individual Firm PDs
- A Novel Approach to Assessing Sovereign Debt Default Risk
 - To Assess the Default Risk of a Sovereign Based on the Health of the Private Sector, Particularly the Non-Financial and Financial Corporate Debt Sectors
 - Using a Default Prediction Model (Z-Metrics Model, 2010), We Aggregate the Corporate Default Probabilities and Compare Them Over Time and Across Countries
 - Results are Compared with the Implied Probability of Default from CDS Spreads

Five Year Implied Probabilities of Default (PD) From Capital Market CDS Spreads*

Jan. 2009 – December 31, 2018



*Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

European & Latin American Government Benchmark Yields and Spreads

December 31, 2018

Country	5-Year Price	5-Year Yield %	5-Year Spread to Germany	10-Year Price	10-Year Yield %	10-Year Spread to Germany/ U.S.
Germany	101.50	-0.32	n/a	100.08	0.24	n/a
Sweden	107.36	-0.03	0.29	102.56	0.46	0.22
Greece	100.89	3.18	3.50	95.23	4.35	4.11
Ireland	100.32	-0.10	0.22	99.97	0.90	0.66
Italy	102.96	1.80	2.12	99.07	3.53*	3.29
Portugal	121.32	0.44	0.76	103.60	1.71	1.47
Spain	100.06	0.33	0.65	99.85	1.41*	1.17
Argentina	n/a	32.92	30.41	n/a	20.85	18.16
Brazil	n/a	8.53	6.02	n/a	9.24	6.55
Colombia	n/a	6.46	3.95	n/a	7.09	4.40
Mexico	n/a	8.51	6.00	n/a	8.62	5.93

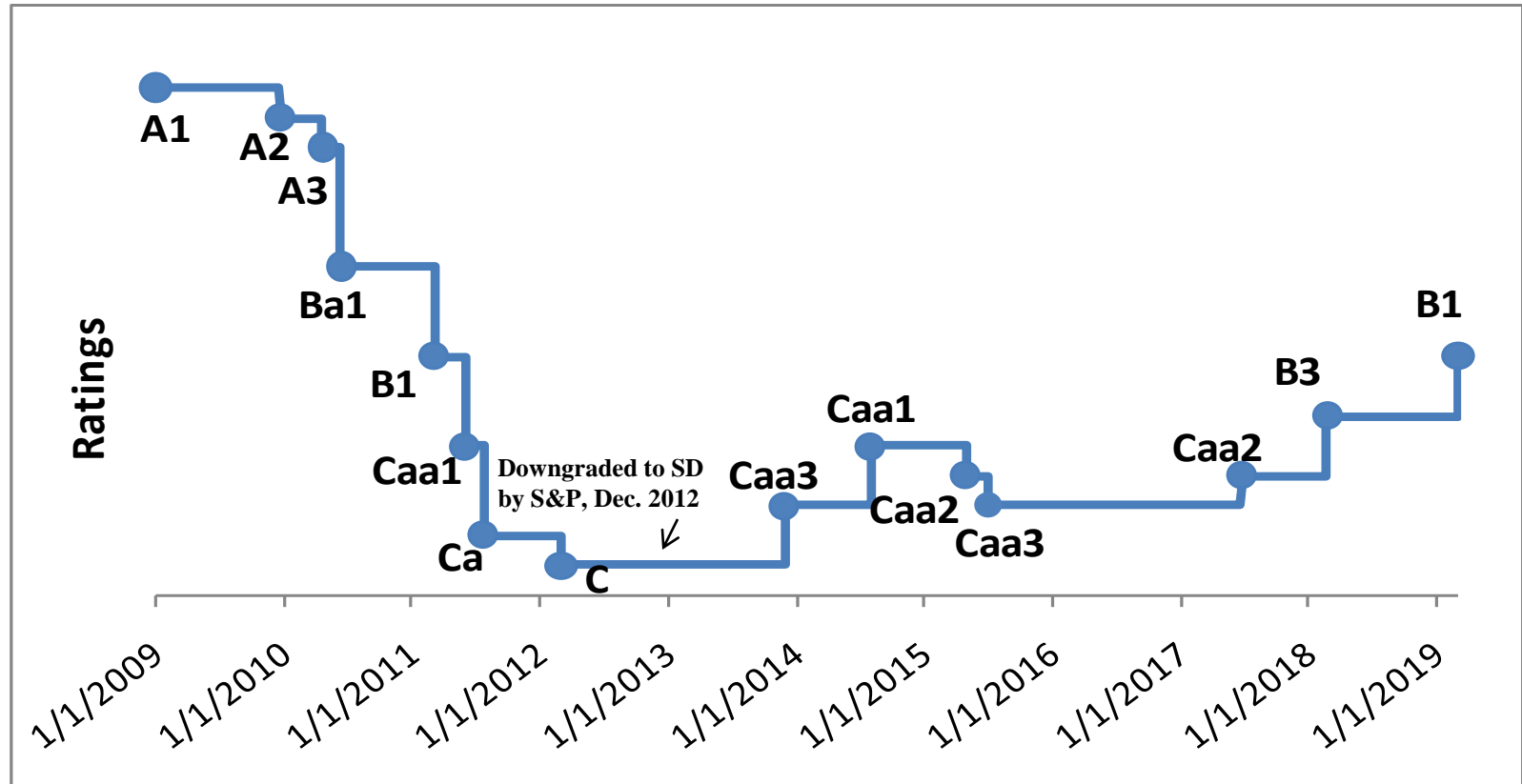
*10-Year Yield as of July 16, 2012 was 6.10% for Italy and 6.77% for Spain.

Source: Bloomberg

Sovereign Ratings Actions (Moody's)

2009 - Present

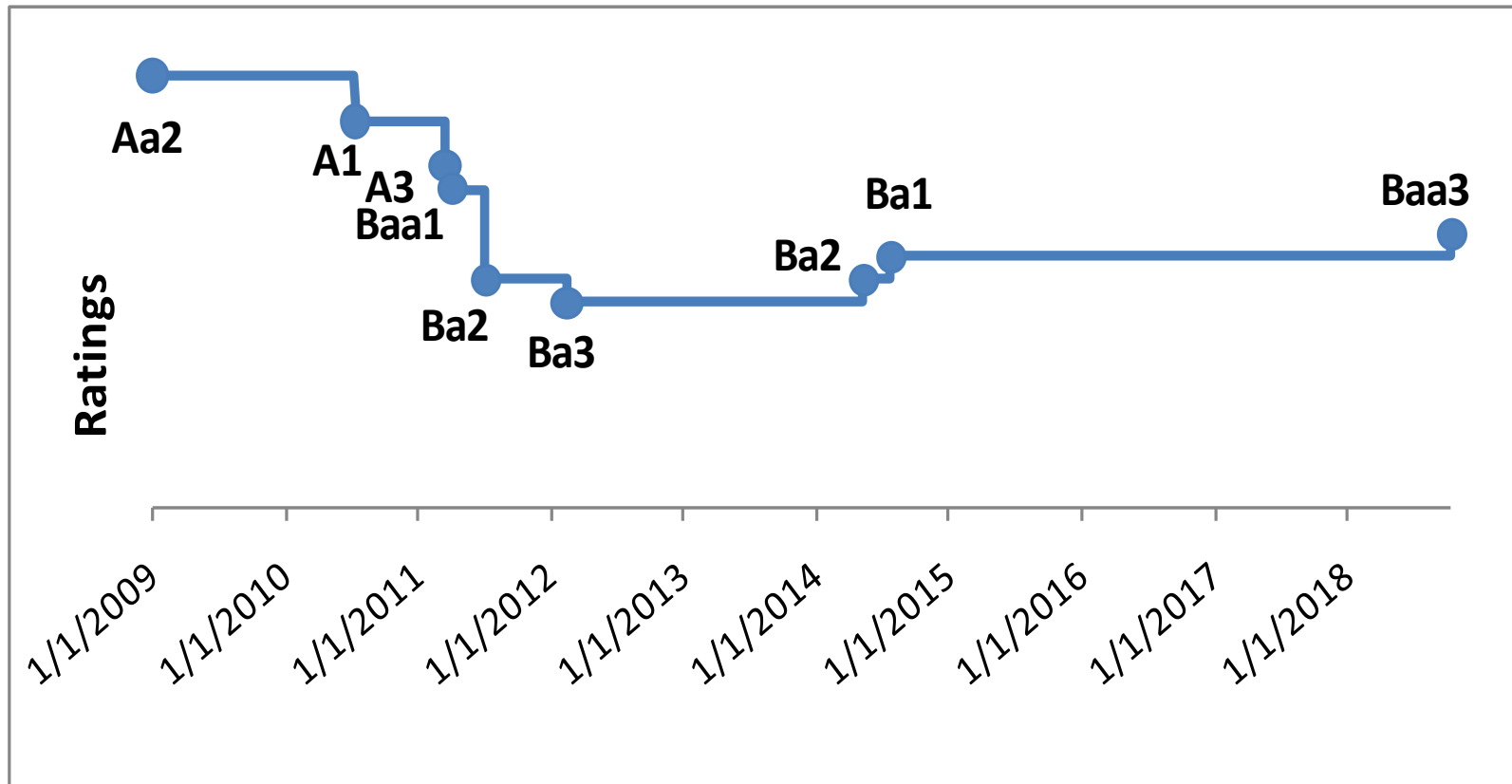
Greece



Sovereign Ratings Actions (Moody's)

