COVID-19 Market Meltdown: Is Your Institution Prepared?

Implications for Credit Loss and Loan Impairment

AXIOM VALUATION

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Stan is the chief valuation officer for the company and is an expert in the valuation of private and public firms. Stan was a tenured Associate Professor of Finance at Bentley University (retired) and prior to his academic appointment Stan was Chief Microeconomist at Data Resources. In this capacity he was responsible for analyzing and forecasting industry performance for a client base that included Wall Street firms and financial institutions.

He is an expert in the valuation of complex financial securities, including thinly traded equity and fixed income instruments, and public and privately held businesses. He was a member of the Financial Accounting Standards Board's (FASB) Valuation Resources Group, an external advisory committee on valuation issues.

Stan received a B.A. in Economics from the City University of New York, Hunter College, a M.A. in Economics from the New School for Social Research, and a Ph.D. in Economics from New York University.

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John M. Byrne is a Managing Director at Axiom Valuation Solutions, Arizona. A Certified Public Accountant with over 30 years experience, he has practiced with local and regional CPA firms where he provided business valuation services required for M&A transactions, financial reporting, income tax compliance, litigation, bankruptcy, and shareholder disputes. John has also participated in numerous due diligence and transaction advisory services providing expertise in strategic value and quality of earnings.

John received a bachelor's degree from Ohio University, and a master's degree in accounting and Financial Information Systems from Cleveland State University. John has served as a seminar leader for various state and local bar associations' continuing legal education programs, lecturing on various business appraisal topics and exit planning strategies. He is a member of the American Institute of Certified Public Accountants, the Arizona Society of Certified Public Accountants, and the American Society of Appraisers. John received the Accredited in Business Valuation designation (ABV) awarded by the AICPA in 1998.

About Axiom Valuation Solutions

Axiom Valuation Solutions is a nationally recognized financial security and business valuation firm. We have conducted valuation assignments for clients throughout the U.S., Europe and Asia. We regularly conduct fair value assignments for financial institutions in terms of fair valuing portfolio assets and liabilities as well as acting as an advisor and assessing whether internal transfers between funds meet the fair value standard. Our Co-founder and Chairman, Dr. Stanley Jay Feldman, was a member FASB's Valuation Resource Group, an advisory group to FASB on fair value issues.

For more information, please visit
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Attendees will Learn About

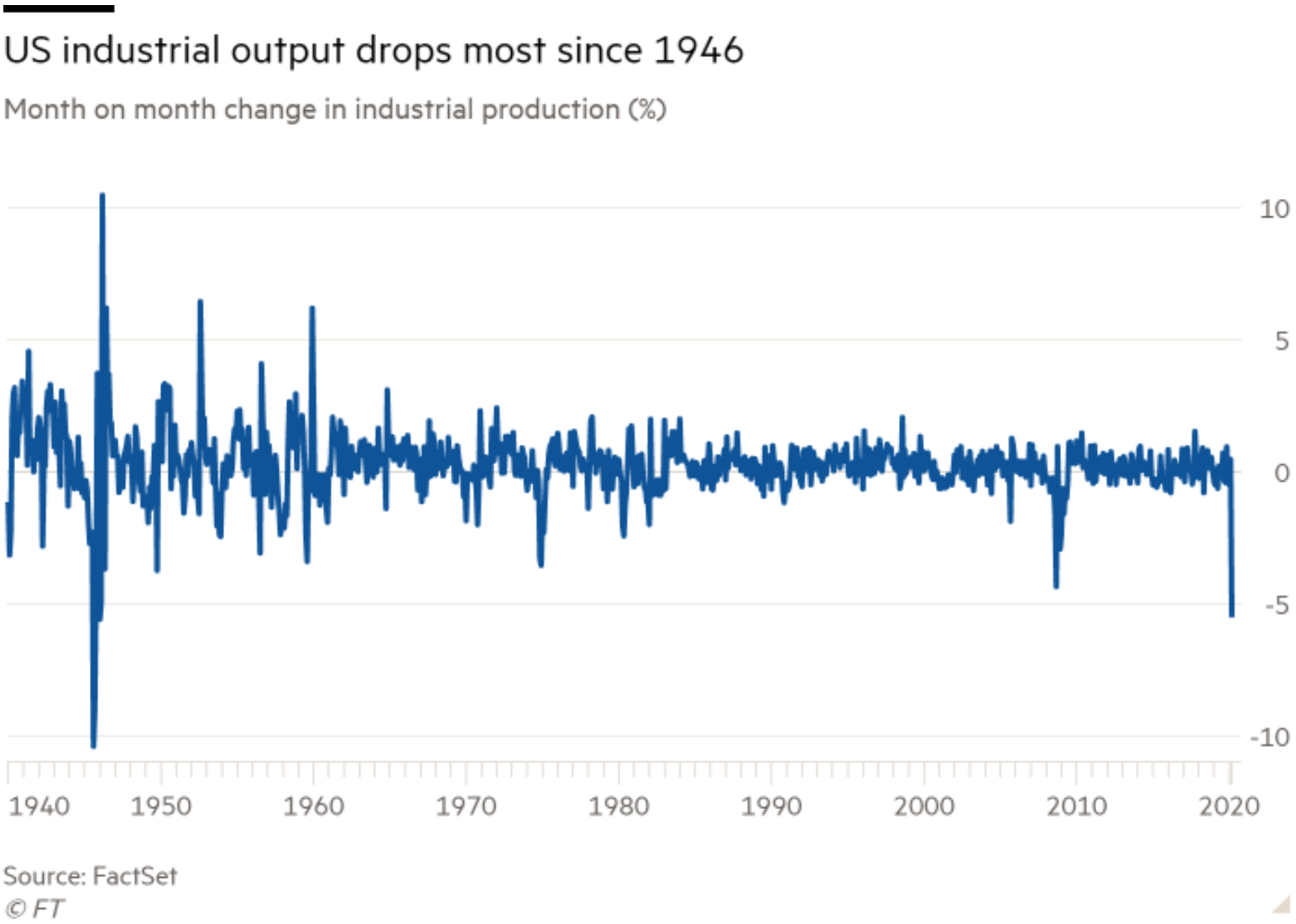
1. The current state of the credit markets, and the implications for loan defaults in the next 12 months

AND

2. How best to apply fair value metrics to:
   - Account for loan impairment
   - Account for credit quality markdowns

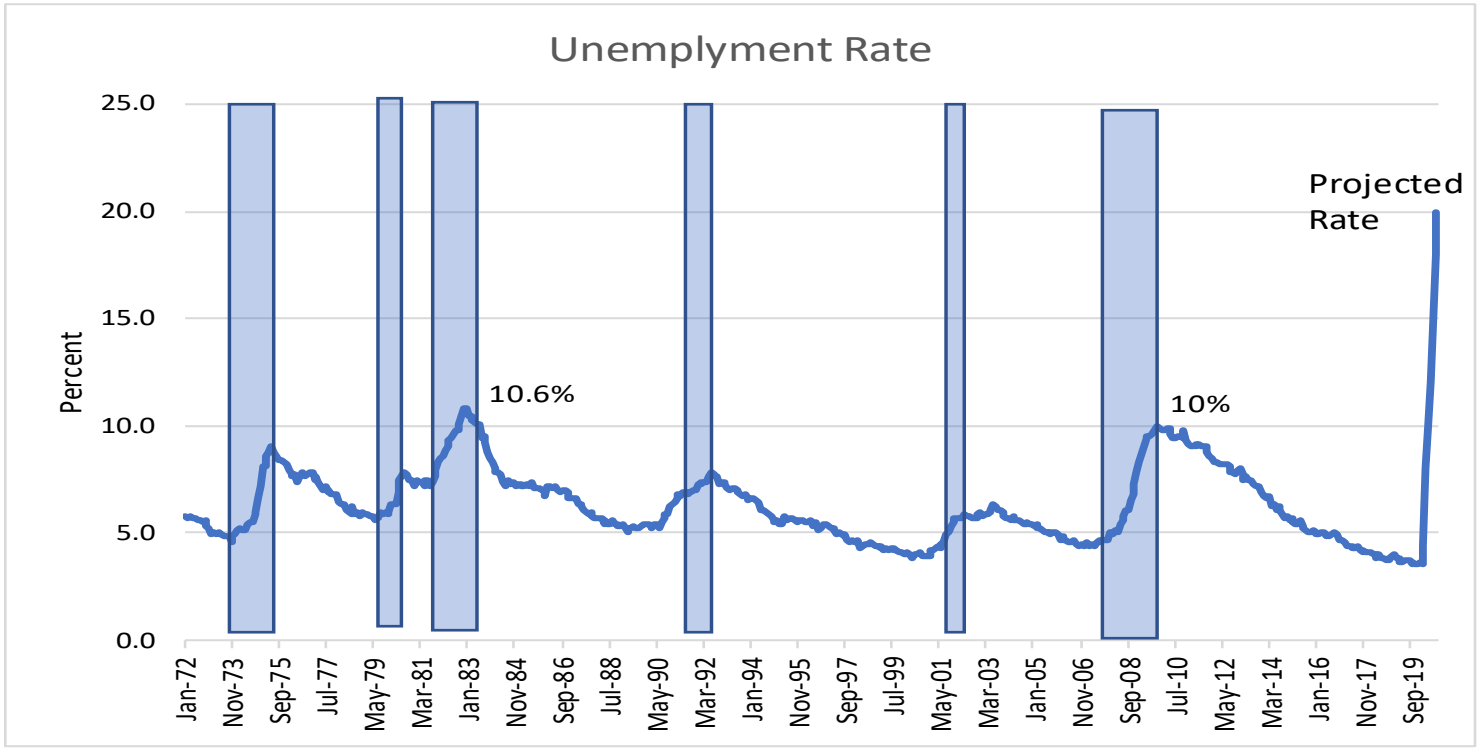
The Largest Economic Downturn Since the Great Depression Will Result in a Double-Digit Default Rate

