

# APAC REGIONAL WEBINAR:

## COVID-19 and the Credit Cycle

### Speaker:

Edward I. Altman

Max L. Heine Professor, Emeritus at the New York University of Stern School of Business

### Session Chair:

Martin S. Fridson, CFA

Chief Investment Officer, Lehmann Livian Fridson Advisors LLC



CFA Institute



## **SESSION CHAIR**

**Martin S. Fridson, CFA**

Chief Investment Officer, Lehmann Livian Fridson  
Advisors LLC



## Housekeeping

- Today's webinar is scheduled for 60 minutes
- All participants are muted, we welcome questions via the Q&A function on your screen
- Audience can use CHAT to share comments and to see what others are saying
- This webinar will be recorded and be available to view after the presentation concludes
- At the end of the webinar, please take a moment to complete the short survey. Your feedback is valuable to us.



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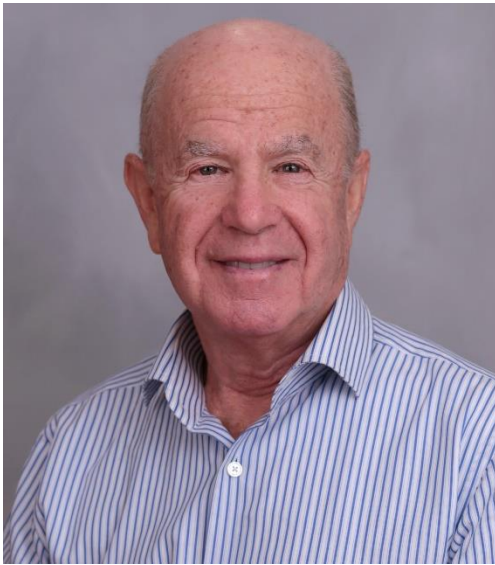
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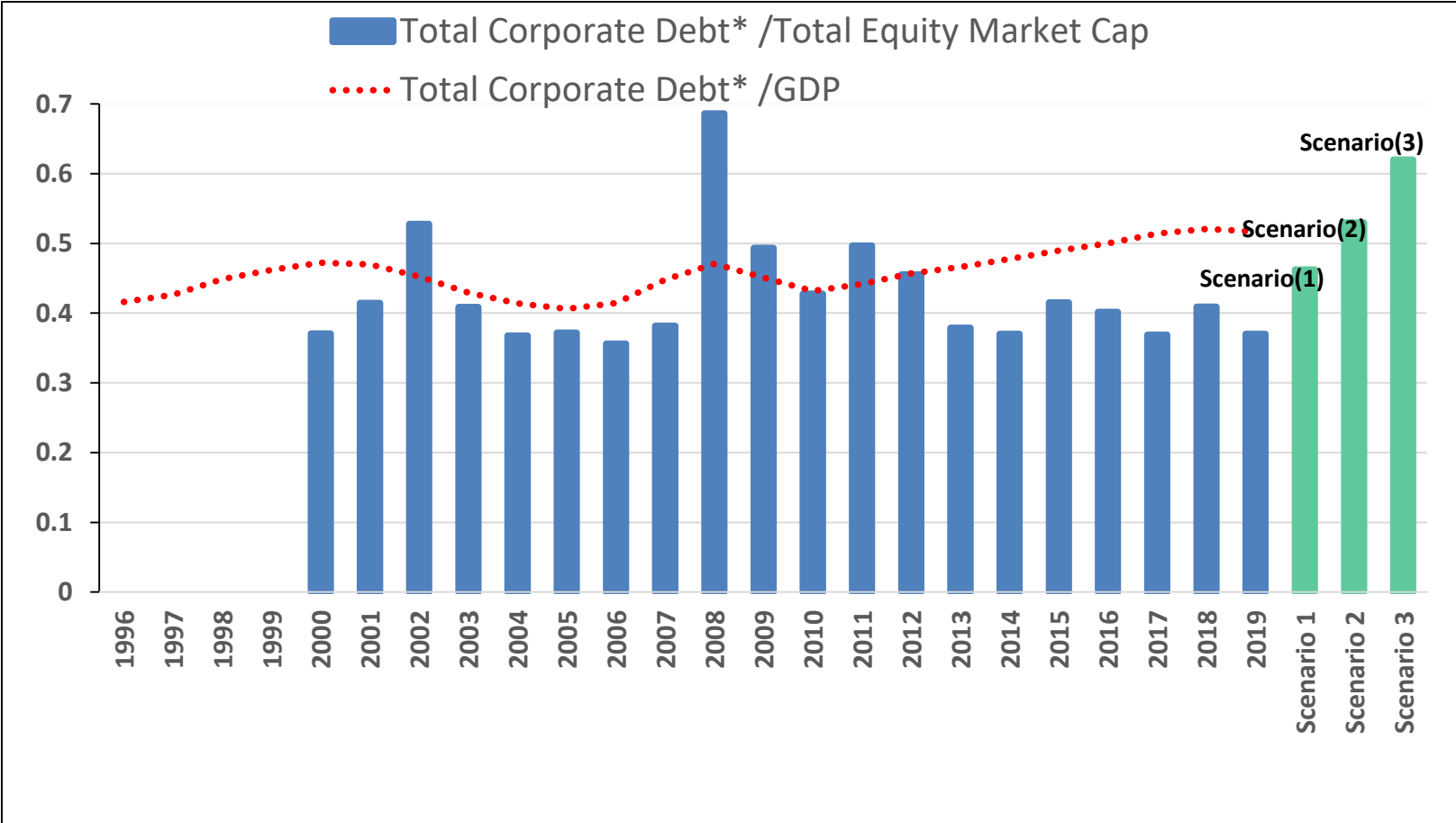
## SPEAKER