2009 - Present

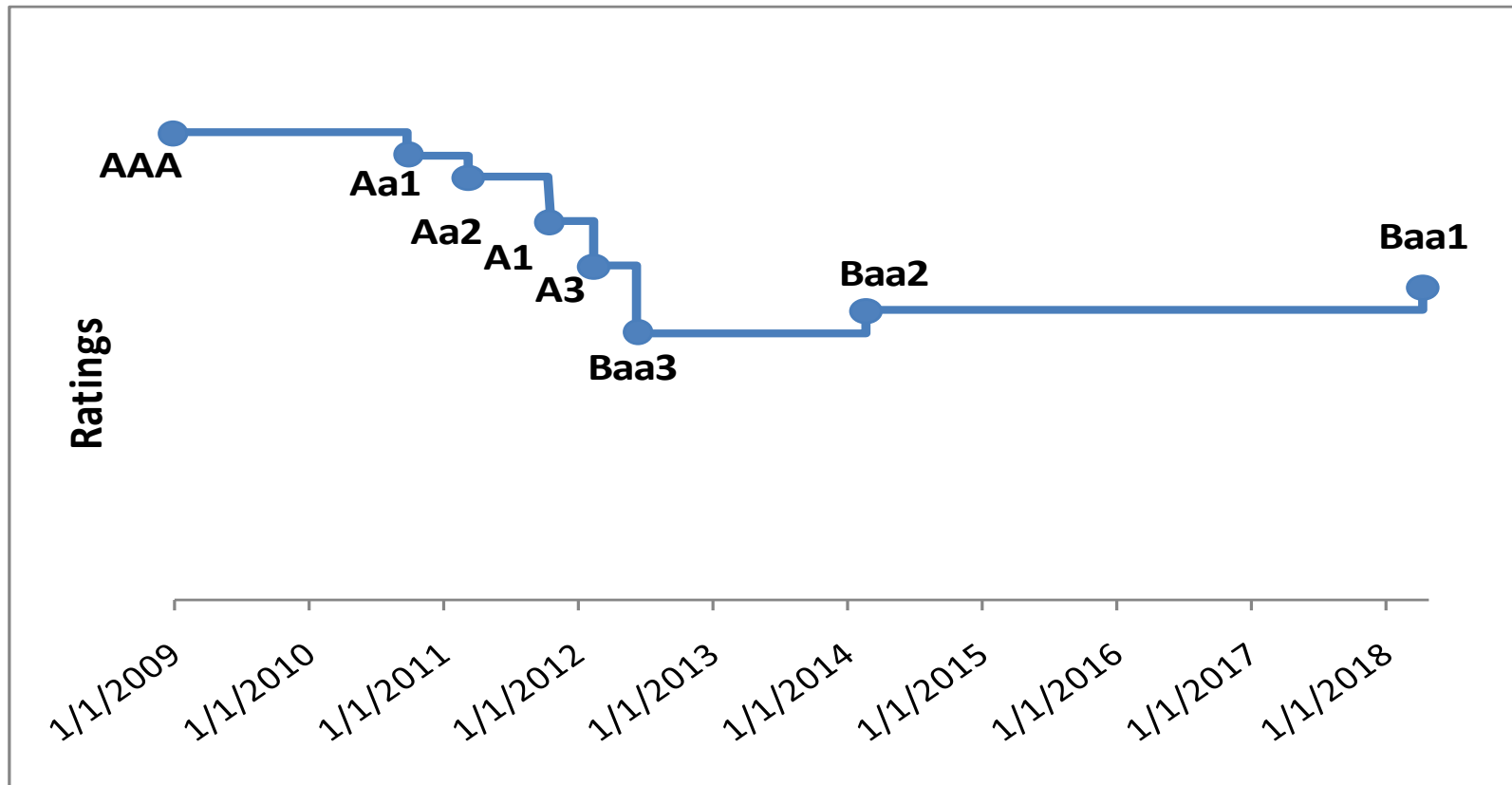
Portugal



Sovereign Ratings Actions (Moody's)

2009 - Present

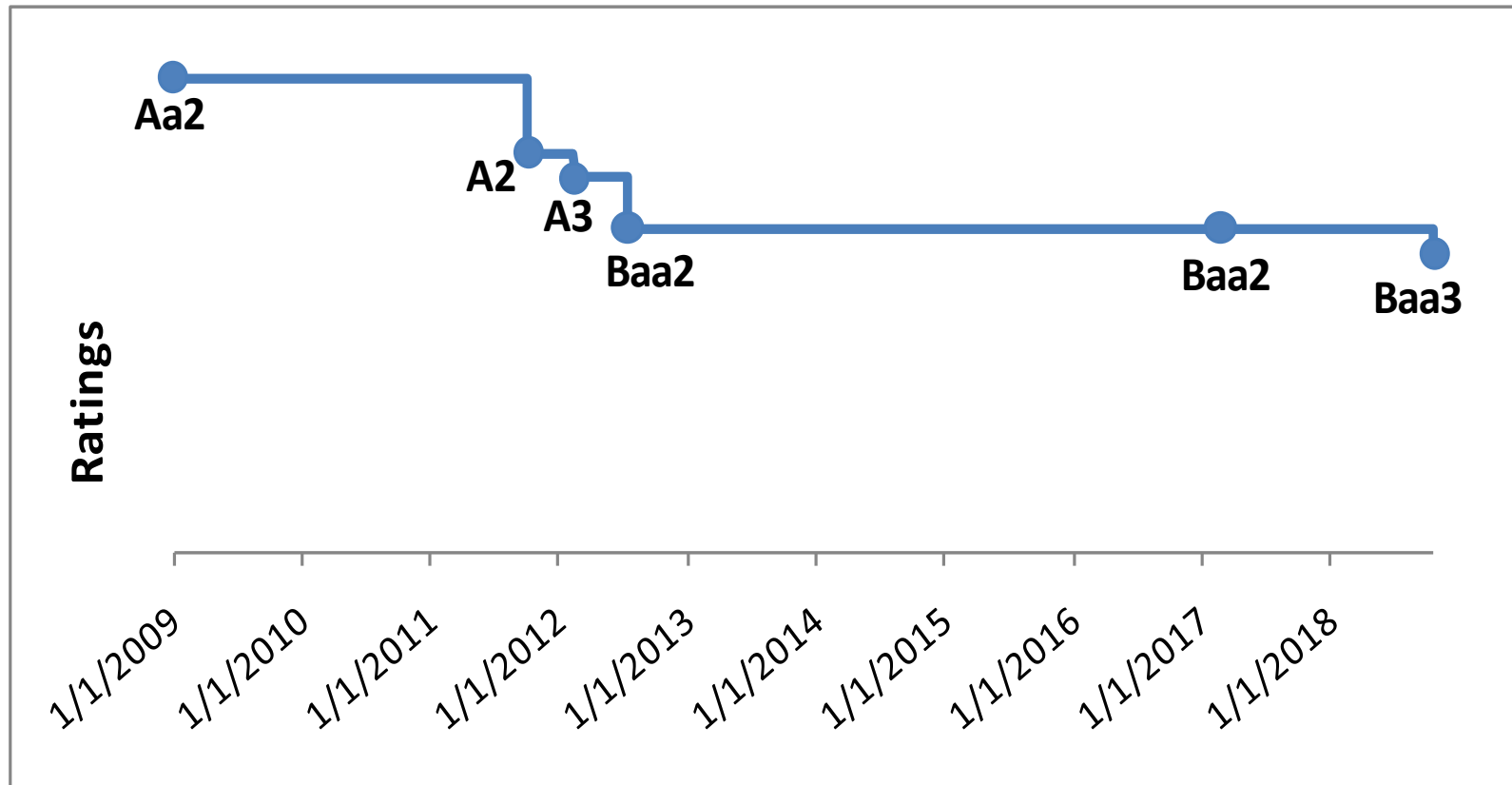
Spain



Sovereign Ratings Actions (Moody's)

2009 - Present

Italy



Financial Health of the Corporate, Non-Financial Sector: Selected European Countries and Australia/U.S.A. in 2009-2017