Unprecedented Drop in Industrial Production



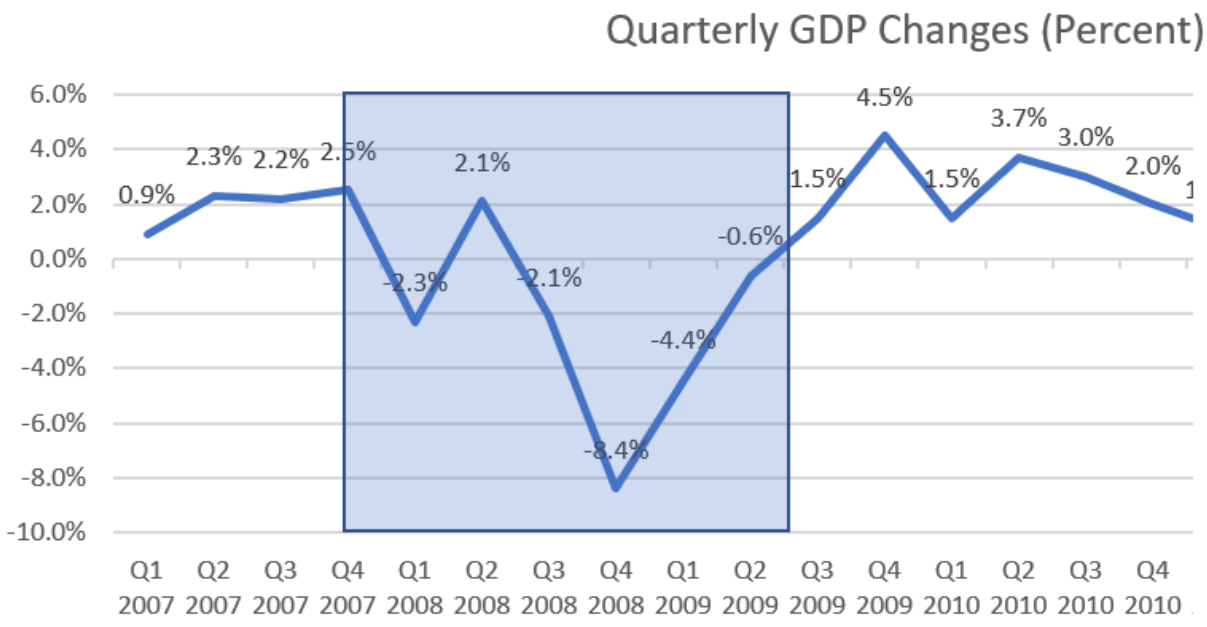
A Significant Recession is Anticipated – Large Rise in Unemployment

	Feb-20
Civilian Labor Force	164,546,000
Unemployed	5,787,000
Unemployment Rate	3.5%
Expected Increase in Unemployed (by end of 2nd Qtr 2020)	20-27 million
Expected Unemployment	15-20%

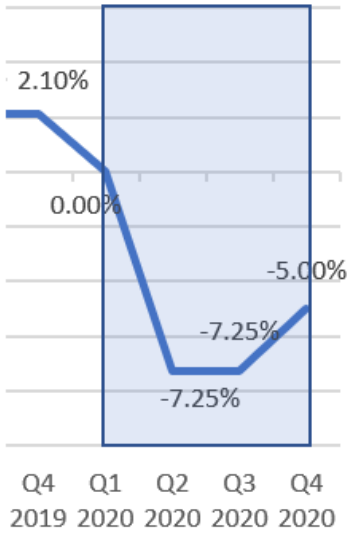


A Significant Recession is Anticipated – Large Decrease in GDP

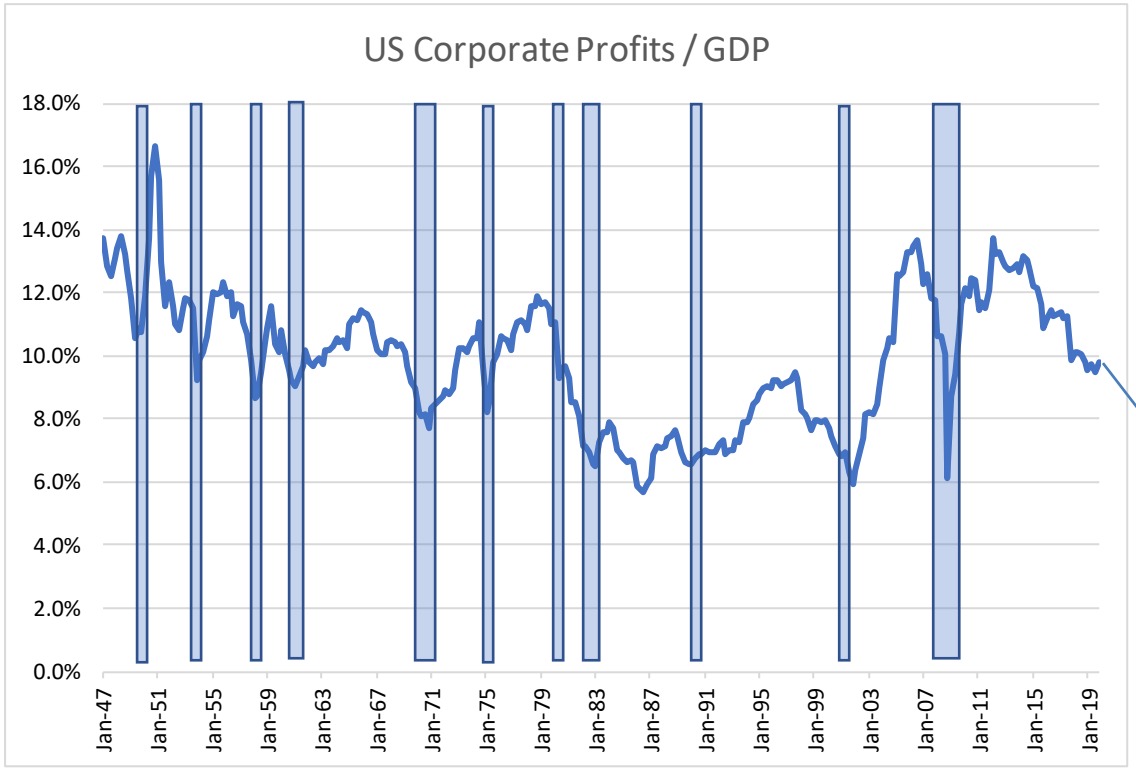
Expected Quaterly GDP Change	
2020 Q1	0.00%
2020 Q2	-7.25%
2020 Q3	-7.25%
2020 Q4	-5.00%