**Edward I. Altman**

Max L. Heine Professor of Finance,  
Emeritus, at the New York University  
Stern School of Business



# Figure 1: U.S. Total Non-Financial Corporate Debt as a Proportion of GDP and Market Cap of Equity



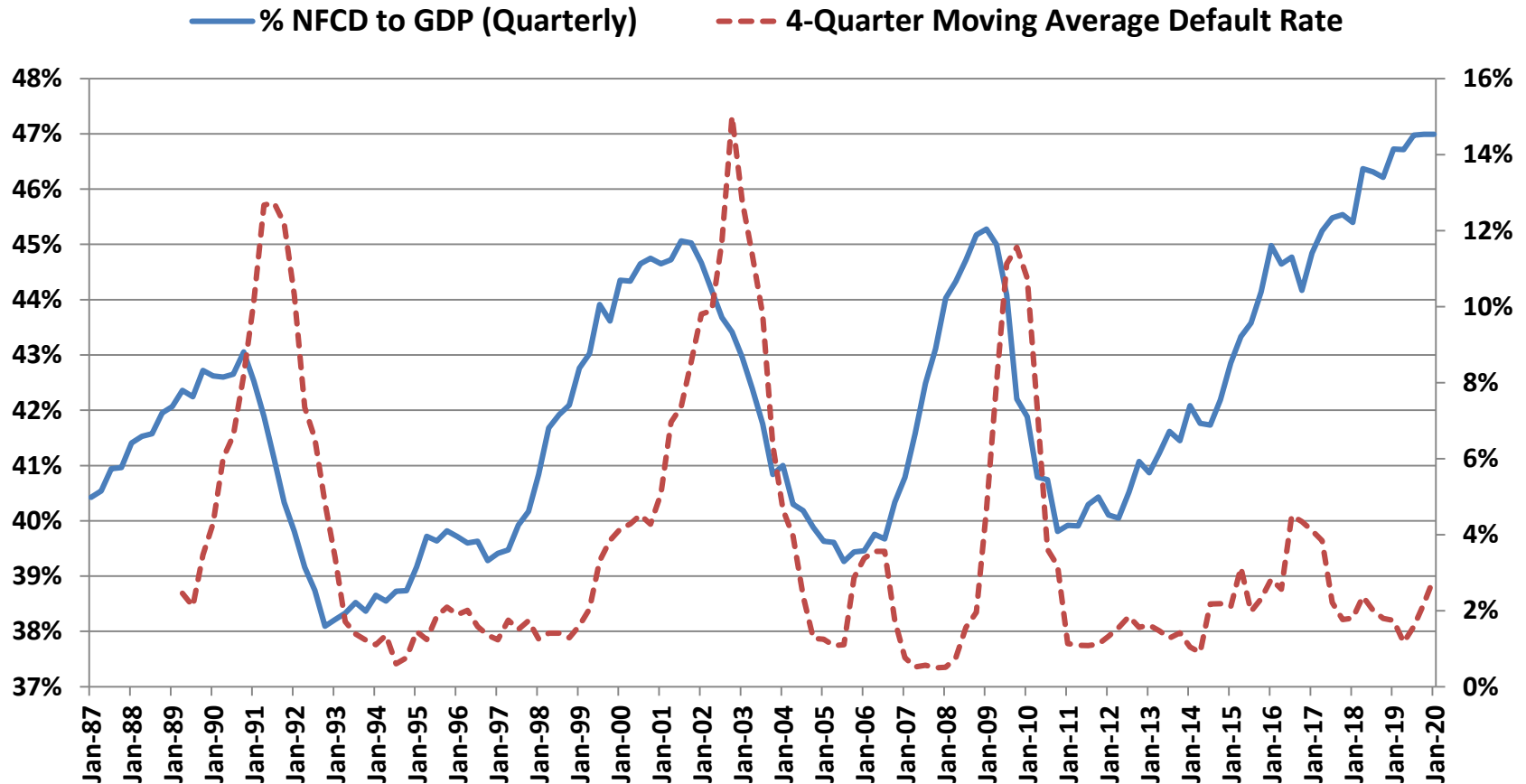
Sources: Bank of America, FRED, World Federation of Exchanges, Volatility & Risk Institute, NYU Stern