Z-Metrics PD Estimates* : Five-Year Public Model										
Country	Listed Companies (2017)**	75th Percentile PD (25% of Firms w/PDs ≥ Percentages Below)								
		2017	2016	2015	2014	2013	2012	2011	2010	2009
Ireland	26	2.3%	2.6%	2.5%	2.9%	2.7%	4.5%	5.9%	7.2%	10.8%
Sweden	209	3.9%	3.9%	4.7%	5.8%	5.7%	6.1%	8.2%	6.5%	7.0%
Netherlands	78	4.0%	6.6%	8.7%	9.6%	6.2%	6.3%	10.0%	6.9%	6.9%
U.K.	501	4.7%	5.2%	5.0%	5.8%	4.7%	5.5%	8.7%	6.0%	9.2%
Germany	315	5.4%	6.9%	8.2%	9.7%	8.4%	8.7%	11.0%	8.8%	11.7%
France	322	6.8%	7.9%	8.8%	9.0%	7.8%	9.9%	13.0%	8.4%	10.9%
Spain	90	9.5%	11.2%	13.9%	14.2%	14.6%	16.3%	18.0%	11.9%	11.0%
Italy	171	9.9%	11.5%	13.9%	14.8%	15.2%	19.3%	21.6%	15.1%	18.0%
Poland	189	10.9%	10.5%	10.8%	11.9%	9.4%	13.8%	20.8%	9.4%	12.4%
Portugal	35	20.0%	30.0%	31.3%	24.3%	21.9%	31.9%	32.1%	22.6%	20.6%
Greece	74	20.8%	26.8%	36.0%	42.3%	32.0%	38.4%	51.1%	37.0%	27.3%
U.S.A.	2,450	2.9%	3.2%	3.5%	3.6%	3.7%	4.6%	11.7%	8.0%	11.5%

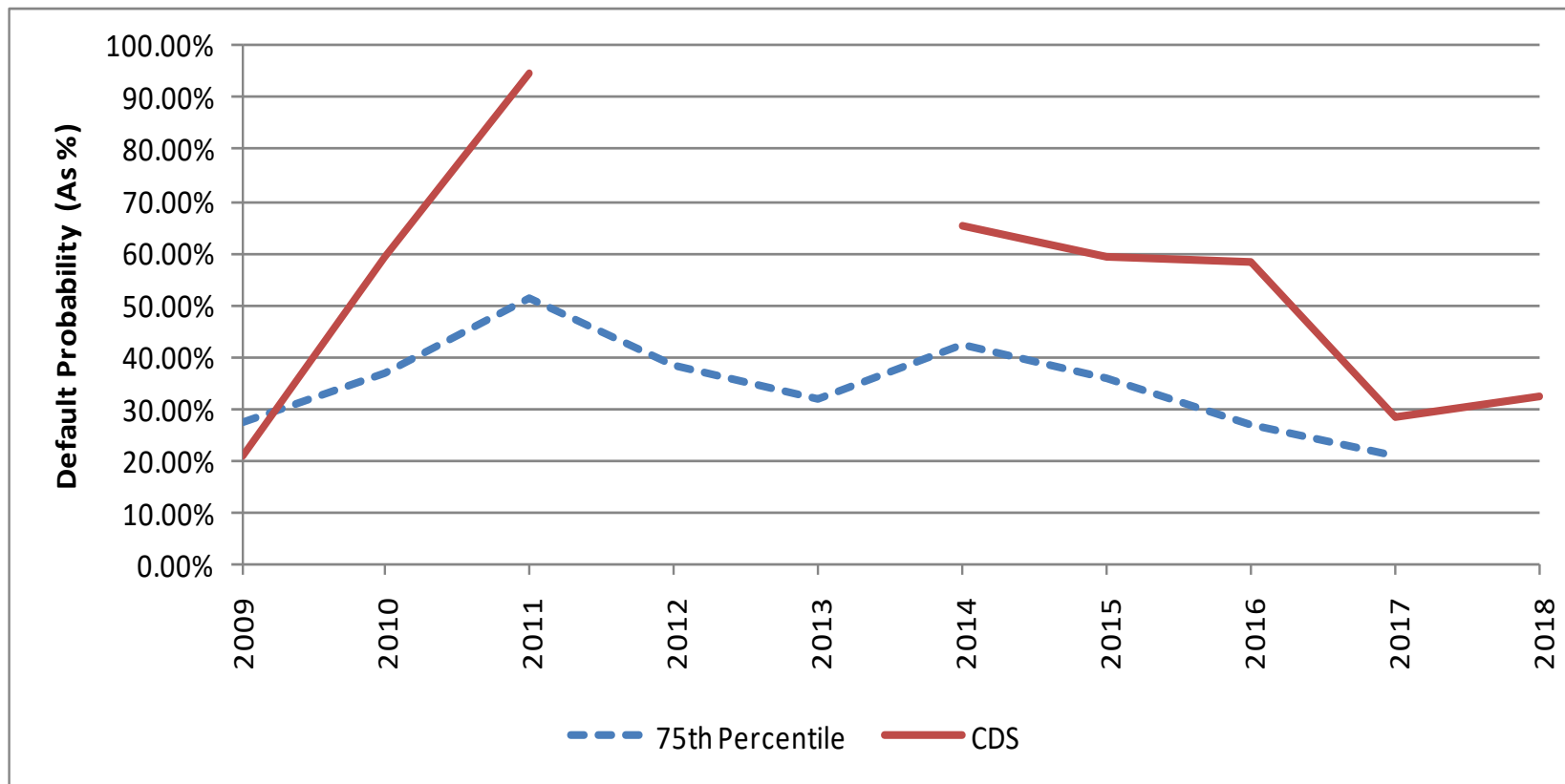
*Since the Z-Metrics Model is not practically available for most analysts, we could substitute the Z"-Score method (available from <altmanZscoreplus.com>).

**Sales > € 50mm

Sources: RiskMetrics Group (MSCI), Markit, Compustat Global.