2008 Financial Crisis



Before Tax Profits to GDP Decline Dramatically During Severe Economic Downturns

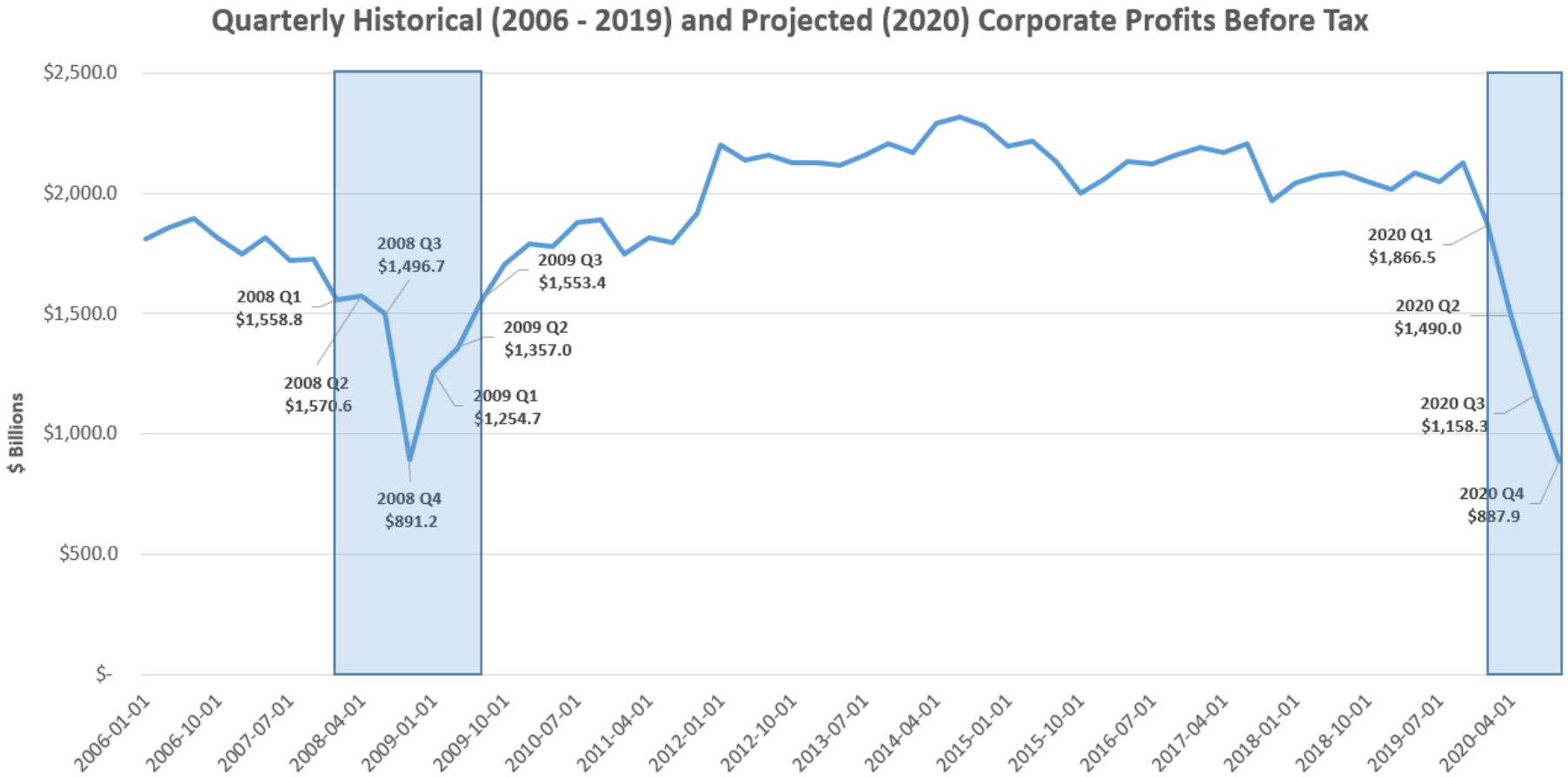


Ratio in 2020 is 5% or a 38% decline

Shaded bars are recession periods
US Corporate Profits before Tax

Source: Economic Research Division
Federal Reserve Bank of St. Louis

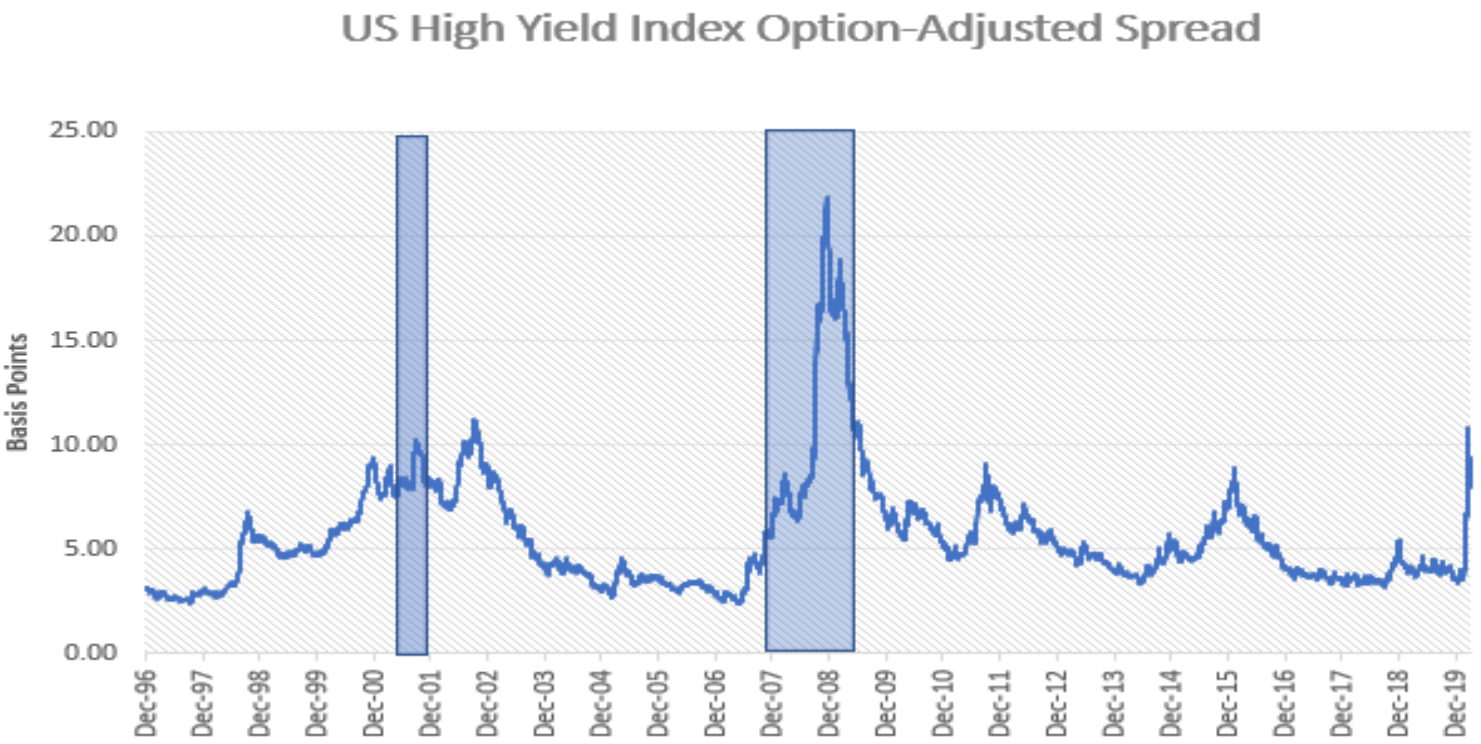
The Decline in Before Tax Corporate Profits in 2020 will be Dramatic



* 1) Shaded bars represented economic recession periods.
2) The quarterly corporate profits before tax between 2006 and 2019 were sourced from Federal Reserve Bank of St. Louis, Federal Reserve Economic Data. The 2020 corporate profits before tax were estimated based on prior assumed GDP quarterly decrease and the corporate profits to GDP ratio, which was assumed to decrease linearly from 9.8% to 5.0% over four quarters.