Scenario assumptions (1,2,3) – Equity Market Cap lower by 20%,30%,40%

\* Debt and Equity do not include financial firms; Market Cap includes NYSE and NASDAQ companies

# Figure 2: U.S. Non-financial Corporate Debt (Credit Market Instruments) to GDP: Comparison to 4-Quarter Moving Average Default Rate

January 1, 1987 – December 31, 2019

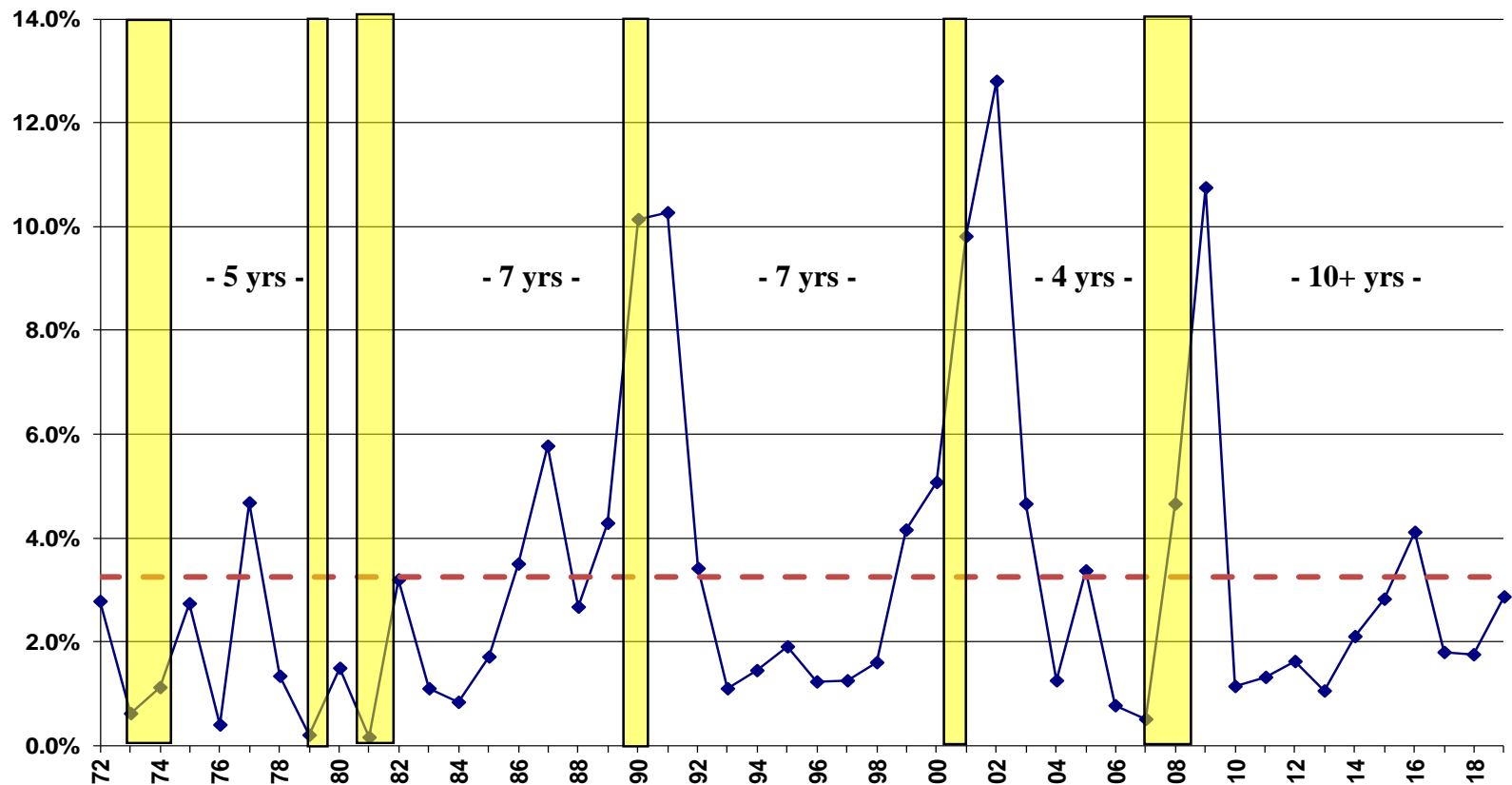


Sources: FRED, Federal Reserve Bank of St. Louis and KBRA/Altman High-Yield Default Rate data.



# Figure 3: Historical Default Rates, Benign Credit Cycles and Recession Periods in the U.S.\*

## High-Yield Bond Market (1972 – 2019)



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. All rates annual.

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

## Figure 4: Mortality Rates by Original Rating

All Rated Corporate Bonds\*  
1971-2019

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%	0.16%	0.04%	0.02%	0.01%	0.03%	0.03%	0.03%	0.04%
	Cumulative	0.00%	0.00%	0.16%	0.20%	0.22%	0.23%	0.26%	0.29%	0.32%	0.36%
A	Marginal	0.01%	0.02%	0.08%	0.09%	0.07%	0.03%	0.02%	0.21%	0.05%	0.02%
	Cumulative	0.01%	0.03%	0.11%	0.20%	0.27%	0.30%	0.32%	0.53%	0.58%	0.60%
BBB	Marginal	0.28%	2.23%	1.19%	0.94%	0.47%	0.19%	0.20%	0.20%	0.18%	0.30%