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Greece, 2009 – 2018

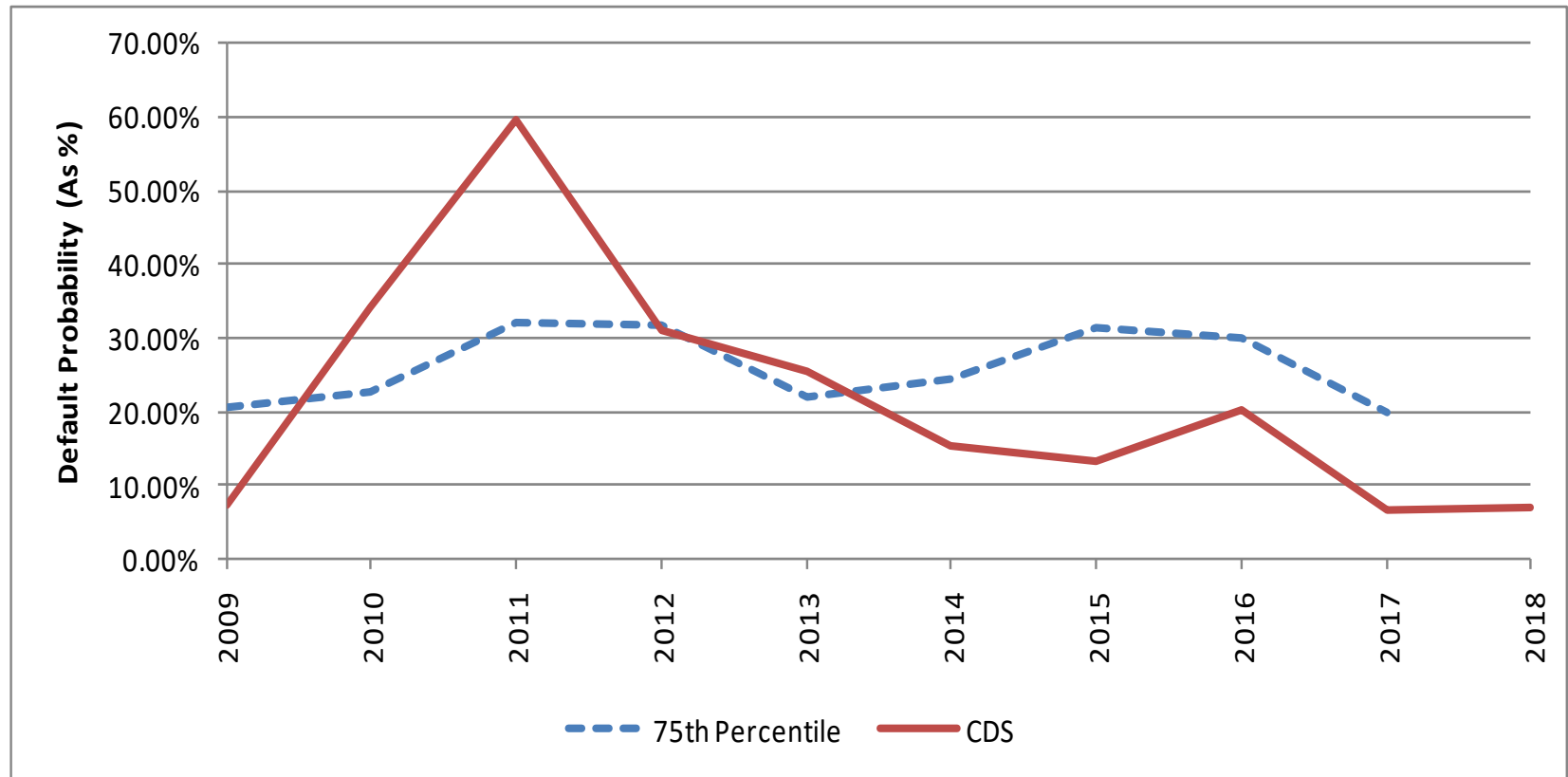


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Portugal, 2009 – 2018

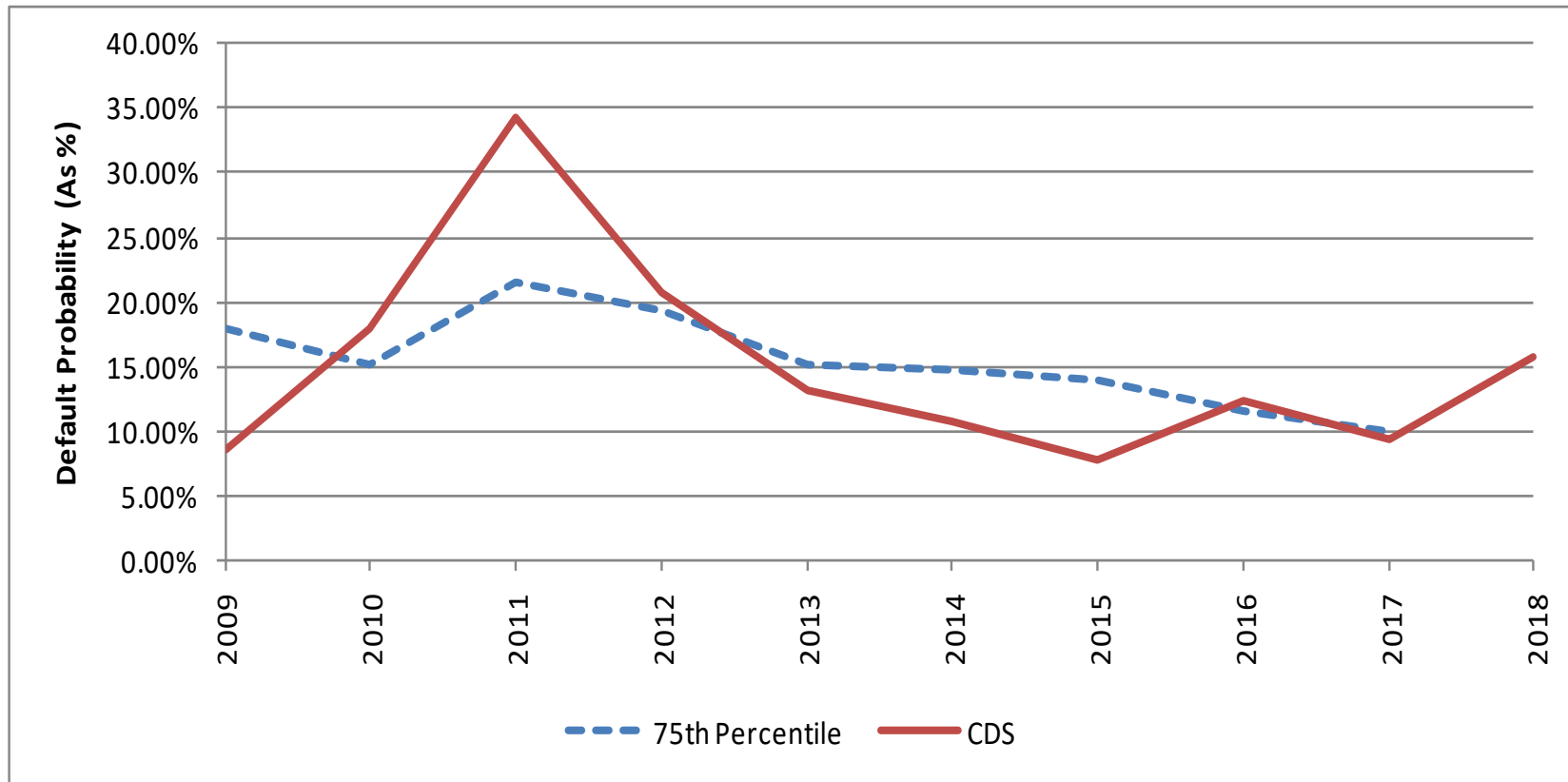


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Italy, 2009 – 2018

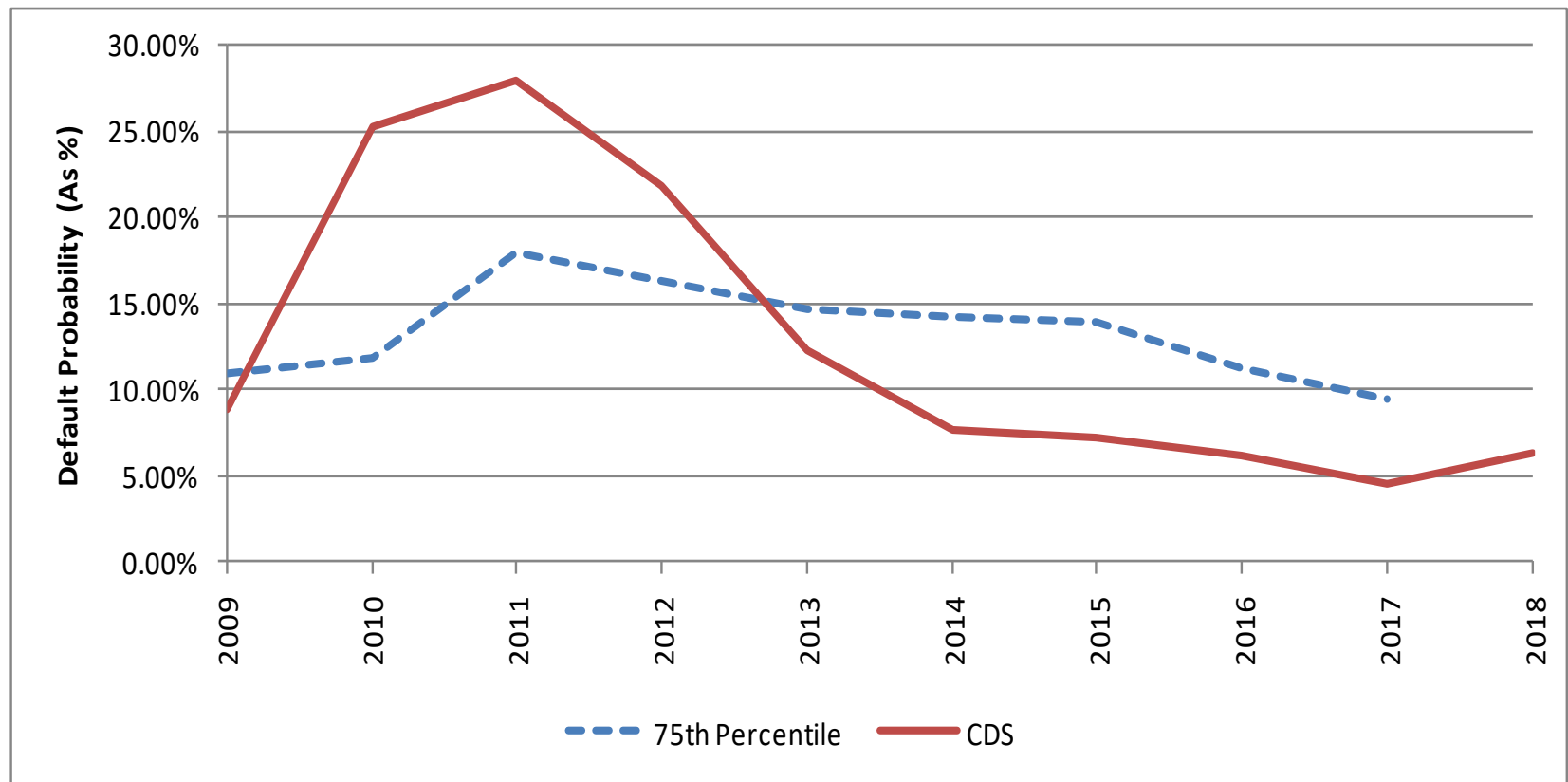


*Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Spain, 2009 – 2018

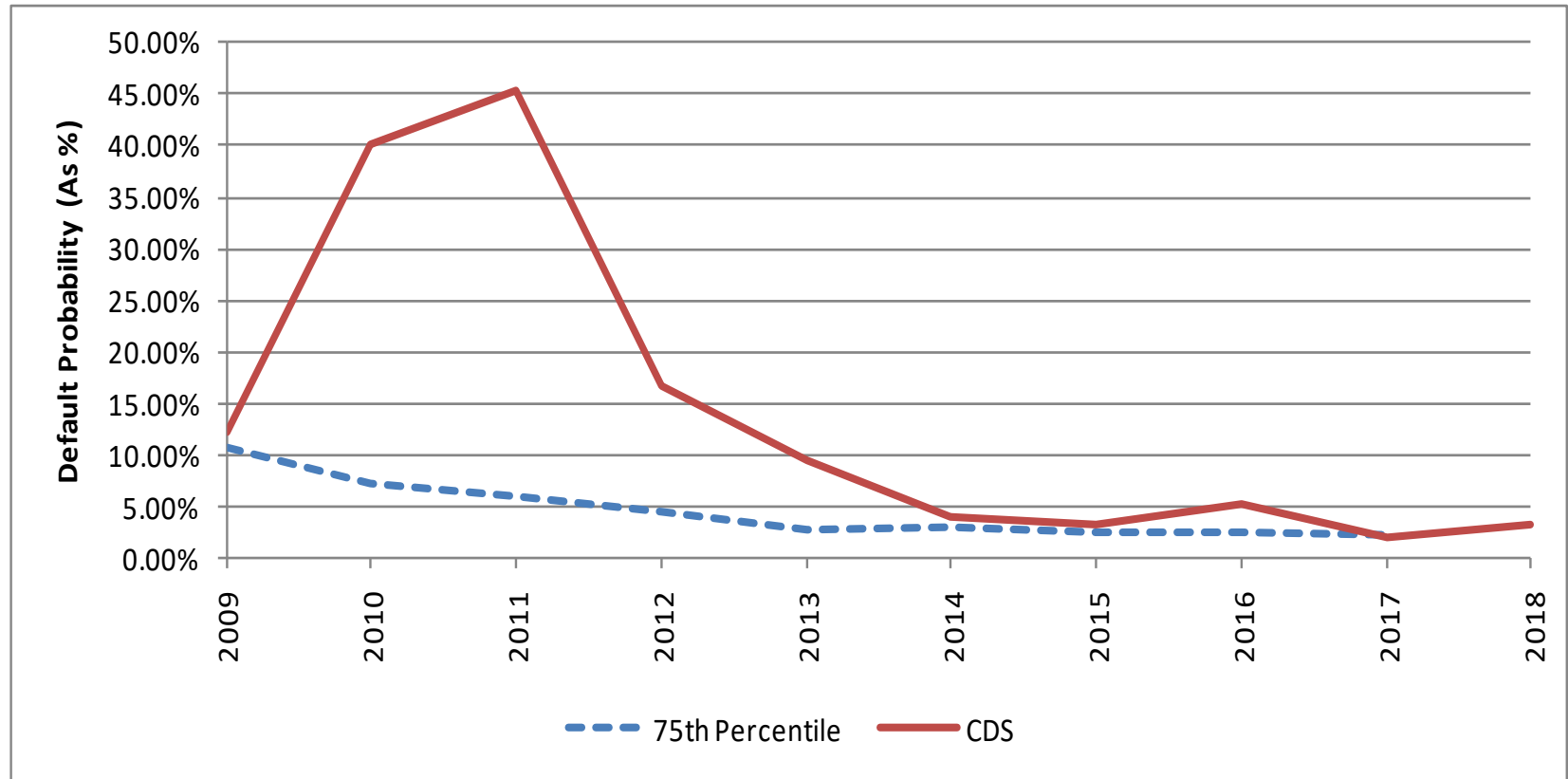


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Ireland, 2009 – 2018



*Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

ASIA ANALYSIS

China Corporate Sector Credit Analysis: Five-Year (2008-2012) Medians of Selected Financial Measures

(Bond Rating Equivalents (BREs) Based on U.S. Industrial Ratios)

	No. of entities	Debt/EBITDA (x)		Debt/debt + equity (%)		EBITDA margin (%)		FFO/debt (%)		Return on capital (%)		Summary Risk Ratings*
		Median ratio	BRE	Median Ratio	BRE	Median Ratio	BRE	Median Ratio	BRE	Median Ratio	BRE	
Automobile OEM & parts suppliers	9	0.7	AA+	20.0	AA+	6.8	CCC-	89.6	AA	18.8	A-	A-
Building materials	8	4.2	BB-	50.8	BB	21.1	A	18.9	BB-	11.9	BB+	BB+
Capital goods	14	2.8	BB+	40.0	BBB+	8.7	CCC-	32.1	BBB-	13.1	BBB	BB+
Coal	6	2.8	BB+	44.6	BBB	15.6	B-	26.3	BB	13.9	BBB	BB+
Construction and engineering	7	4.8	B+	55.0	BB	5.6	CCC-	14.4	B+	10.6	BB	B+
Consumer products	15	0.7	AA+	16.7	AAA	12.0	CCC	110.1	AA	21.1	A	A
Diversified	12	6.2	B-	52.8	BB	8.4	CCC-	11.9	B	7.6	B	B
Healthcare & pharmaceuticals	5	1.7	A-	19.2	AA+	5.6	CCC-	53.3	A	13.3	BBB	BBB
High technology	9	1.5	A	24.5	AA+	4.9	CCC-	54.1	A	14.5	BBB+	BBB+
Infrastructure	16	4.1	BB-	40.5	BBB+	42.3	AAA	16.7	B+	7.8	B	BBB-
Metals & mining	7	7.2	CCC+	55.5	BB	6.6	CCC-	10.6	B	4.9	CCC+	B-
Oil & gas	5	1.6	A	26.4	AA	23.8	A+	55.2	A+	13.7	BBB	A
Real estate	7	3.8	BB-	49.0	BB+	27.1	AA	10.5	B	14.1	BBB	BBB-
Retail	12	3.8	BB-	54.5	BB	8.2	CCC-	21.7	BB-	12.8	BBB-	BB-
Telecommunications	3	1.7	A-	23.6	AA+	35.3	AAA	88.5	AA	6.2	B-	A
Transportation services	6	3.1	BB	33.3	A	17.6	BB	28.3	BB+	7.3	B	BB+