Source: Federal Reserve Bank of St. Louis, Federal Reserve Economic Data

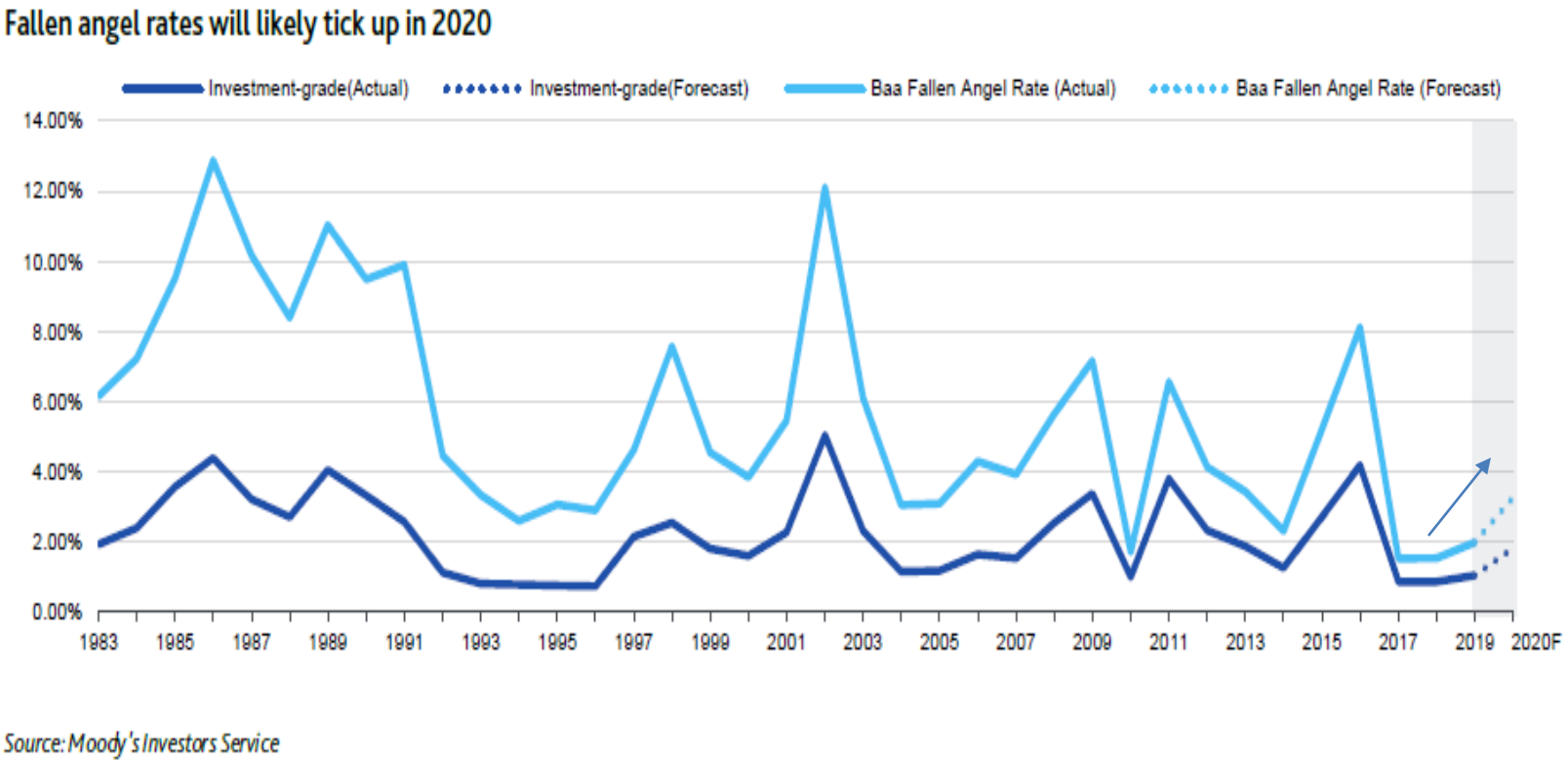
The Credit Spreads Widen Signaling Recession



Shaded bars are recession periods

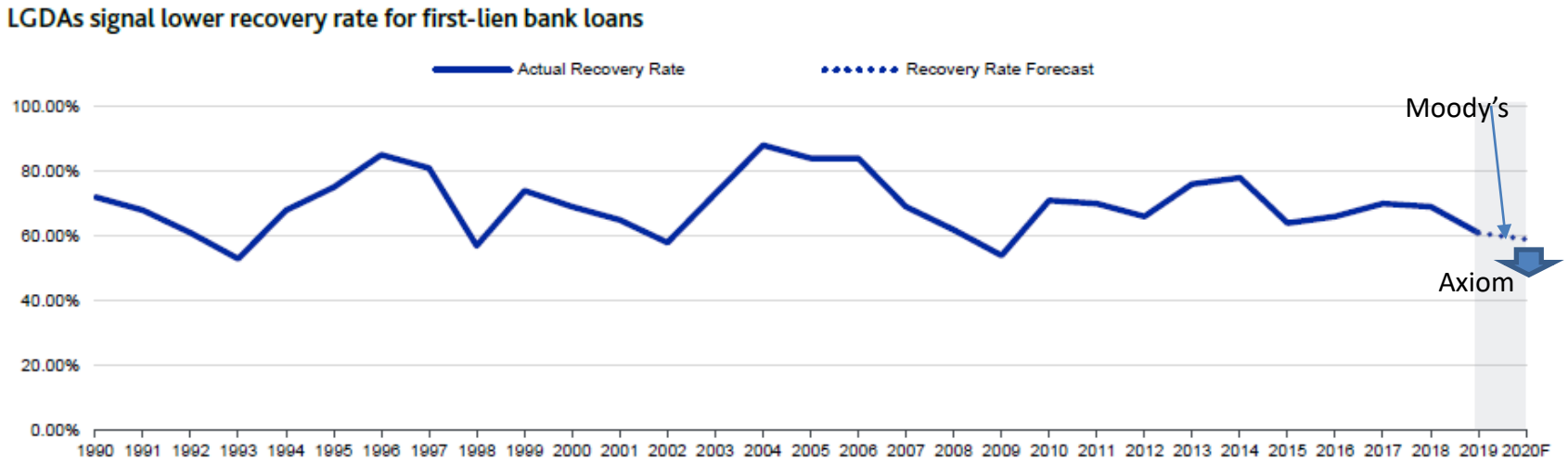
Source: St. Louis Fed, ICE BofA US High Yield Index Option-Adjusted Spread (BAMLH0A0HYM2)

Even before the COVID-19 Pandemic, spreads on fallen angels began to widen.



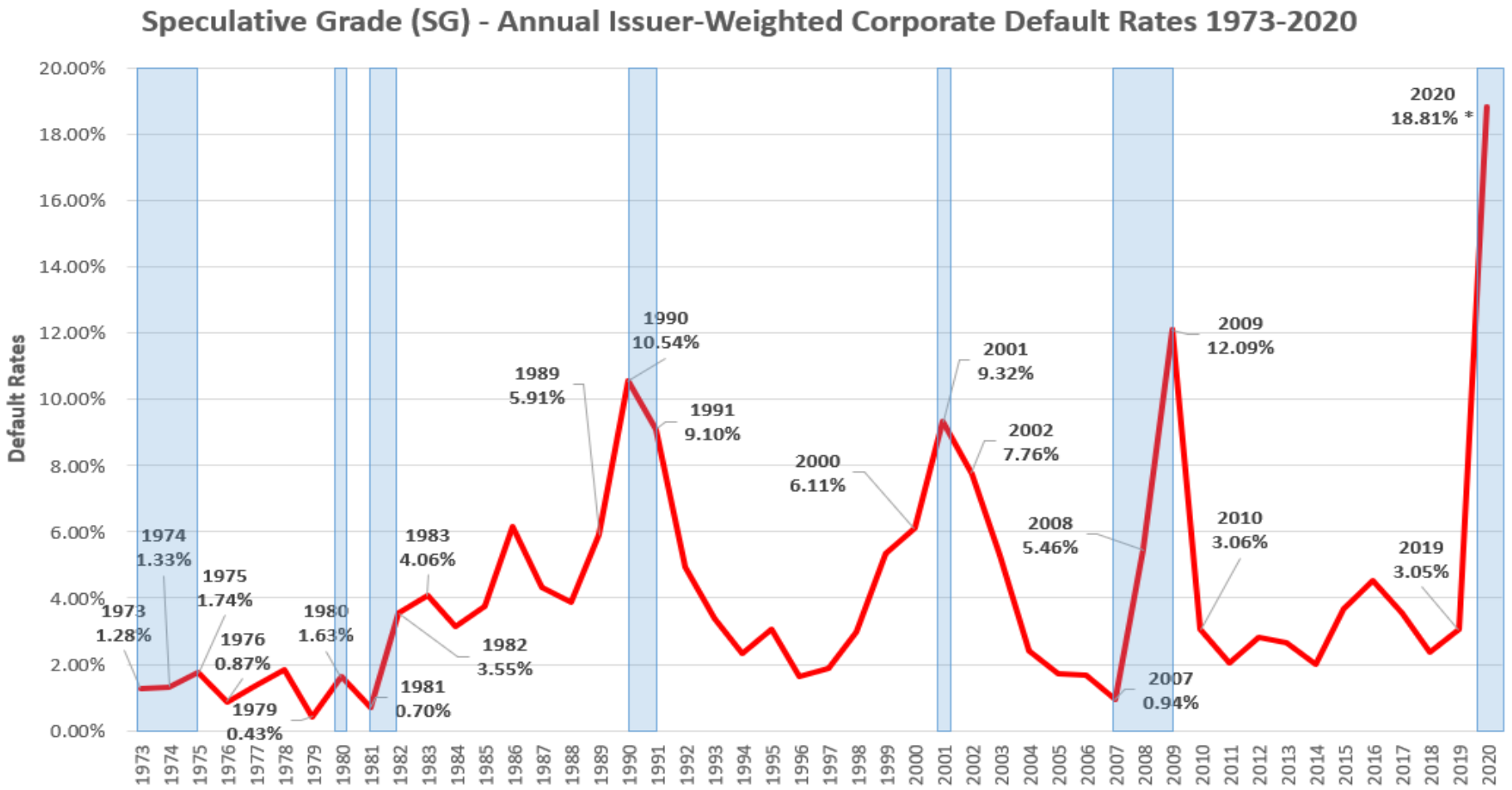
Source: Moody's Investors Service

Loan Recovery Rates – Projected to Decline



Source: Moody's Investors Service

Default Rates Rise Dramatically During Severe Economic Downturns Along with Significantly Lower Recovery Rates



* 1) Shaded bars represented economic recession periods.
2) 2020 default rate was estimated based on available data as of 3/31/2020 with following formula:
Credit Spread = (1 - Recovery Rate) * Default Rate
a) 10-year B rated non-financial credit spread (9.4%) from Capital IQ used as a proxy for that of SG corporate financial instruments.
b) Based on historical data and the recovery rate trend, 50% was assumed for the estimation.

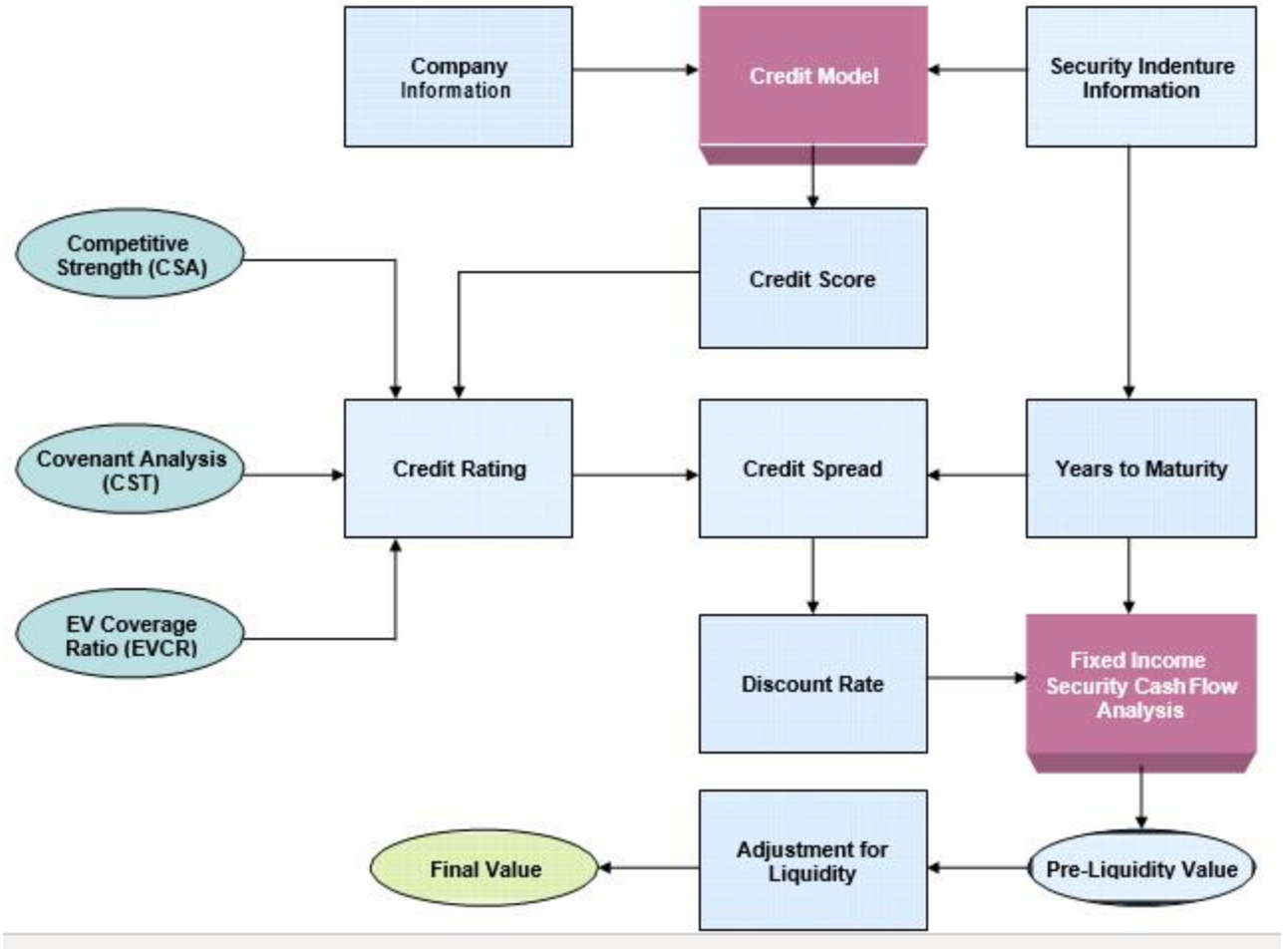
Source: Moody's Investors Service, Default Trends - Global: Annual Default Study: Defaults will Edge Higher in 2020, 30 January 2020

The Axiom Credit Platform

Risk Management and Financial Reporting Tool

- Estimate the fair value of a specific loan or pool of loans for accounting and disclosure requirements
- Based on a synthetic credit rating using four, company specific variables