	Cumulative	0.28%	2.50%	3.66%	4.57%	5.02%	5.20%	5.39%	5.58%	5.75%	6.03%
BB	Marginal	0.88%	2.11%	3.77%	1.94%	2.36%	1.50%	1.40%	1.05%	1.36%	3.05%
	Cumulative	0.88%	2.97%	6.63%	8.44%	10.60%	11.94%	13.18%	14.09%	15.26%	17.84%
B	Marginal	2.82%	7.60%	7.70%	7.70%	5.70%	4.42%	3.66%	2.01%	1.68%	0.68%
	Cumulative	2.82%	10.21%	17.12%	23.50%	27.86%	31.05%	33.57%	34.91%	36.00%	36.44%
CCC	Marginal	8.03%	12.35%	17.64%	16.17%	4.85%	11.56%	8.37%	4.74%	0.59%	4.20%
	Cumulative	8.03%	19.39%	33.61%	44.34%	47.04%	53.16%	57.08%	59.12%	59.36%	61.07%

\*Rated by S&P at Issuance  
Based on 3,578 issues

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

## Figure 5: Default Rate Forecasts for U.S. High-Yield Bonds For 2020 and 2021

Forecaster	12 Month Ending April, 2021	Cumulative 2020 & 2021
E. Altman (NYU)	8-9%	-
Bank of America	9.6%	22.0%
Barclay's	9-10%	20.0%
Deutsche Bank	9.5%	-
Fitch	5-7%	12-15%
Moody's	6.8%-16.1%	-
S&P Global	10/13%	20.0%

Compilation by E. Altman, NYU

## Figure 6: 2020 Large Firm Bankruptcy Filings in the U.S. as of June 1<sup>st</sup> & Extrapolations \*

Number of Chapter 11s >\$50 million = 79  
Extrapolated Number for 2020 = 192  
Extrapolated Ranking 1989-2019 = (2nd)  
All Time Highest Ranking (2009) = (242)