Utilities	10	7.9	CCC+	76.7	B	20.2	A-	6.9	CCC+	5.0	CCC+	B
Total or average	151	3.4	BB	40.2	BBB+	15.9	B-	38.2	BBB+	11.6	BB+	BB+

*Summary Risk Rating based on Equally Weighted Average of the five financial measures.

Source: Standard & Poor's, Ratings Direct, August 18, 2013 and S&P Key Financial Ratios (2009-2011). BREs based on E. Altman and NYU Salomon Center interpolations.

China Corporate Sector Credit Analysis: Five-Year (2008-2012) Medians of Selected Financial Measures

(Bond Rating Equivalents (BREs) Based on EMEA Industrial Ratios)

	No. of entities	Debt/EBITDA (x)		Debt/debt + equity (%)		EBITDA margin (%)		FFO/debt (%)		Return on capital (%)		Summary Risk Ratings*
		Median ratio	BRE	Median Ratio	BRE	Median Ratio	BRE	Median Ratio	BRE	Median Ratio	BRE	
Automobile OEM & parts suppliers	9	0.7	AA+	20.0	AA+	6.8	CCC-	89.6	AA	18.8	AA-	A
Building materials	8	4.2	BB-	50.8	BB	21.1	AA-	18.9	BB-	11.9	BBB+	BBB-
Capital goods	14	2.8	BBB-	40.0	BBB+	8.7	CCC-	32.1	BBB	13.1	BBB+	BB+
Coal	6	2.8	BBB-	44.6	BBB	15.6	B-	26.3	BB+	13.9	A-	BB+
Construction and engineering	7	4.8	B+	55.0	BB	5.6	CCC-	14.4	B+	10.6	BBB-	B+
Consumer products	15	0.7	AA+	16.7	AAA	12.0	CCC	110.1	AA	21.1	AA	A+
Diversified	12	6.2	B	52.8	BB	8.4	CCC-	11.9	B	7.6	B+	B
Healthcare & pharmaceuticals	5	1.7	A	19.2	AA+	5.6	CCC-	53.3	A+	13.3	A-	BBB+
High technology	9	1.5	A	24.5	AA	4.9	CCC-	54.1	A+	14.5	A-	BBB+
Infrastructure	16	4.1	BB-	40.5	BBB+	42.3	AAA	16.7	BB-	7.8	B+	BBB-
Metals & mining	7	7.2	B-	55.5	BB	6.6	CCC-	10.6	B	4.9	B-	B-
Oil & gas	5	1.6	A	26.4	AA	23.8	AA	55.2	A+	13.7	A-	A+
Real estate	7	3.8	BB-	49.0	BB+	27.1	AA+	10.5	B	14.1	A-	BBB-
Retail	12	3.8	BB-	54.5	BB	8.2	CCC-	21.7	BB	12.8	BBB+	BB-
Telecommunications	3	1.7	A	23.6	AA	35.3	AAA	88.5	AA	6.2	B	A
Transportation services	6	3.1	BB+	33.3	A	17.6	A	28.3	BBB-	7.3	B+	BBB
Utilities	10	7.9	CCC+	76.7	B	20.2	A+	6.9	B-	5.0	B-	B+
Total or average	151	3.4	BB	40.2	BBB+	15.9	BBB+	38.2	BBB+	11.6	BBB	BBB

*Summary Risk Rating based on Equally Weighted Average of the five financial measures.