Axiom Valuation's Credit Rating Platform



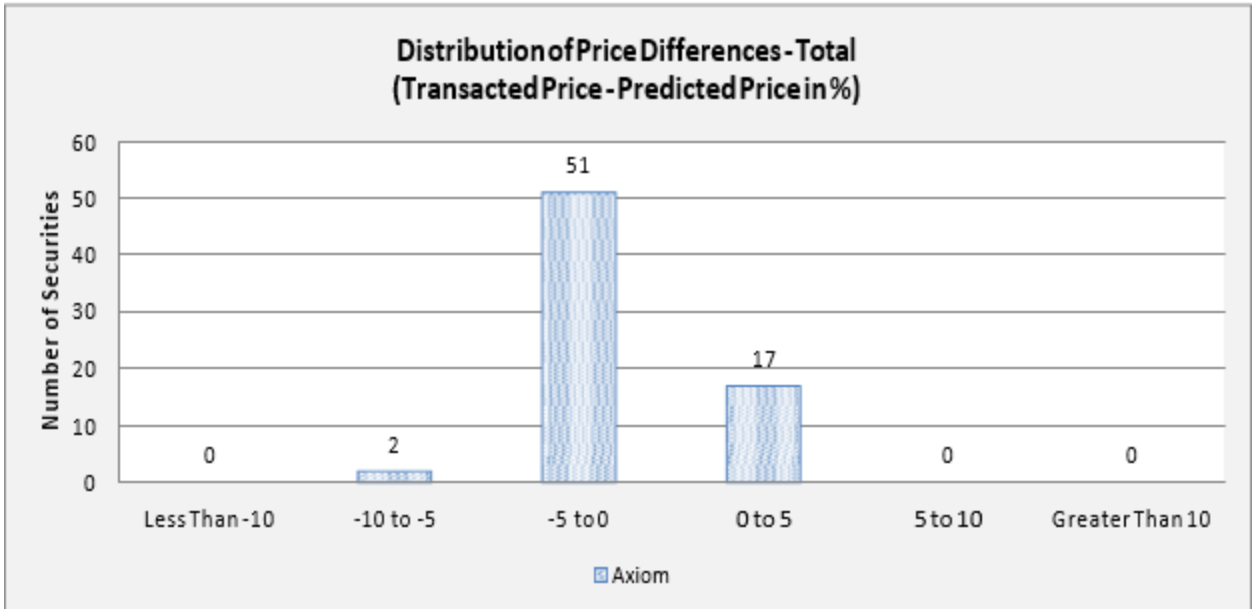
Axiom Valuation's Credit Rating Incorporates Multiple Factors but Four are Critical and Have Been Shown to Accurately Predict Credit Quality

Axiom Credit Rating Platform

Variable	Standardized Coefficient Relative Strength	T - Statistics
Unlevered Beta	1	4.0322
Long-term Debt to Book Value of Equity Ratio	2	5.8506
Revenue	3	(9.9701)
Free Operating Cash Flow to Revenue Ratio	4	(4.7869)

Unlevered beta (or asset **beta**) measures the market risk of the company without the impact of debt. Unlevering a **beta** removes the financial effects of leverage thus isolating the risk due solely to company assets.

Axiom Valuation's Credit Rating Platform Performance



Prices predicted by the Axiom Credit Rating Platform were compared with transacted prices to show the accuracy of the platform.

	S&P Rating	Axiom
Within 5%	76%	97%
Within 10%	97%	100%

From: **Predicting Market Prices of Fixed Income Instruments Using Axiom Valuation Solutions' Credit Rating and Fair Value Platform**, Stanley Feldman, John Roberts, Ryan Tang (www.axiomvaluation.com/library/articles-papers)

Sample Credit Ratings, Cost of Debt, and Loan Value at Different Times

Example: **A Company Operates in the Apparel and Footwear Industry**

Date	Unlevered Beta	Long-term Debt to Book Value of Equity Ratio	Annual Revenue	Free Operating Cash Flow to Revenue Ratio
12/31/2019	1.00	2.00	$ 50,000,000	15.0%
	Increase 25.0%	*Increase 139.5%*	*Decrease 18.3%*	*Decrease 48.9%*
12/31/2020	1.25	4.79	$ 40,862,172	7.7%

** The revenue was assumed to decrease at the same rate as that for the GDP.*
The free operating cash flow and equity value was assumed to decrease at the same rate as that for the corporate profits before tax.

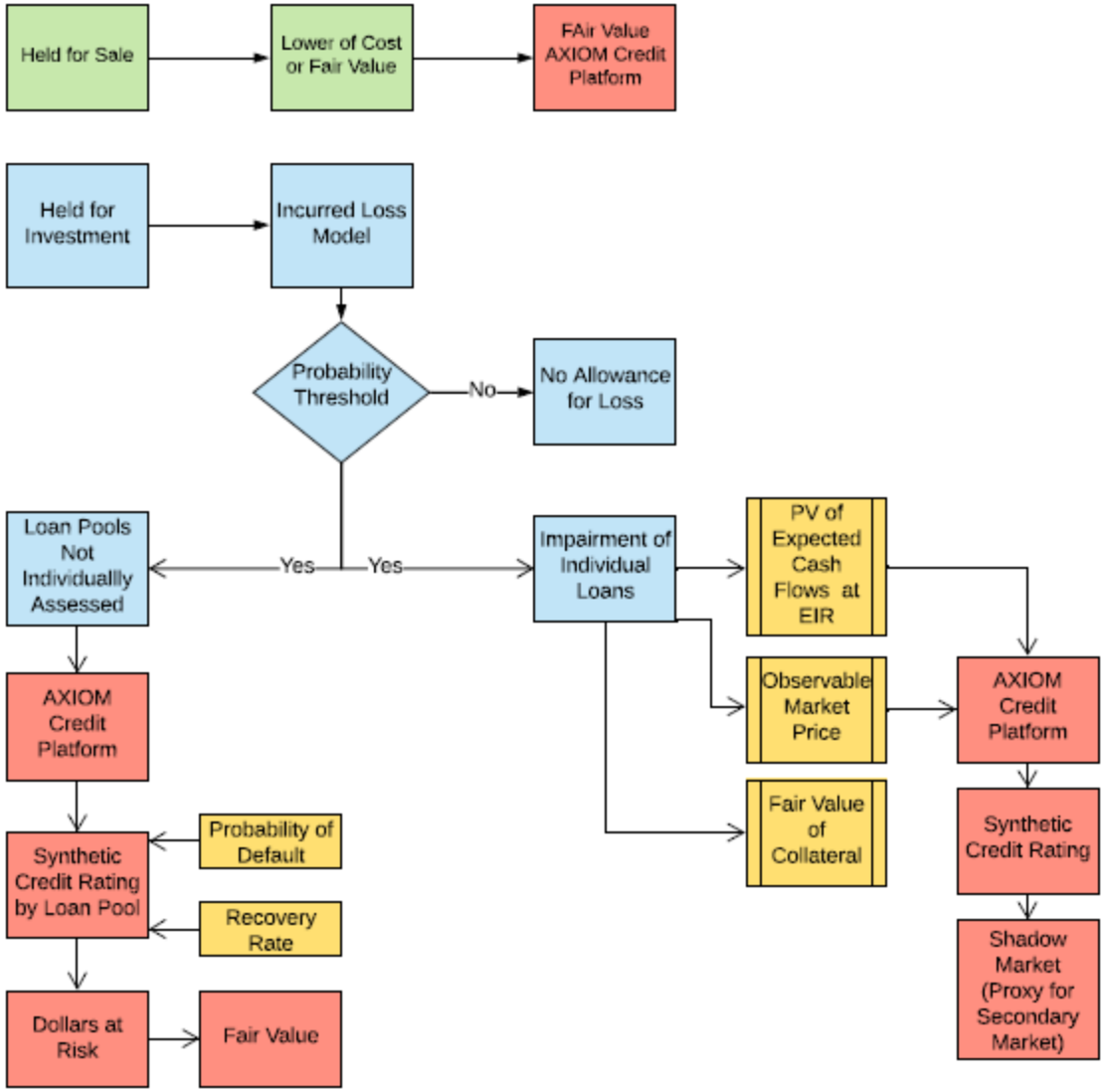
Date	Axiom Credit Rating	Cost of Debt (Loan Discount Rate)	Loan CarryingValue	Loan FairValue
12/31/2019	BB	5.57%	$ 20,000,000	$ 19,601,314
	Decrease 4 Notches	*Increase 139.8%*	*Keep Same*	*Decrease 22.4%*
12/31/2020	B-	13.36%	$ 20,000,000	$ 15,209,149

** Cost of Debt for 12/31/2020 was based on the available market yield and credit spread information as of 3/31/2020.*

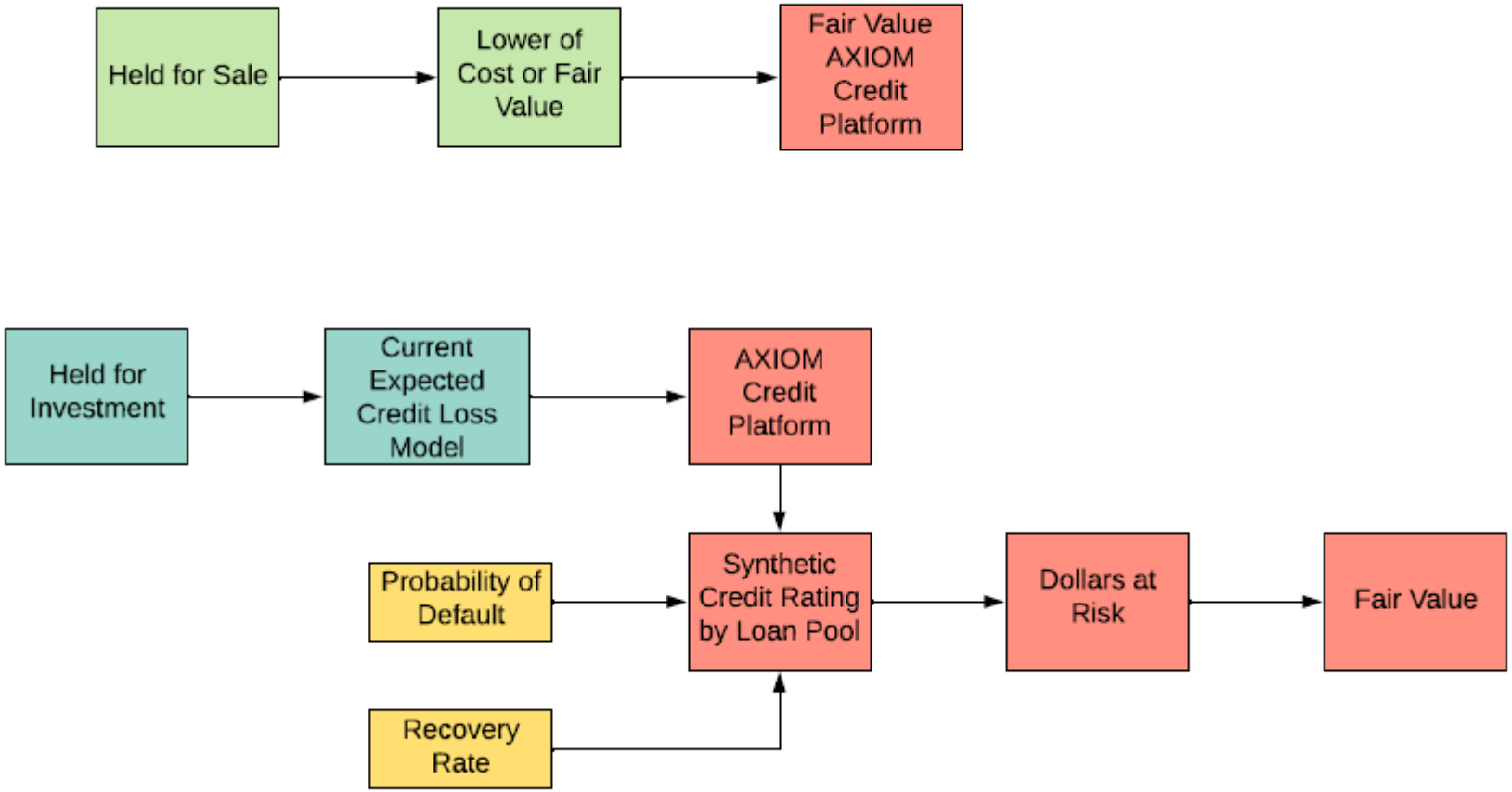
Loan Information

Principal	$ 20,000,000	Interest Type	Compounding and Accumulate
Maturity	12/31/2024	Interest Repayment Interval	Quarterly
Annual Interest Rate	LIBOR + 3.0%	Amortization Schedule	100% at Maturity

Accounting for Credit Loss (Pre CECL) ASC 310-10



Accounting for Credit Loss (Post CECL) ASU 2016-13



Excerpt, Financial Accounting Manual for Federal Reserve Banks

Measuring loan losses for a homogenous pool of loans under FASB ASC Topic 450-20; formerly SFAS No. 5.

For a large pool of small-balance loans and other loans not individually identified as impaired…….
Expected loss is the estimate of the current amount of loans for which it is probable that the Bank will be unable to collect given facts and circumstances as of the evaluation date. ……..The calculation is based on a formula commonly used in practice to develop a FASB ASC Topic 450-20; formerly SFAS No. 5 allowance:

$Expected Loss = PD% * LGD% * $EAD
PD - Probability of default
LGD - Loss given default
EAD - Exposure at default

Expected Loss

For a Loan Rated BBB

Expected Loss Estimation 1
- Based on Hypothetical Portfolio and Market Information

Overall Credit Rating	BBB		
Maturity (Year)	3		
Simple Annual Interest Rate (%)	5.0%		
Date	**Year 1**	**Year 2**	**Year 3**
Credit Spread (bps)	200	300	400
Recovery Rate (%)	50.0%	50.0%	50.0%
Loss Rate (%) = 1 - Recovery Rate (%)	50.0%	50.0%	50.0%
Default Rate (%) *	4.0%	6.0%	8.0%
Outstanding Principal	1,000	900	800
Assumed Interest	135	85	40
Principal + Interest	$ 1,135	$ 985	$ 840
Expected Loss *	$ 23	$ 30	$ 34
Risk-free Rate *	0.17%	0.23%	0.29%
Present Value Factor	0.9983	0.9954	0.9914
Expected Loss Present Value	$ 23	$ 29	$ 33
Total Present Value of Expected Loss			**$ 85**

** 1) Default Rate was estimated based on the following formula:*
*Credit Spread = (1 - Recovery Rate) * Default Rate*
2) Expected Loss was estimated based on the following formula:
*Expected Loss = Default Rate * Loss Rate * (Principal + Interest)*
3) Source: U.S. Treasury Rates as of 3/31/2020.

For a Loan Rated BB

Expected Loss Estimation 2
- Based on Hypothetical Portfolio and Market Information

Overall Credit Rating	BB		
Maturity (Year)	3		
Simple Annual Interest Rate (%)	5.0%		
Date	**Year 1**	**Year 2**	**Year 3**
Credit Spread (bps)	500	600	700
Recovery Rate (%)	50.0%	50.0%	50.0%
Loss Rate (%) = 1 - Recovery Rate (%)	50.0%	50.0%	50.0%
Default Rate (%) *	10.0%	12.0%	14.0%
Outstanding Principal	1,000	900	800
Assumed Interest	135	85	40
Principal + Interest	$ 1,135	$ 985	$ 840
Expected Loss *	$ 57	$ 59	$ 59
Risk-free Rate *	0.17%	0.23%	0.29%
Present Value Factor	0.9983	0.9954	0.9914
Expected Loss Present Value	$ 57	$ 59	$ 58
Total Present Value of Expected Loss			**$ 174**

** 1) Default Rate was estimated based on the following formula:*
*Credit Spread = (1 - Recovery Rate) * Default Rate*
2) Expected Loss was estimated based on the following formula:
*Expected Loss = Default Rate * Loss Rate * (Principal + Interest)*
3) Source: U.S. Treasury Rates as of 3/31/2020.

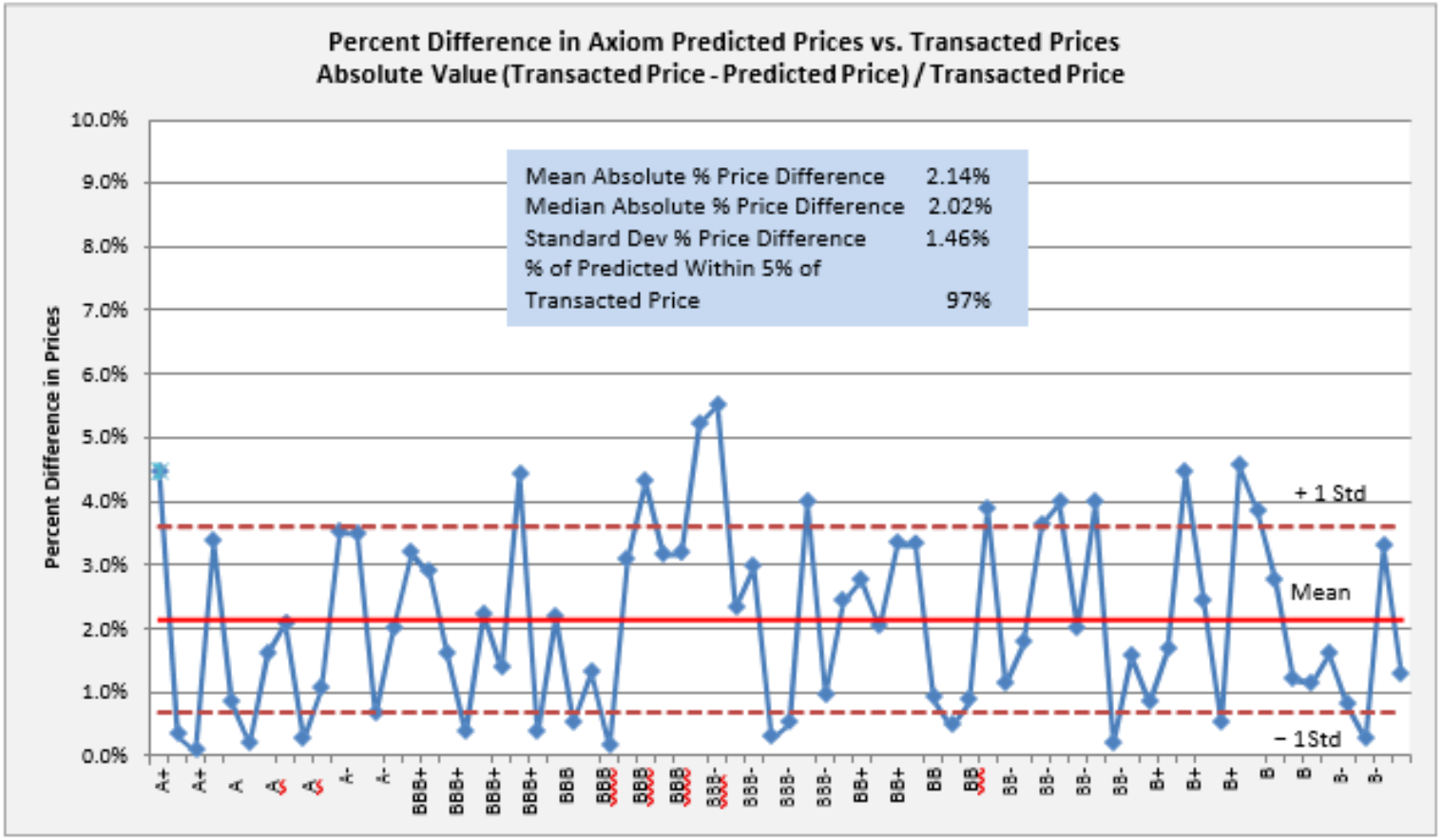
Final Thoughts

- COVID-19 highlights the need for a transparent tool for measuring fair value of financial assets
- The AXIOM credit platform incorporates four basic variables to generate a synthetic credit rating which produces a shadows market price or fair value
- The AXIOM credit platform can be used for individual loan/asset or pools of assets with similar credit attributes
- The AXIOM credit platform has been vetted by big four audit firms, is transparent, and has been tested against major credit agencies
- Open for audience questions

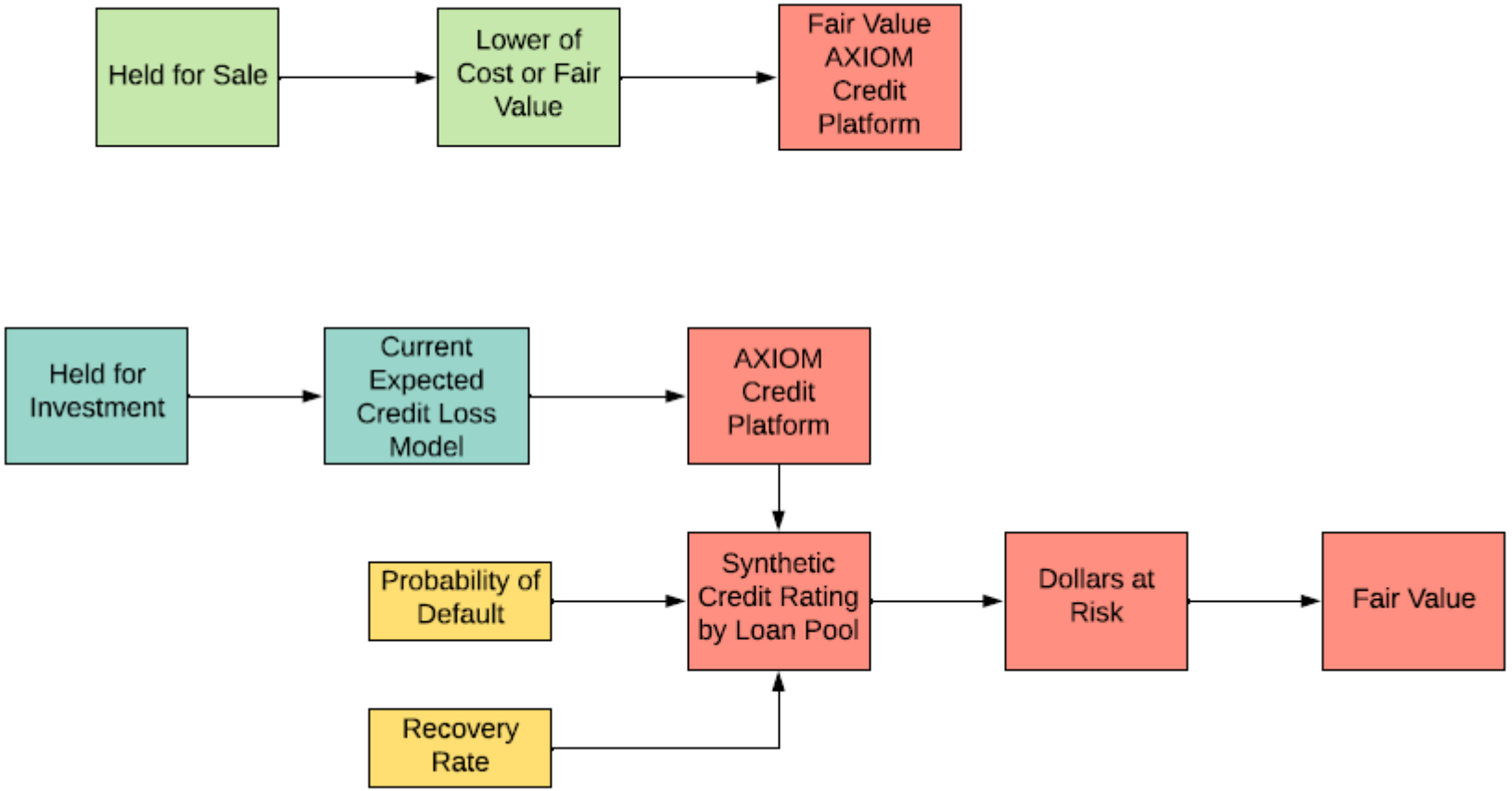
Appendix

Axiom Valuation's Credit Rating Platform Performance

Using Axiom Credit Ratings to Forecast Transaction Prices of Fixed Income Securities



Axiom Valuation's Credit Rating Model Performance



Industrial Market Yield and Credit Spread Comparison

Industry	Industrial			
Maturity	10-year			
Date	12/31/2019	12/31/2019	3/31/2020	3/31/2020
Credit Rating	Market Yield (%)	Credit Spread (bps)	Market Yield (%)	Credit Spread (bps)
Aaa/AAA	2.52%	60	1.83%	113
Aa1/AA+	2.67%	75	2.16%	146
Aa2/AA	2.82%	90	2.50%	180
Aa3/AA-	2.83%	91	2.60%	190
A1/A+	2.84%	92	2.71%	201
A2/A	2.85%	93	2.81%	211
A3/A-	3.00%	108	3.12%	242
Baa1/BBB+	3.16%	124	3.42%	272
Baa2/BBB	3.31%	139	3.73%	303
Baa3/BBB-	4.07%	215	5.31%	461
Ba1/BB+	4.82%	290	6.89%	619
Ba2/BB	5.57%	365	8.47%	777
Ba3/BB-	6.28%	436	9.95%	925
B1/B+	6.99%	507	11.43%	1,073
B2/B	7.70%	578	12.91%	1,221
B3/B-	10.14%	822	13.36%	1,266
Caa1/CCC+	12.58%	1,066	13.80%	1,310
Caa2/CCC	15.02%	1,310	14.25%	1,355
U.S. Treasury Rate (%)	**1.92%**	**1.92%**	**0.70%**	**0.70%**

** Source: Capital IQ.*