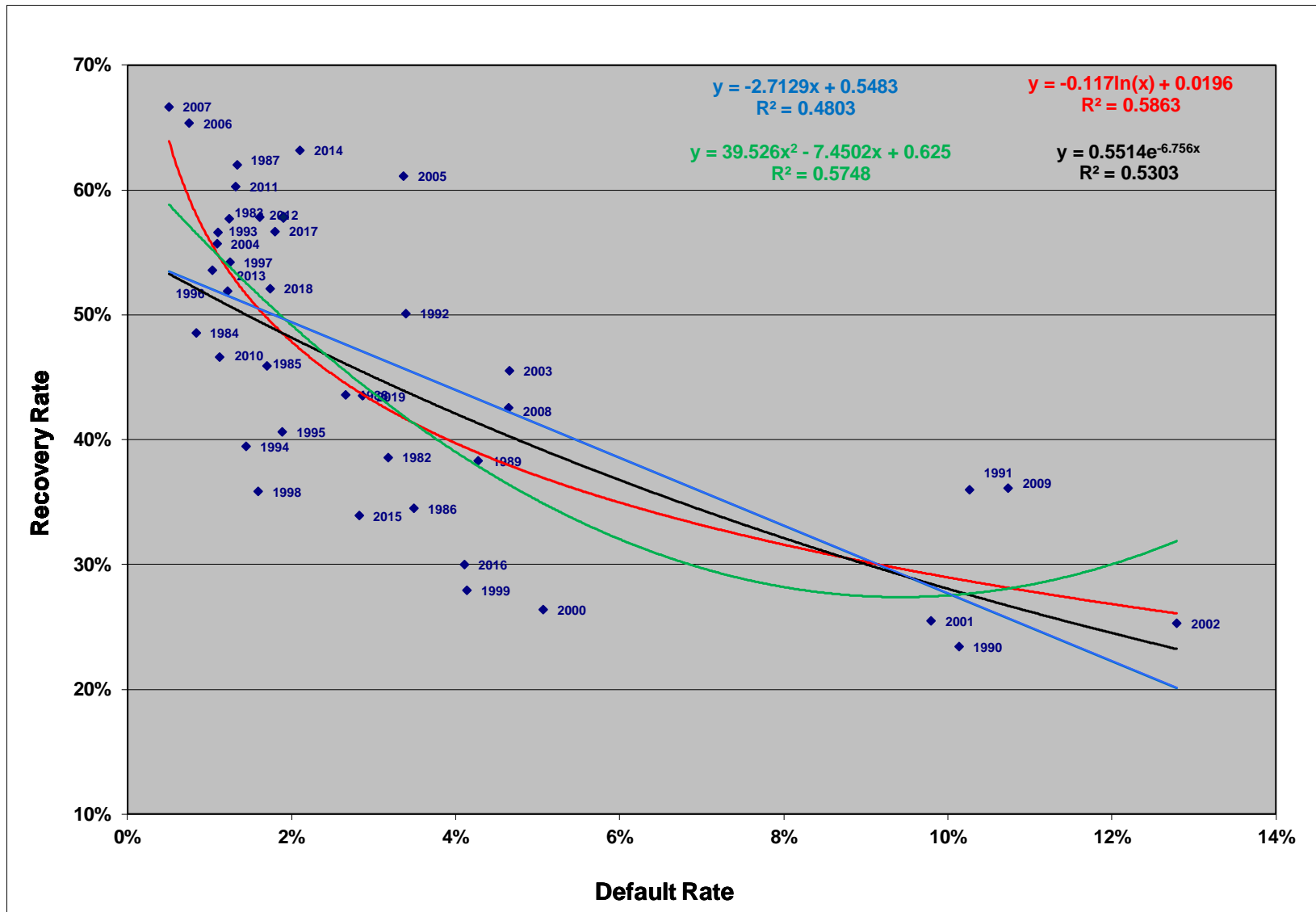
Number of Chapter 11s > \$1 billion = 27  
Extrapolated Number for 2020 = 66  
Extrapolated Ranking 1989-2019 = (1st)  
Next highest year (2009) = 49

Historic Yearly Average 1989-2019 = 17  
Historic Yearly Median 1989-2019 = 20

Source: E. Altman (NYU Stern Salomon Center) and KBRA, using data from New Generation Research, Boston, MA.

\* Includes firms with > \$ 50 million and > \$1 billion in Liabilities

**Figure 7: Recovery Rate/Default Rate Association: Dollar-Weighted Average Recovery Rates to Dollar Weighted Average Default Rates, 1982 – 2019**



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

# Figure 8: U.S. BBB Rated Bonds Outstanding, 2005-2018



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

## Figure 9: Z-Score Component Definitions and Weightings

Variable	Definition	Weighting Factor
$X_1$	$\frac{\text{Working Capital}}{\text{Total Assets}}$	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

**Figure 10: Median Z-Score by S&P Bond Rating for U.S. Manufacturing Firms: 1992 - 2017**

<b>Rating</b>	<b>2017 (No.)</b>	<b>2013 (No.)</b>	<b>2004-2010</b>	<b>1996-2001</b>	<b>1992-1995</b>
<b>AAA/AA</b>	<b>4.20 (14)</b>	<b>4.13 (15)</b>	<b>4.18</b>	<b>6.20*</b>	<b>4.80*</b>
<b>A</b>	<b>3.85 (55)</b>	<b>4.00 (64)</b>	<b>3.71</b>	<b>4.22</b>	<b>3.87</b>
<b>BBB</b>	<b>3.10 (137)</b>	<b>3.01 (131)</b>	<b>3.26</b>	<b>3.74</b>	<b>2.75</b>
<b>BB</b>	<b>2.45 (173)</b>	<b>2.69 (119)</b>	<b>2.48</b>	<b>2.81</b>	<b>2.25</b>
<b>B</b>	<b>1.65 (94)</b>	<b>1.66 (80)</b>	<b>1.74</b>	<b>1.80</b>	<b>1.87</b>
<b>CCC/CC</b>	<b>0.73 (4)</b>	<b>0.23 (3)</b>	<b>0.46</b>	<b>0.33</b>	<b>0.40</b>
<b>D</b>	<b>-0.10 (6)<sup>1</sup></b>	<b>0.01 (33)<sup>2</sup></b>	<b>-0.04</b>	<b>-0.20</b>	<b>0.05</b>

\*AAA Only.

<sup>1</sup> From 1/2014-11/2017, <sup>2</sup>From 1/2011-12/2013.

Sources: S&P Global Market Intelligence's *Compustat* Database, mainly S&P 500 firms, compilation by NYU Salomon Center, Stern School of Business.



## Figure 11: Z" Score Model for Manufacturers, Non-Manufacturer Industrials; Developed and Emerging Market Credits (1995)

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

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

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

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

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

## Figure 12: US Bond Rating Equivalents Based on Z"-Score Model

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

Rating	Median 1996 Z''-Score <sup>a</sup>	Median 2006 Z''-Score <sup>a</sup>	Median 2013 Z''-Score <sup>a</sup>
AAA/AA+	8.15 (8)	7.51 (14)	8.80 (15)
AA/AA-	7.16 (33)	7.78 (20)	8.40 (17)
A+	6.85 (24)	7.76 (26)	8.22 (23)
A	6.65 (42)	7.53 (61)	6.94 (48)
A-	6.40 (38)	7.10 (65)	6.12 (52)
BBB+	6.25 (38)	6.47 (74)	5.80 (70)
BBB	5.85 (59)	6.41 (99)	5.75 (127)
BBB-	5.65 (52)	6.36 (76)	5.70 (96)
BB+	5.25 (34)	6.25 (68)	5.65 (71)
BB	4.95 (25)	6.17 (114)	5.52 (100)
BB-	4.75 (65)	5.65 (173)	5.07 (121)
B+	4.50 (78)	5.05 (164)	4.81 (93)
B	4.15 (115)	4.29 (139)	4.03 (100)
B-	3.75 (95)	3.68 (62)	3.74 (37)
CCC+	3.20 (23)	2.98 (16)	2.84 (13)
CCC	2.50 (10)	2.20 (8)	2.57(3)
CCC-	1.75 (6)	1.62 (-) <sup>b</sup>	1.72 (-) <sup>b</sup>
CC/D	0 (14)	0.84 (120)	0.05 (94) <sup>c</sup>

<sup>a</sup>Sample Size in Parantheses. <sup>b</sup>Interpolated between CCC and CC/D. <sup>c</sup>Based on 94 Chapter 11 bankruptcy filings, 2010-2013.  
Sources: Compustat, Company Filings and S&P.

## Figure 13: Downgrade Vulnerability of BBB Rated Bonds Based On Z-Score As Of 2019

### Z-Score Determined Bond Rating Equivalents Of BBB Rated Bonds

- From BBB to BB 57/298 (19%)
- From BBB to B 45/298 (15%)
- Total 102/298 (34%)

### Z''-Score Determined Bond Rating Equivalents Of BBB Rated Bonds

- From BBB to BB 78/371 (21%)
- From BBB to B 56/371 (15%)
- Total 134/371 (36%)

Source: Author's computations from *Capital IQ* data

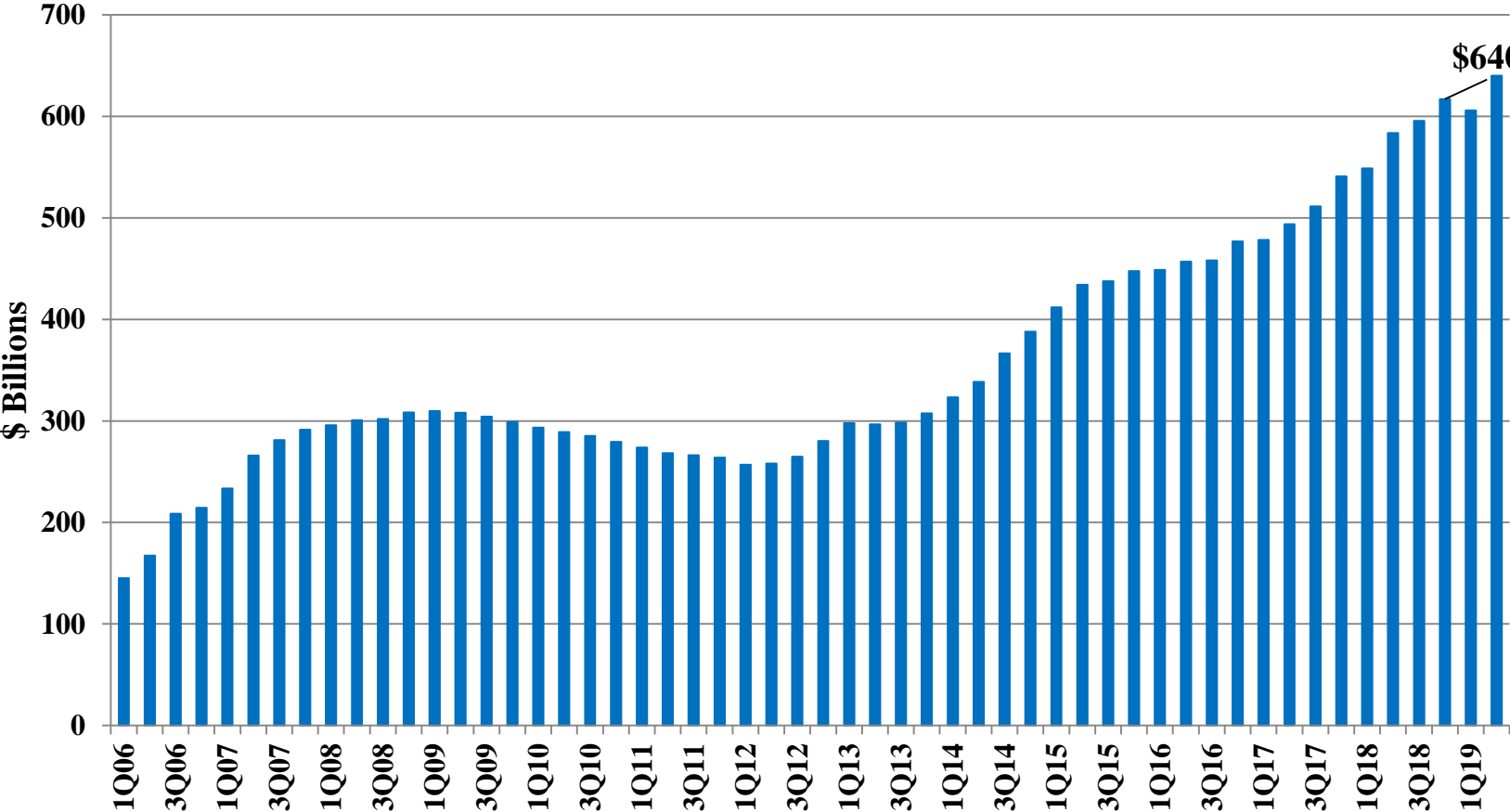
## Figure 14: Fallen Angel Z And Z"-Scores And Their Bond Rating Equivalent (BRE): May 2020

General Information				Financial Information				
Issuer Name	Ticker	Industry	Face Downgrade \$M	Date Of Data	Z-Score	Z-Score BRE	Z"-Score	Z"-Score BRE
Ford Motor	F	Autos	\$34,572	12/31/2019	0.91	CC+	4.13	B
Occidental Petroleum	OXY	Energy	\$29,059	12/31/2019	0.80	CC	4.71	B+
Western Midstream Partners	WES	Energy	\$7,820	12/31/2019	0.77	CC	3.95	B
Continental Resources	CLR	Energy	\$5,300	12/31/2019	1.54	B-	5.73	BBB
Cenovus Energy	CVECN	Energy	\$4,781	12/31/2019	1.39	CCC+	5.18	BB-
Delta Air Lines	DAL	Transportation	\$4,100	12/31/2019	1.30	CCC+	3.04	CCC+
Macy's	M	Retail	\$2,456	11/02/2019	2.05	B+	5.63	BB+
ZF NA Capital	ZFFNGR	Autos	\$1,699	12/31/2019	-	-	5.15	BB-
Methanex	MXCN	Chemicals	\$1,550	12/31/2019	1.28	CCC+	5.30	BB
Adani Abbot Point Terminal	ADAABB	Transportation	\$500	03/31/2019	-	-	3.87	B-
Marks & Spencer	MARSPE	Retail	\$300	09/28/2019	2.36	BB	5.76	BBB
Pemex	PEMEX	Energy	\$58,621	12/31/2019	-	-	-2.93	D
Rockies Express Pipeline	ROCKIE	Energy	\$2,050	12/31/2019	-	-	5.37	BB+
Royal Caribbean Cruises	RCL	Leisure	\$1,450	12/31/2019	1.81	B+	4.25	B
Trinidad Generation	TRNGEN	Utility	\$600	12/31/2019	-	-	5.68	BBB-
Growthpoint Properties	GRTSJ	Real Estate	\$425	12/31/2019	0.81	CCC	5.02	BB
Hillenbrand	HI	Capital Goods	\$375	12/31/2019	1.37	B-	4.94	BB
Rolls Royce	RR.	Capital Goods	\$6,117	12/31/2019	0.46	CCC-	2.67	CCC
Service Properties Trust	SVC	Real Estate	\$5,680	12/31/2019	0.78	CCC	3.99	B

Source: E. Altman, NYU Salomon Center

# Figure 15: U.S. CLOs Outstanding

1Q 2006 – 2Q 2019



Sources: 2006-2018: SIFMA, from Figure 1 of Liu, Emily and Tim Schmidt-Eisenlohr (2019). “Who Owns U.S. CLO Securities?,” FEDS Notes. Washington: Board of Governors of the Federal Reserve System, July 19, 2019, <https://doi.org/10.17016/2380-7172.2423>. 1Q19 from SIFMA data. 2Q19 from Bank of America.

## Figure 16: Financial Profile Of Low-Rated Bonds And Their Z-Score Default Prediction

Companies Rated B-, CCC+, CCC, Or CCC- And Their Z-Score Default Prediction: December 2019											
S&P Rating	Sample Size	Z-Score BRE Of D	% Rating With BRE Of D	EBIT / Interest BRE Of D				EBITDA / Interest BRE Of D			
				< 1.0	1.0-1.5	1.5-2.0	> 2.0	< 1.0	1.0-1.5	1.5-2.0	> 2.0
B-	59	12	20.3%	10	-	1	1	4	2	1	5
CCC+	21	7	33.3%	6	-	1	-	3	1	1	2
CCC	9	3	33.3%	2	1	-	-	2	1	-	-
CCC-	8	4	50.0%	3	-	1	-	2	1	-	1
<b>Total</b>	<b>97</b>	<b>26</b>	<b>26.8%</b>	<b>21</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>11</b>	<b>5</b>	<b>2</b>	<b>8</b>

Source: E. Altman, NYU Salomon Center

## Figure 17: Financial Profile Of Low-Rated Bonds And Their Z"-Score Default Prediction

Companies Rated B-, CCC+, CCC, Or CCC- And Their Z"-Score Default Prediction: December 2019											
S&P Rating	Sample Size	Z"-Score BRE Of D	% Rating With BRE Of D	EBIT / Interest BRE Of D				EBITDA / Interest BRE Of D			
				< 1.0	1.0-1.5	1.5-2.0	> 2.0	< 1.0	1.0-1.5	1.5-2.0	> 2.0
B-	67	8	11.9%	6	-	-	2	3	2	1	2
CCC+	23	3	13.0%	3	-	-	-	2	-	1	-
CCC	9	1	11.1%	1	-	-	-	1	-	-	-
CCC-	9	4	44.4%	3	-	1	-	3	-	-	1
<b>Total</b>	<b>108</b>	<b>16</b>	<b>14.8%</b>	<b>13</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>9</b>	<b>2</b>	<b>2</b>	<b>3</b>

Source: Author Compilation From Capital IQ Data

# APAC REGIONAL WEBINAR:

## COVID-19 and the Credit Cycle

### Q & A Session



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