Source: Standard & Poor's, Ratings Direct, August 18, 2013 and S&P Key Financial Ratios (2009-2011). BREs based on E. Altman and NYU Salomon Center interpolations.

China Corporate Industry Sectors: Hierarchy of Summary Risk Ratings (2008-2012)

(Based on U.S. & EMEA Industrial BREs)

	Summary Risk Ratings: U.S. Equivalents	Summary Risk Ratings: EMEA Equivalents
Consumer products	A	A+
Oil & gas	A	A+
Telecommunications	A	A
Automobile OEM & parts suppliers	A-	A
High technology	BBB+	BBB+
Healthcare & pharmaceuticals	BBB	BBB+
Infrastructure	BBB-	BBB-
Real estate	BBB-	BBB-
Building materials	BB+	BBB-
Capital goods	BB+	BB+
Coal	BB+	BB+
Transportation services	BB+	BBB
Retail	BB-	BB-
Construction and engineering	B+	B+
Diversified	B	B
Utilities	B	B+
Metals & mining	B-	B-
Overall average	BB+	BBB

Financial Health of the Corporate, Non-Financial Sector: Selected Asian, LatAm & BRIC Countries

Z-Metrics PD Estimates* : Five-Year Public Model								
Country	Listed Companies (2017)**	75th Percentile PD (25% of Firms w/PDs ≥ Percentages Below)						
		2017	2016	2015	2014	2013	2012	Late 1990' s
Mexico	88	5.9%	6.2%	6.3%	6.0%	5.7%	6.0%	n/a
Chile	93	6.8%	9.5%	9.5%	9.8%	8.0%	6.3%	n/a
Argentina	43	8.1%	11.0%	14.1%	19.1%	21.9%	17.5%	n/a
Brazil	185	15.7%	22.9%	27.8%	20.6%	14.9%	15.1%	7.6%
Japan	2,495	4.0%	4.8%	5.4%	6.1%	5.8%	7.0%	5.8%
China	2,694	5.4%	5.7%	7.3%	8.1%	7.7%	8.5%	10.6%
Hong Kong	120	6.9%	7.0%	8.2%	8.6%	7.5%	11.6%	8.5%
India	1,024	9.9%	13.6%	14.7%	17.4%	19.7%	15.3%	20.3%
S. Korea	1,095	10.2%	11.6%	12.0%	14.1%	14.2%	14.6%	29.0%
Singapore	262	10.9%	13.6%	14.6%	11.8%	9.2%	9.1%	7.7%
Indonesia	239	11.5%	13.9%	17.0%	12.4%	14.6%	10.7%	18.5%
Russia	146	14.8%	15.9%	22.6%	25.6%	11.8%	9.3%	26.6%

*Since the Z-Metrics Model is not practically available for most analysts, we could substitute the Z'-Score method (available from <altmanZscoreplus.com>).

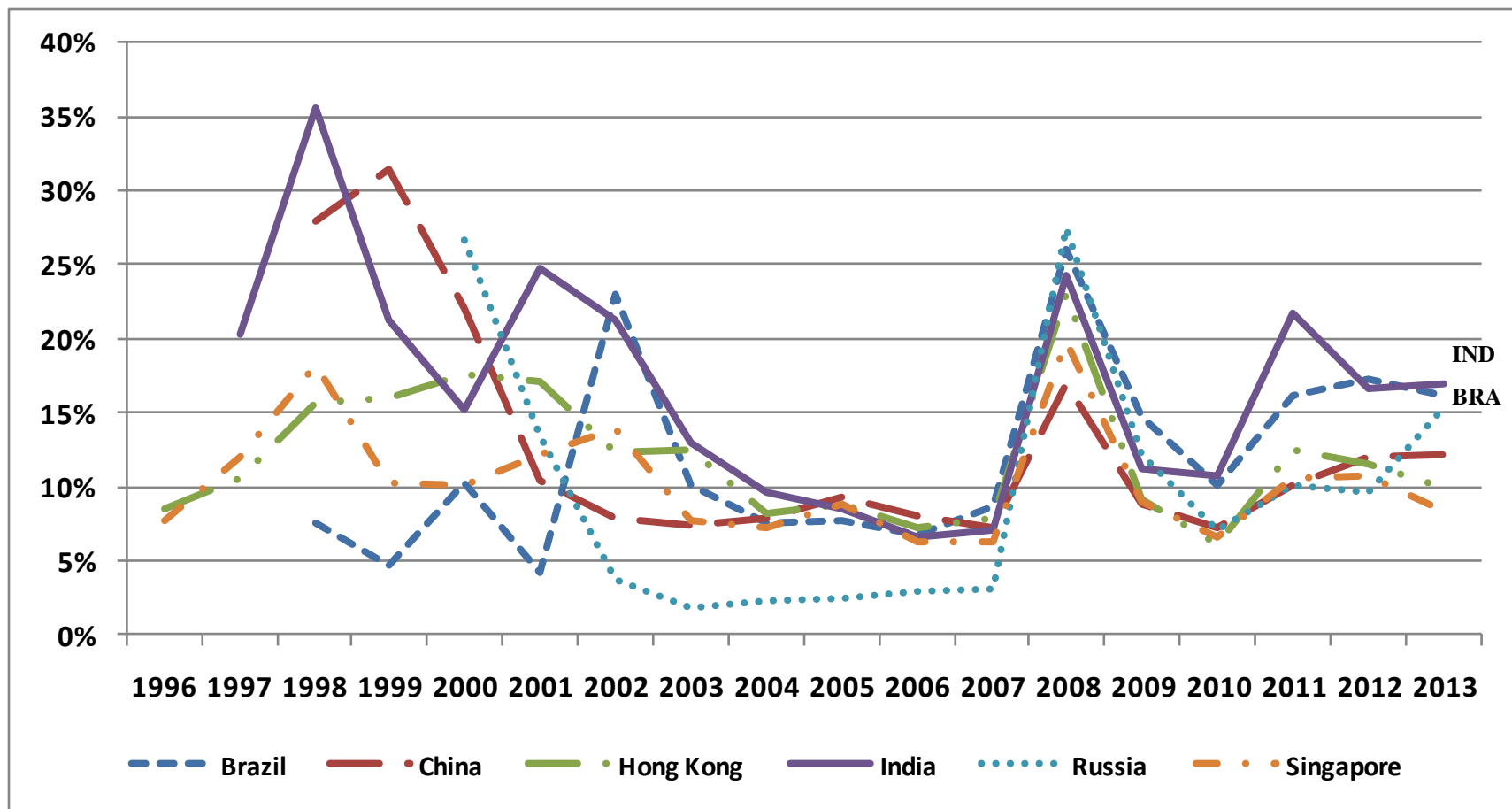
**Sales > \$ 50mm

Sources: RiskMetrics Group (MSCI), Markit, Compustat Global.

Measures of Sovereign Financial Health: BIRCHS

Countries 75th Percentile 5-Year PD*

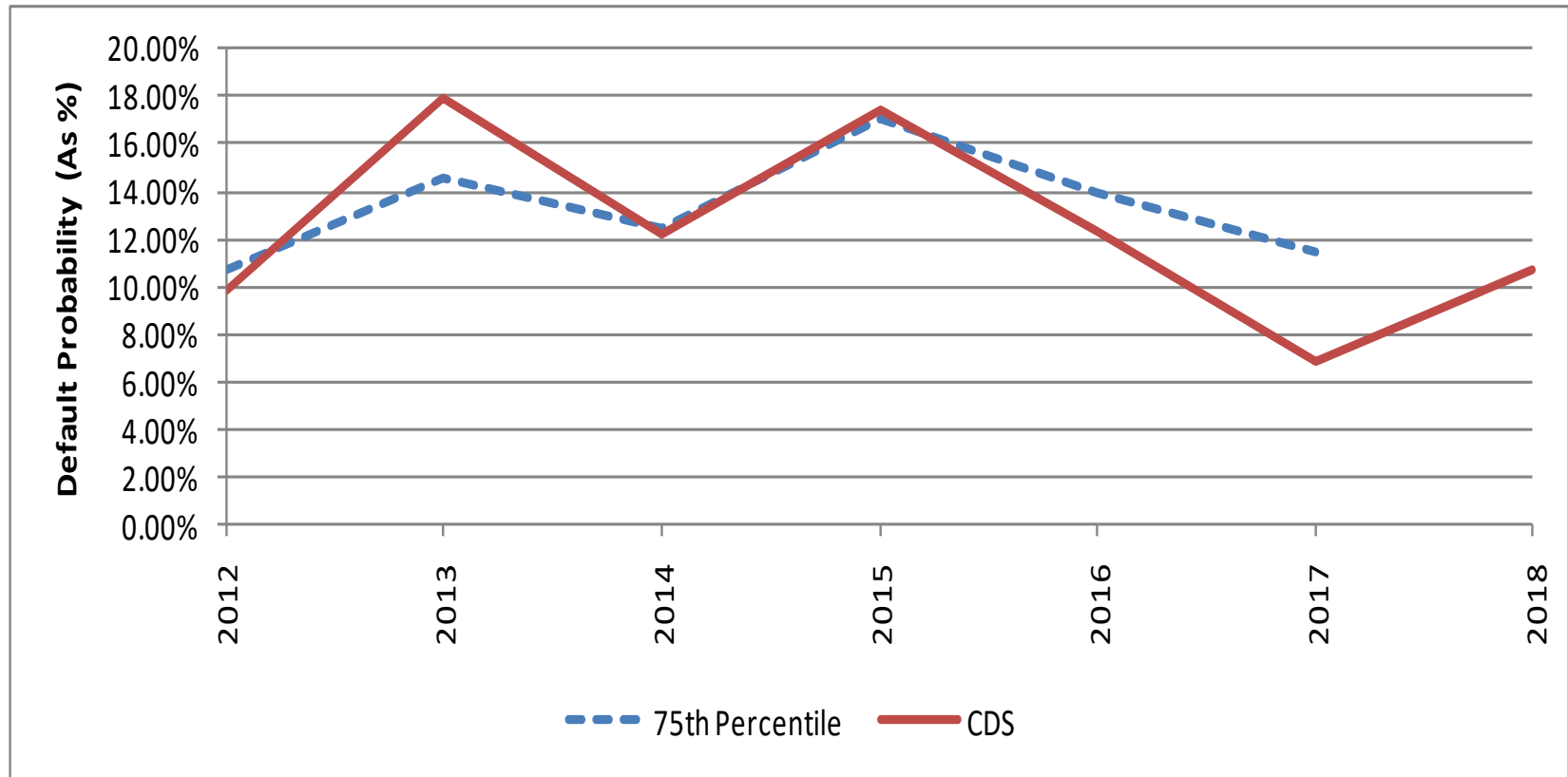
Financial Crisis of the late 1990's to 2013



Source: Compustat (S&P), *Based on Z-Metrics Model Calculation

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Indonesia, 2012 – 2018

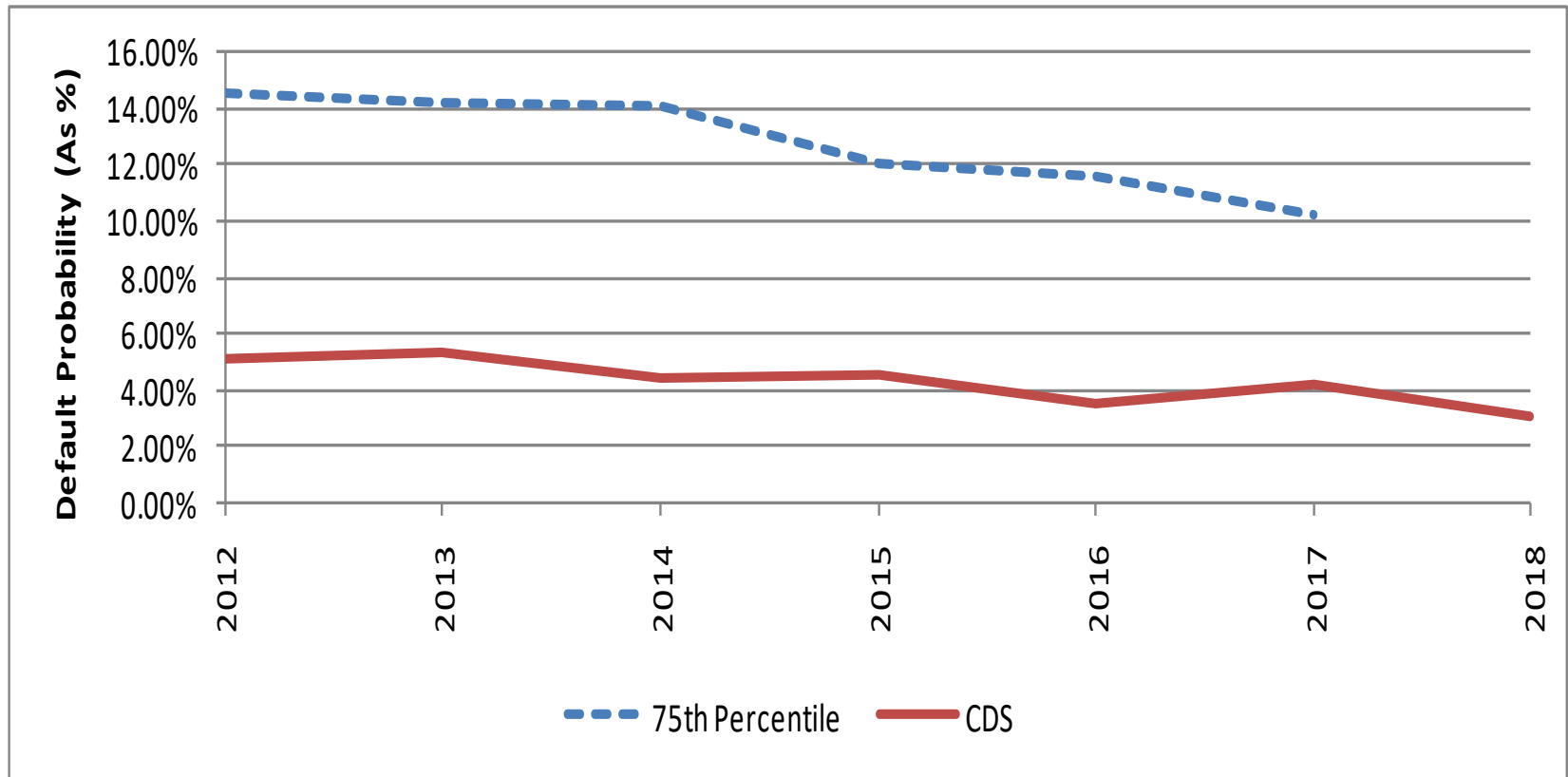


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

S. Korea, 2012 – 2018

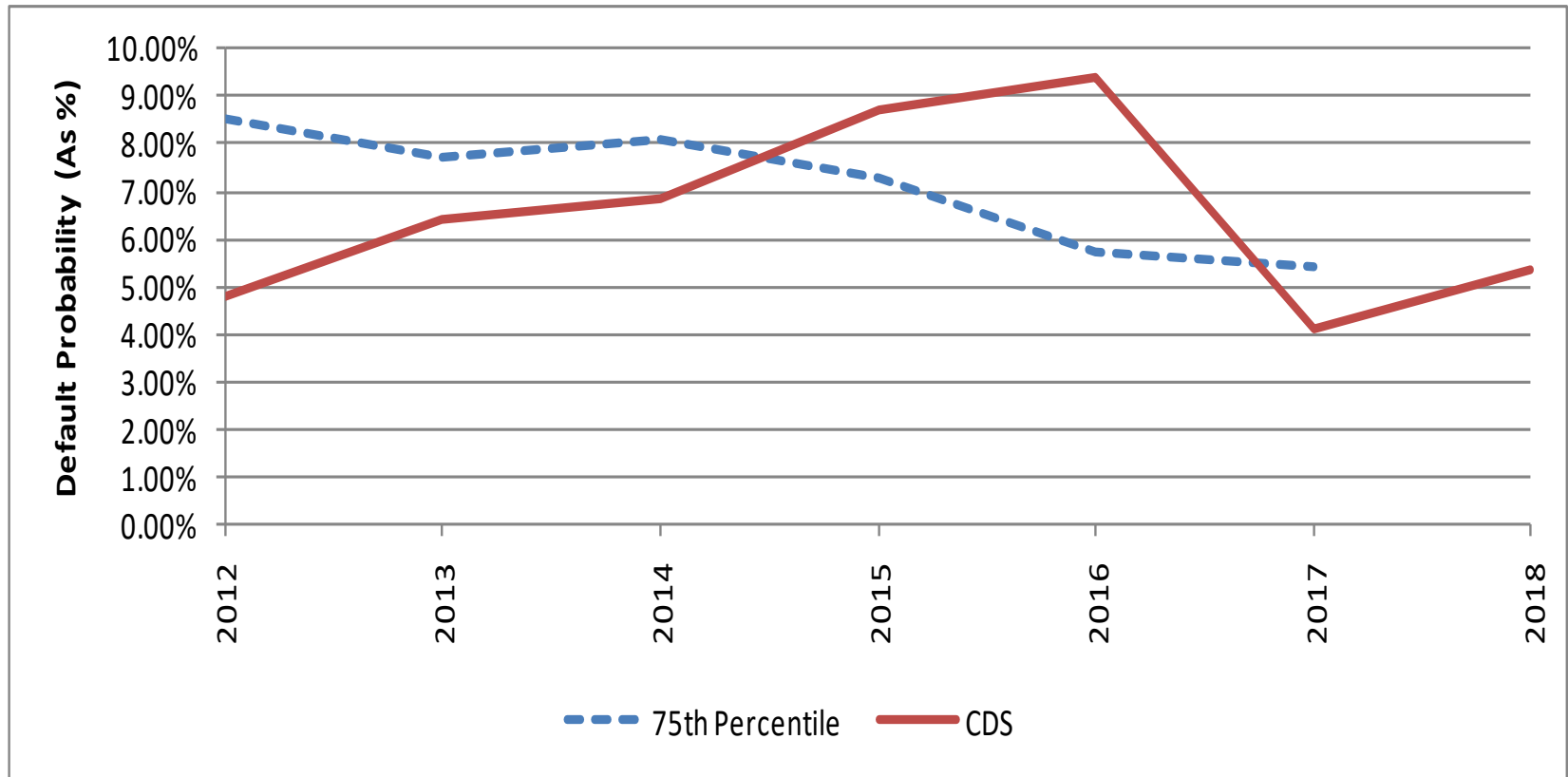


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

China, 2012 – 2018

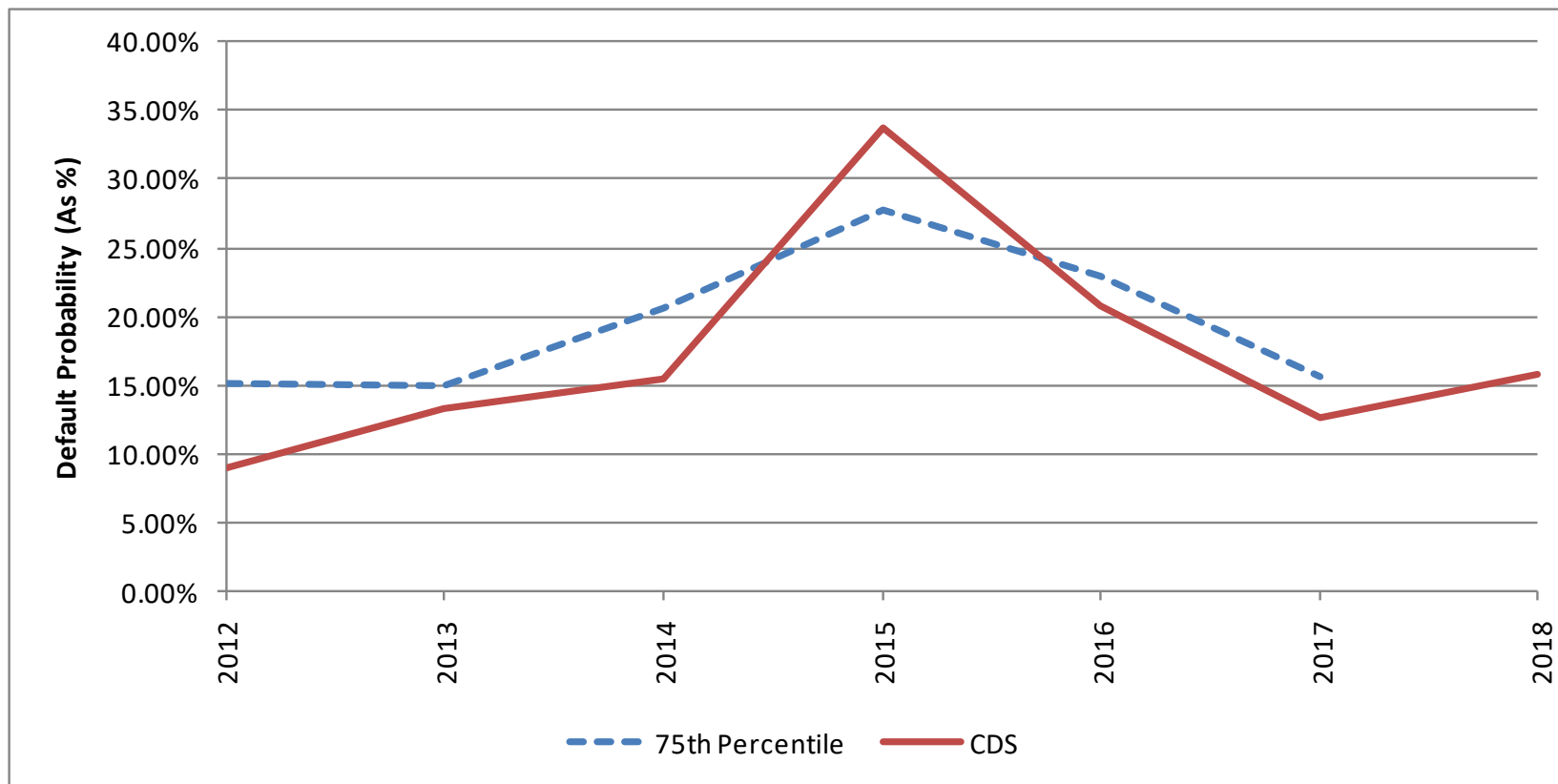


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Brazil, 2012 – 2018

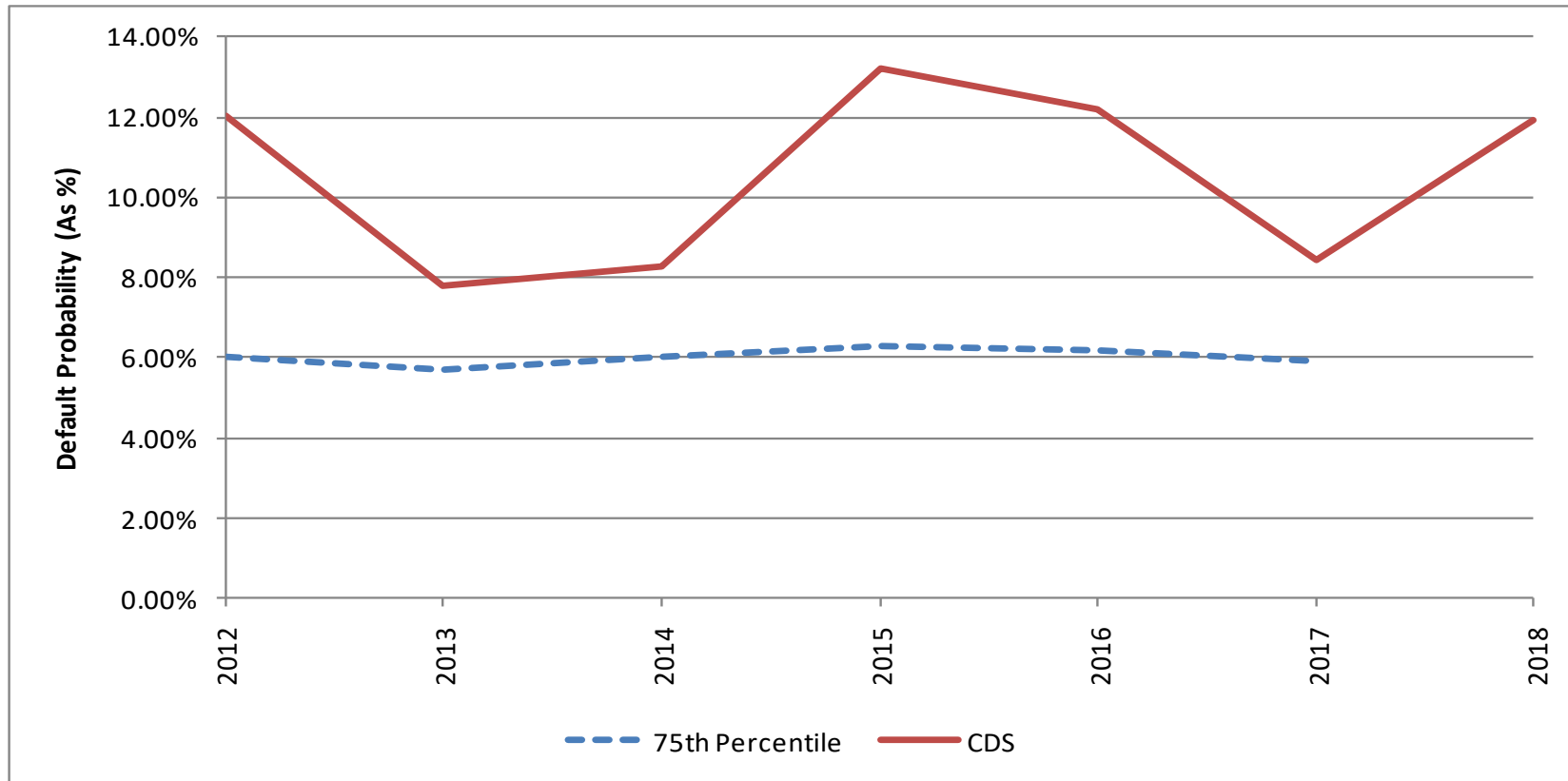


* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg

Five Year Implied Probabilities of Default (PD) From Sovereign CDS* Spreads vs 75th Percentile Corporate PD

Mexico, 2012 – 2018



* Assuming a 40% recovery rate (R); based on the median CDS spread (s). PD Computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg