

# **Where Are We in The Credit Cycle?**

†

Edward I. Altman

**And**

## **Global Zombies: An Alternative Type of Resiliency**

Edward I. Altman, Rui Dai, and Wei Wang

†Altman is at the Leonard N. Stern School of Business of New York University, Dai is at the Wharton Research Data Services of the University of Pennsylvania, and Wang is at the Smith School of Business of Queen's University.

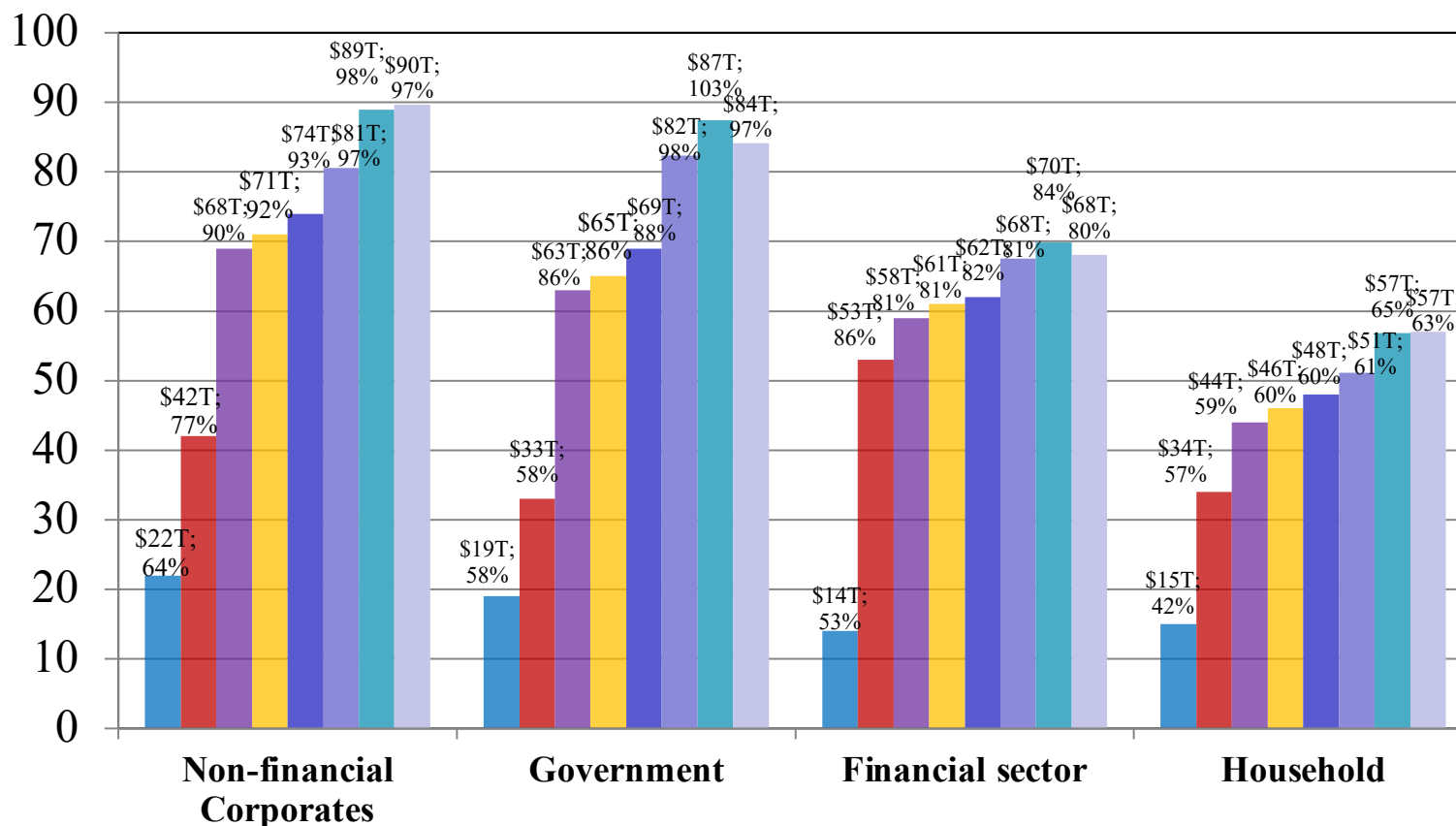
# **Where Are We Now in the Credit Cycle?**

**Edward I. Altman  
NYU Stern School of Business  
And  
Co-Founder, Wisefunding Ltd.**

# Global Sectoral Indebtedness

\$ Trillion and % GDP

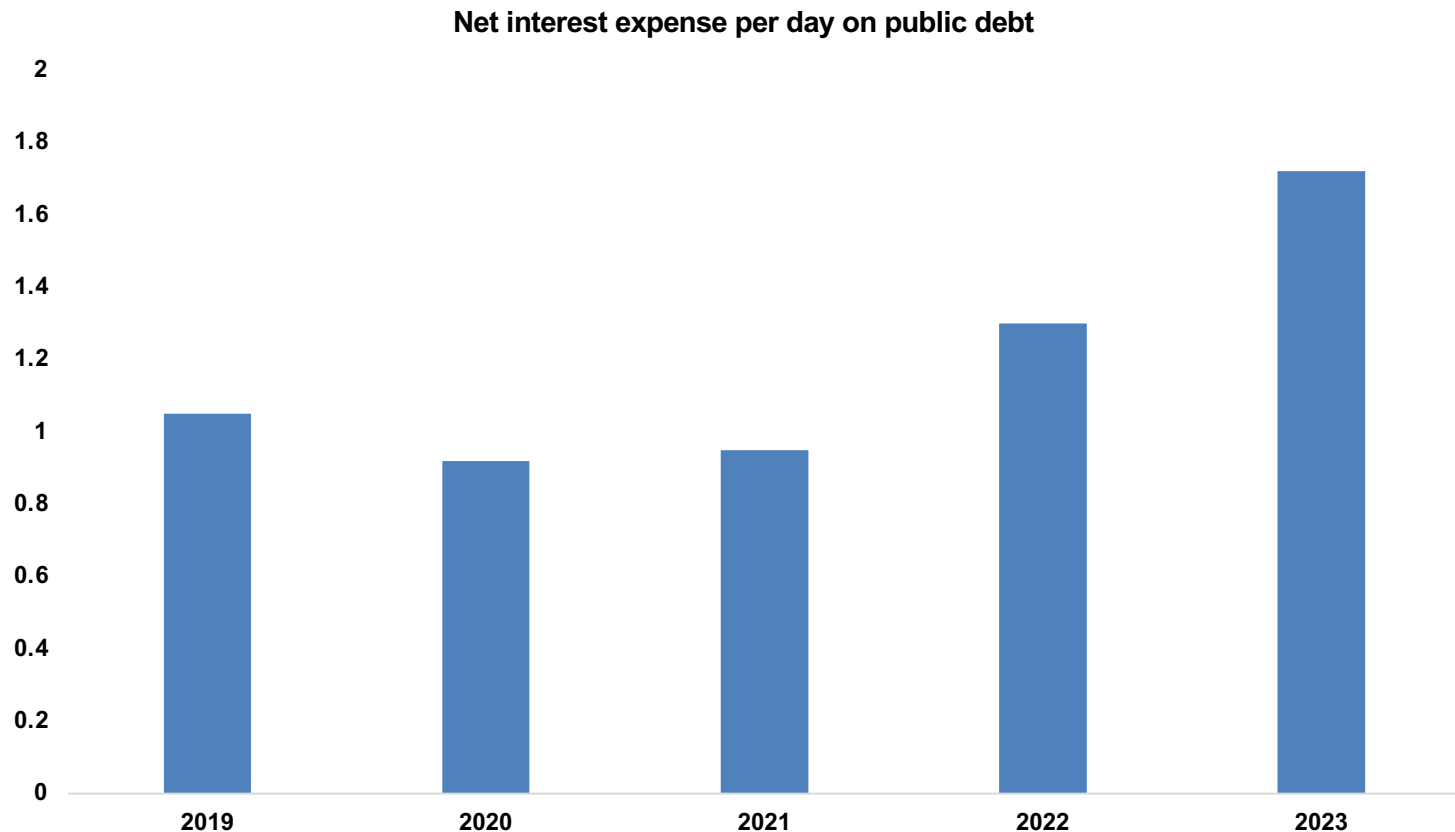
1997 2007 2017 2018 2019 2020 2021 2022



Year	% of GDP	Total \$ Amt. (\$ T)
1997	217%	70
2007	278%	162
2017	317%	233
2018	319%	243
2019	322%	253
2020	336%	282
2021	350%	303
2022	337%	299

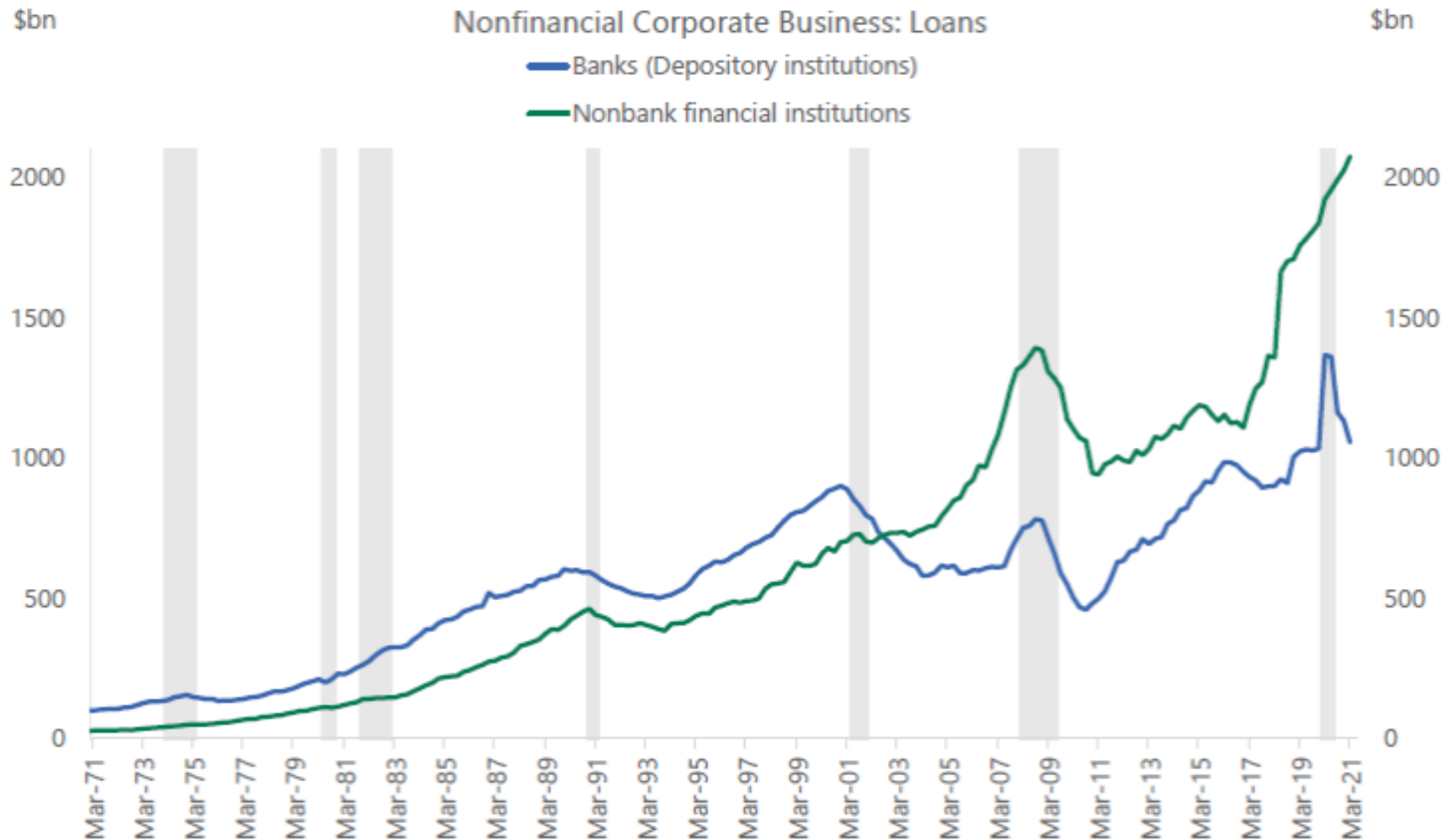
Sources: Chart from *Independent UK* using IIF, BIS, IMF and Haver data for 1997 and 2007. Data for 2017, 2018, 2019, 2020, 2021, and 2022 from “Global Debt Monitor”, Institute of International Finance, March 26, 2023.

# **US government interest payments per day have doubled from \$1 bn per day before the pandemic to almost \$2 bn per day in 2023**



Sources: CBO, Haver Analytics, Apollo Chief Economist.

# Sources of financing for nonfinancial corporate businesses



# Credit Cycle Indicators

Indicators	Historical Average	August 2nd 2023 YTD
Default Rates – Current & Forecasted	3.3%	Current: 1.8% Forecast as of Aug 31: 2.3%
Recovery Rates – Weighted Average Price at Default	45%	22%
Investor Required Rates of Return	5.4% (OAS) 5.2% (YTMS)	3.96% (OAS) 4.25% (YTMS)
High Yield Bond Distress Ratio (Percent of HY Bonds > 10% above T-Bond)	8-10%	7%
Liquidity – New Issue Volume including CCC New Issuance	~\$200-\$250Bn CCC 10-15% of HY	\$100Bn 6 CCC Issue
Default Rates Leveraged loans	2.5%	2.6%
Lev Loan Recovery Rate	---	47%

# How To Tell Where Are We in the Credit Cycle (Multiple Factors)

	<u>Historic Avg</u>	<u>Current (August 2 2023)</u>
• Recent 2022 Default Rate (2022)	• 3.3%	• ~ 1.3% (2022) (B)
• 2023 YTD Default Rate	• ---	• 1.8% • 2.3% (Aug 31 forecast)
• Forecast HY Bonds Default Rate for 12/2023	• --- • ---	• 3.5% (Altman) • 4.4% (Avg. for 4 rating agencies + BoA)
• Recovery Rates - Loss Given Default (LGD)	• 45% (wgt)	• 22% (B)
• Default Rates Leveraged loans	• 2.5%	• 2.6%
• Lev Loan Recovery Rate	• ---	• 47%
• Recent 2022 default rate	• 2.5%	• 2.4%
• Required Returns (Spread over T-Bonds)		
• YTM Risk Premia	• 5.20%	• 4.25% (<Avg)
• OAS Risk Premia	• 5.40%	• 3.96% (<Avg)
• Distress Ratios (% of HY>10% over RF Rate)	• 8-10%	• 7.0% (~Avg)
• Liquidity - New Issues of Risky Debt	• ~\$200-\$250B • CCC 10-15% HY	• Decreasing (\$105B) 2022 and below Avg. -\$100B in YTD 2023 • Stressed

\* Forecast 2023-Altman 3.5%, Fitch 3.5%, KBRA 4.5%, Moody's 5.2%, S&P 4.0%

B = Benign, Avg = Average, S = Stressed

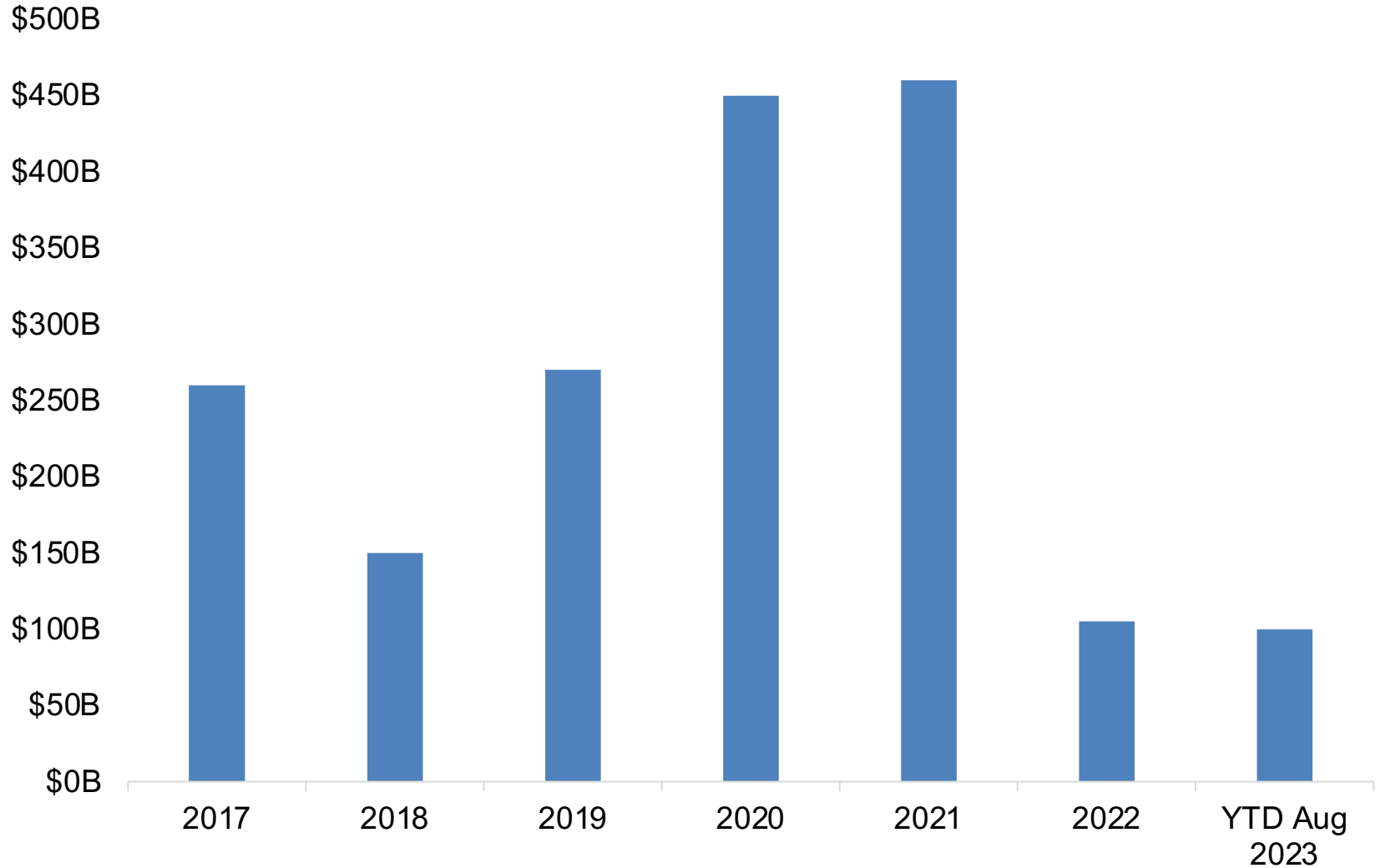
Source: E. Altman, NYU & 4 Rating Agencies, FRED, ICE BofA

# High Yield Bond Spread (OAS, Option-Adjusted)





# High Yield Bonds New Issue Volume



# **Forecasting High Yield Bond Default Rates**

## **Key Variables in the Forecast**

- **Mortality Rate Technique**
- **Yield Spread – Risk Premium Technique**
- **Distressed Ratio Technique**

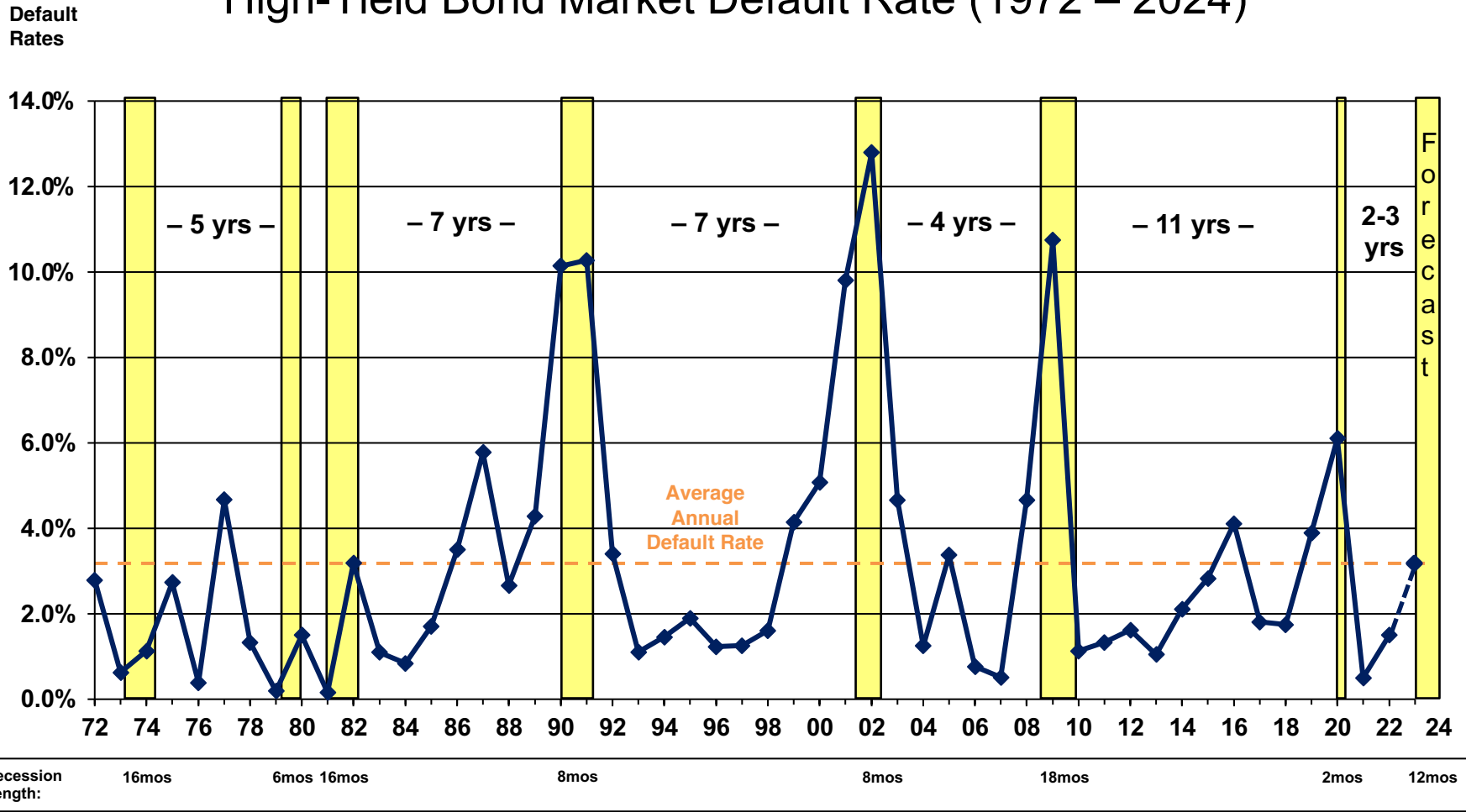
## **Resulting In**

- **Our 2023 Expected Default Rate = 3.5%**

# **Default Rates, Distressed Debt Returns and the Credit Cycle**

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

## High-Yield Bond Market Default Rate (1972 – 2024)

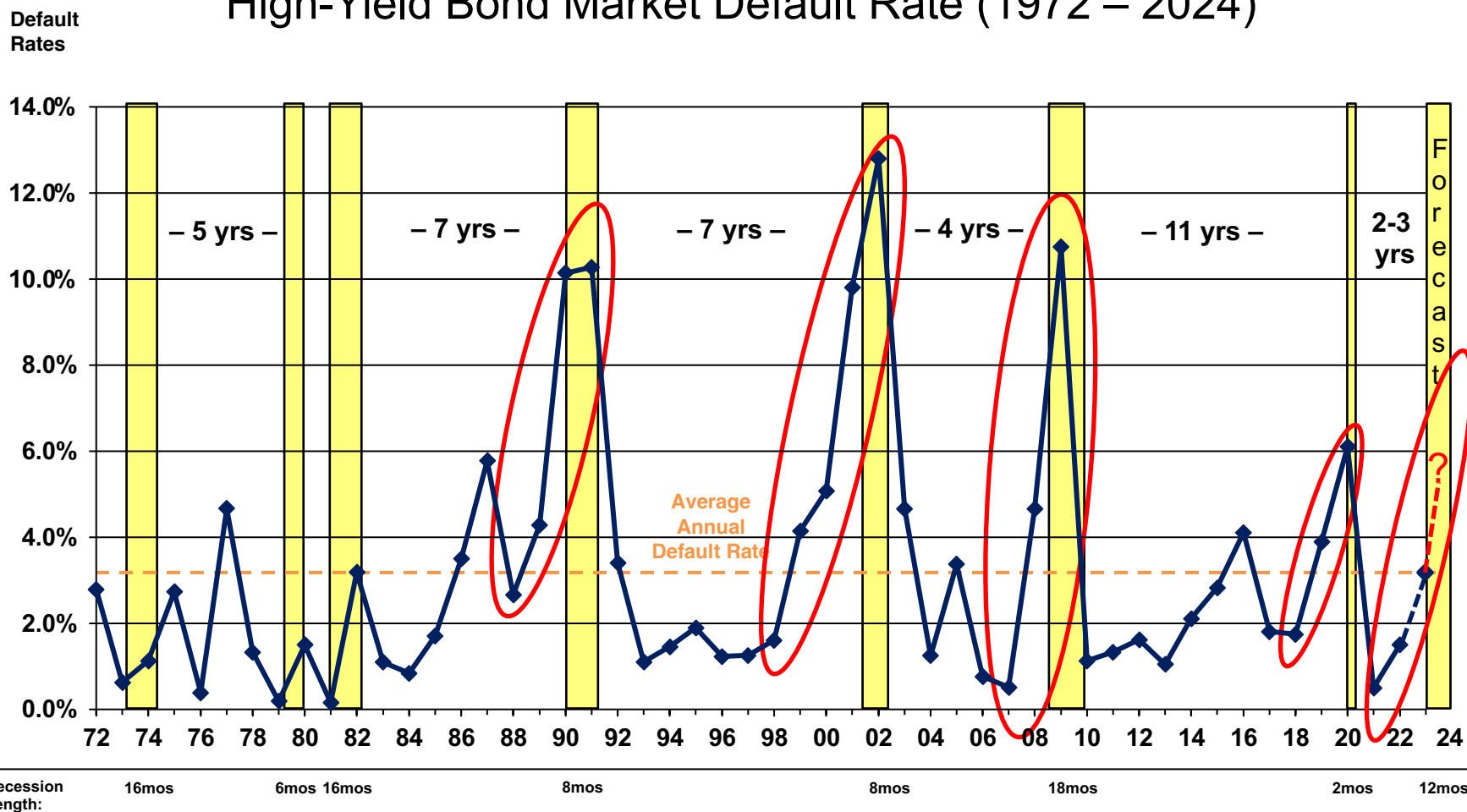


Note: The highlighted areas show Periods of Recession. Periods of Recession are as follows: 11/73 – 3/75, 1/80 – 7/80, 7/81 – 11/82, 7/90 – 3/91, 4/01 – 12/01, 12/07 – 6/09, 2/20 – 4/20, 1/23 – 12/23. 1/23 - 12/23 is a forecast rather than actual. Benign credit cycles are approximated. All rates are annual.

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

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

## High-Yield Bond Market Default Rate (1972 – 2024)



Note: The highlighted areas show Periods of Recession. Periods of Recession are as follows: 11/73 – 3/75, 1/80 – 7/80, 7/81 – 11/82, 7/90 – 3/91, 4/01 – 12/01, 12/07 – 6/09, 2/20 – 4/20, 1/23 – 12/23. 1/23 - 12/23 is a forecast rather than actual. Benign credit cycles are approximated. All rates are annual.

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

# Positive and Negative Credit Cycle Factors

## Positive Factors

- **Continuing Robust Corporate Earnings**
- **Waterfall Analysis**
- **Average Forecasted Default and Recovery Rates about Historical Average**
- **Slightly Decreasing Inflation Rate (US and Europe)**
- **“No Landing” ? - Positive or Negative for Capital Markets?**

## Negative Factors

- **High Interest Rates**
- **High Inflation Rates**
- **Likely Recession?**
- **Major Liquidity Concerns**
- **Increasing Default Rates in 2022 and 2023**
- **Golub Capital Altman Index – Middle Market**
- **Increase in Credit Risk, 2019 vs 2022 based on Z Score Analytics**

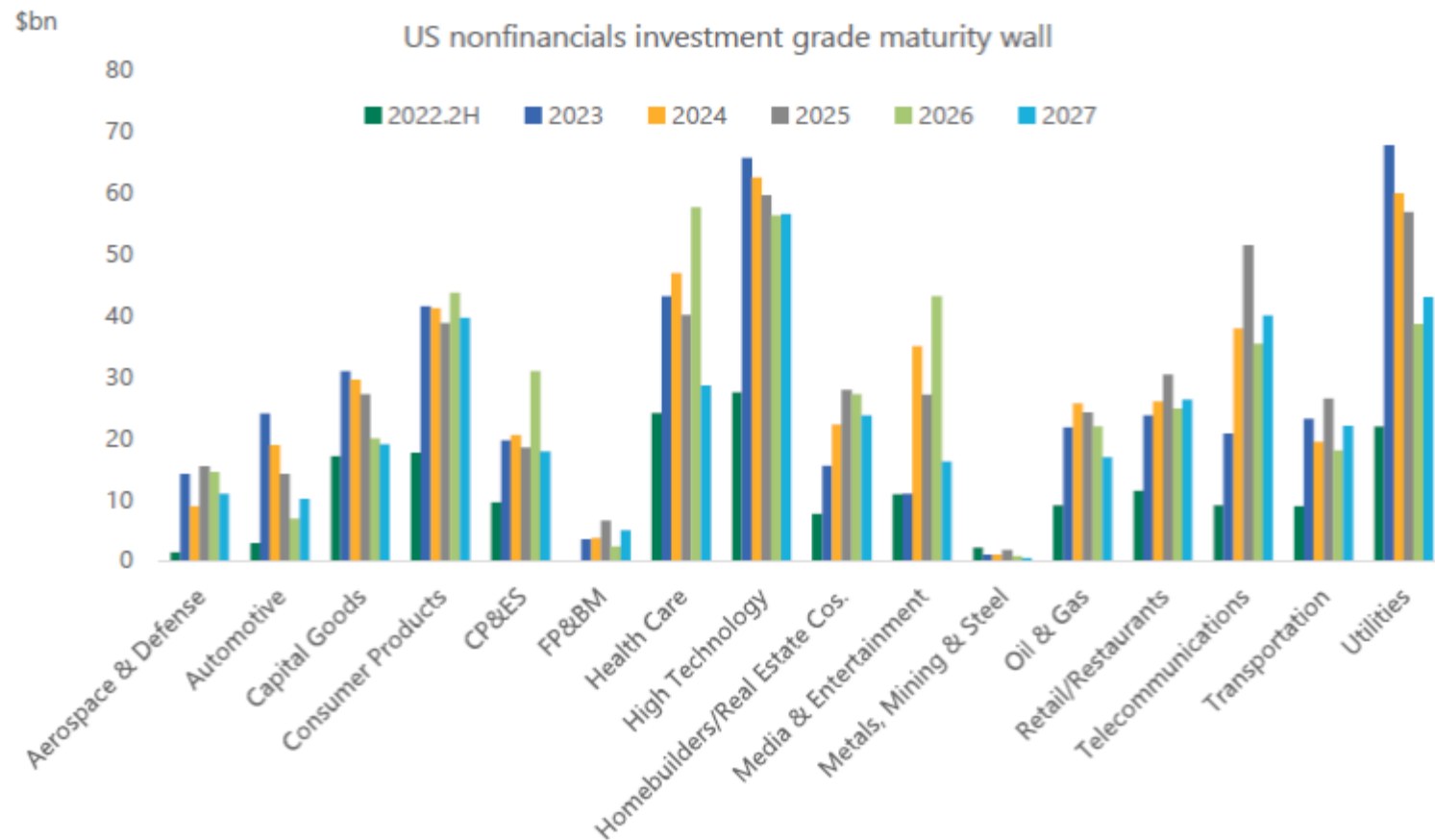
# Comparing Z-Scores:2019 vs 2022

Altman Z Score Date: 10/31/2022							
----- Q2/Q3 2022 -----				----- Q4 2019 -----			
S&P Rating	Number of Observations	Average	Median	Number of Observations	Average	Median	Change in Z Score 2022 vs 2019
AAA/AA	20	5.61	6.32	20	5.82	5.19	-0.21
A	99	4.86	4.33	99	5.16	4.66	-0.30
BBB	315	3.78	3.63	313	3.83	3.63	-0.05
BB	324	3.22	3.13	307	3.48	3.10	-0.26
B	242	2.05	1.84	219	2.89	1.78	-0.84
CCC/CC	34	0.08	0.33	29	1.53	1.21	-1.45
Overall	1034	3.22	3.04	987	3.62	3.07	-0.40

Altman Z" Score Date: 10/31/2022							
----- Q2/Q3 2022 -----				----- Q4 2019 -----			
S&P Rating	Number of Observations	Average	Median	Number of Observations	Average	Median	Change in Z" Score 2022 vs 2019
AAA/AA	19	6.89	6.71	13	7.11	7.29	-0.21
A	94	6.17	5.44	78	5.96	5.42	0.21
BBB	299	5.46	5.31	245	5.33	5.09	0.13
BB	310	4.92	4.95	252	4.99	4.72	-0.07
B	226	4.00	3.74	191	4.18	3.87	-0.18
CCC/CC	33	2.84	2.98	26	3.66	3.25	-0.82
Overall	981	4.96	4.72	805	4.99	4.64	-0.03

Source: Author's calculations from *Bloomberg*.

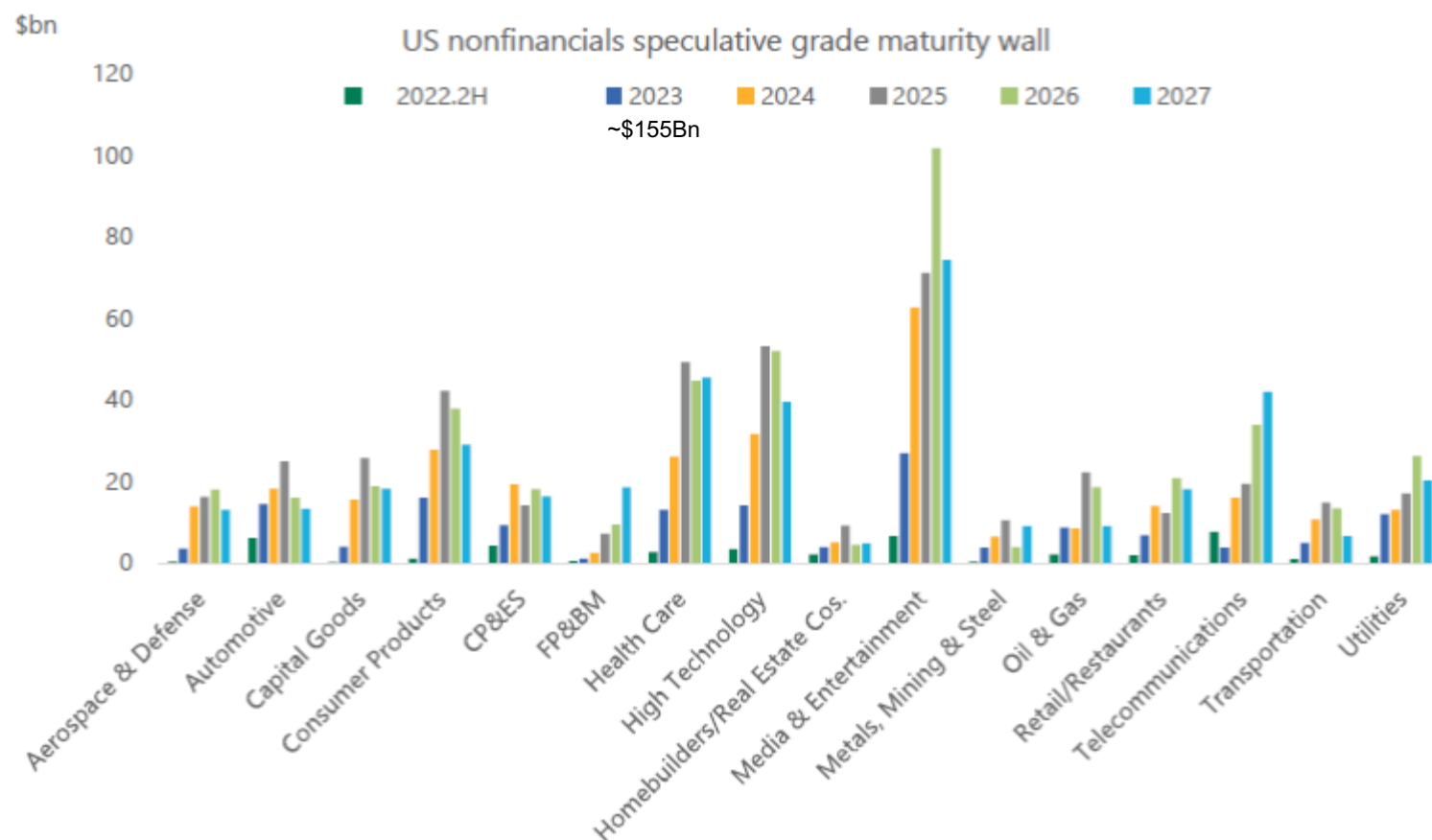
## Maturity wall for US IG nonfinancials



Source: S&P, Apollo Chief Economist. Note: CP&ES—Chemicals, packaging, and environmental services. FP&BM—Forest products and building materials. Media and entertainment includes the leisure sector. Includes bonds, loans, and revolving credit facilities that are rated by S&P Global Ratings. Data as of July 1, 2022.



## Maturity wall for US HY nonfinancials



Source: S&P, Apollo Chief Economist. Note: CP&ES—Chemicals, packaging, and environmental services. FP&BM—Forest products and building materials. Media and entertainment includes the leisure sector. Includes bonds, loans, and revolving credit facilities that are rated by S&P Global Ratings. Data as of July 1, 2022.

# **A Shift in The Credit Cycle?**

## **Recent Changes and Key Factors in Risky Debt Markets**

(As of May 2023 )

### **CONCLUSION:**

**The Credit Cycle is mostly Average but has reached an Inflection Point from Benign to Average Credit Risk, with two major signals of a Distressed Cycle. But, is it really Average?**

# ***WHAT IS A ZOMBIE FIRM?***

- **Insolvent Firm That is Still Functioning over a Relatively Long Time Period**
- **What Are Appropriate Measures of Zombie Firms?**
- **For How Long?**
- **How Are Zombie Firms Supported? And by Whom?**

# **OUR STUDY PROPOSES AND ANALYSES**

- **What Are The "CONS" (Negatives) of Zombie Firms For An Economy?**
- **What are the "PROS" (Positives) of Zombie Firms For An Economy?**
- **How Best to Measure Zombie Firms?**
- **What Have Been The Trends Of Zombie Firms Over The Last 30 Years Globally And For Specific Countries?**
- **What Are The Major Determinants of The Percentage of Listed Zombie Firms In An Economy And Across Different Countries Over Time?**

# OUR SUGGESTED MEASURES OF ZOMBIE FIRMS

- **Firms With Cash Flow Interest Expense Coverage ( $IC = \text{EBITDA} / \text{Interest}$ )  $< 1.0$ , Based On A 3-Year Moving Average**

**AND**

- **Firms With A Clear, Very High Probability of Default, Also Based On A 3-Year Moving Average, Using Z-Scores or Z"-Scores**

## Z and Z" Score Models

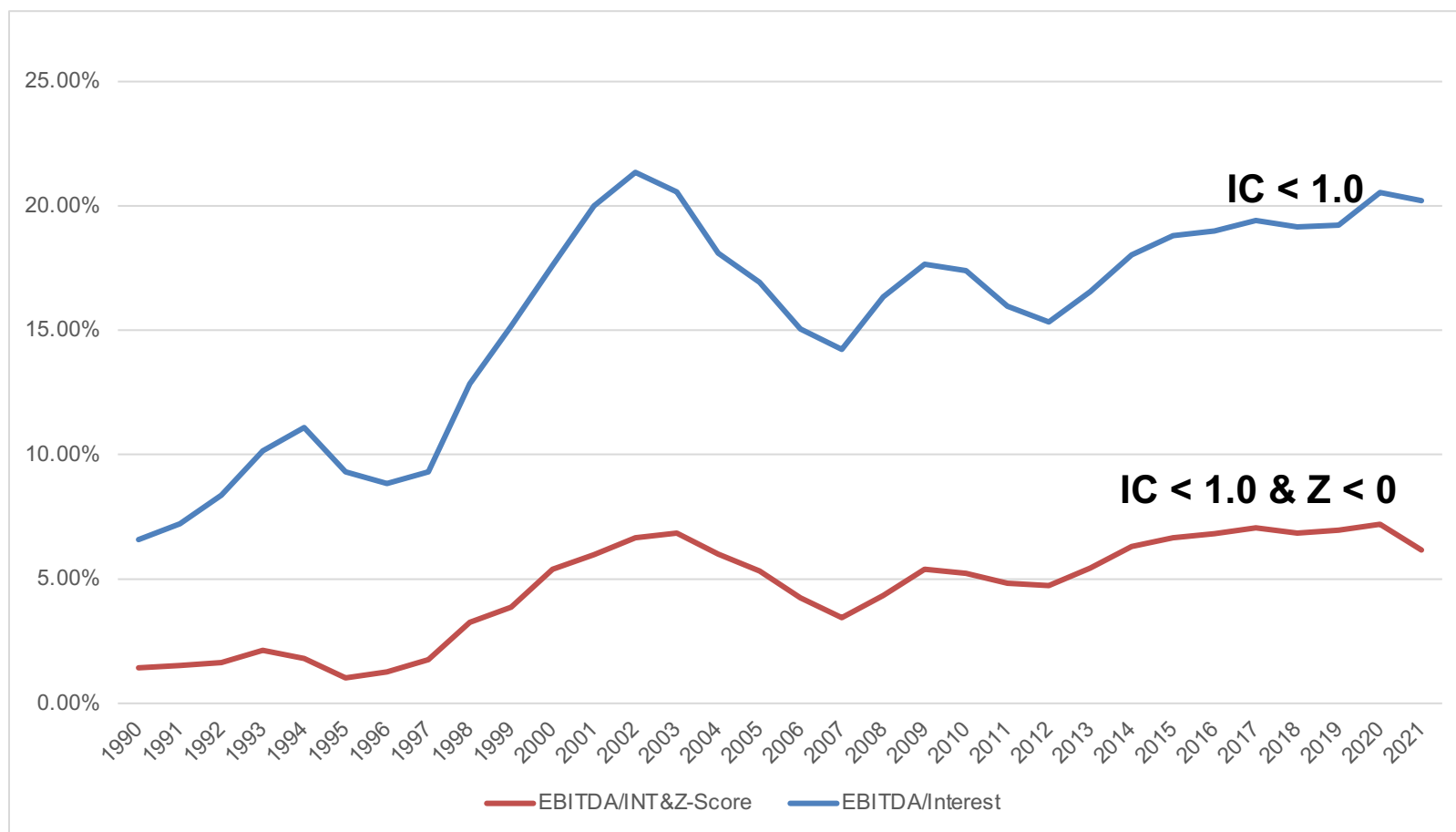
$$\begin{aligned} Z - \text{Score} = & 1.2 \times \frac{\text{Current assets} - \text{Current liabilities}}{\text{Total Assets}} + 1.4 \times \frac{\text{Retained Earnings}}{\text{Total Assets}} \\ & + 3.3 \times \frac{\text{EBIT}}{\text{Total Assets}} + 0.6 \times \frac{\text{Market Value of Equity}}{\text{Total Liabilities}} + 1.0 \times \frac{\text{Sales}}{\text{Total Assets}} \end{aligned}$$

$$\begin{aligned} Z'' - \text{Score} = & 3.25 + 6.56 \times \frac{\text{Current assets} - \text{Current liabilities}}{\text{Total Assets}} + 3.26 \times \frac{\text{Retained Earnings}}{\text{Total Assets}} \\ & + 6.72 \times \frac{\text{EBIT}}{\text{Total Assets}} + 1.05 \times \frac{\text{Book Value of Equity}}{\text{Total Liabilities}}. \end{aligned}$$

# Comparing Interest Coverage Zombie Ratios to the Dual-Filter Approach: Global and USA

	Global					USA		
	Listed Public Firms Means					Listed Public Firms Means		
year	EBITDA/ Interest	Z-Score	Z"-Score	EBITDA/ INT & Z-Score	EBITDA/ INT & Z"-Score	EBITDA/ Interest	EBITDA/ INT & Z-Score	EBITDA/ INT & Z"-Score
1990	6.58%	1.61%	1.65%	1.42%	1.44%	23.38%	5.53%	7.60%
1991	7.23%	1.69%	1.61%	1.52%	1.33%	22.83%	5.04%	7.04%
1992	8.37%	1.78%	1.81%	1.64%	1.58%	21.48%	3.64%	6.07%
1993	10.14%	2.29%	2.09%	2.13%	1.82%	21.47%	3.15%	5.59%
1994	11.09%	2.08%	2.02%	1.80%	1.59%	20.88%	3.53%	5.99%
1995	9.31%	1.49%	1.78%	1.02%	1.32%	20.87%	3.21%	6.07%
1996	8.85%	1.50%	1.76%	1.27%	1.47%	22.76%	3.43%	6.53%
1997	9.31%	1.94%	2.44%	1.75%	2.13%	23.96%	4.33%	7.44%
1998	12.84%	3.76%	3.60%	3.25%	3.06%	22.76%	4.70%	7.28%
1999	15.18%	4.42%	4.60%	3.87%	3.78%	23.82%	4.18%	6.88%
2000	17.60%	6.09%	6.30%	5.40%	5.36%	27.87%	6.07%	8.94%
2001	20.00%	7.05%	7.26%	5.98%	6.07%	26.77%	5.99%	8.97%
2002	21.35%	8.31%	8.33%	6.67%	6.70%	26.28%	8.54%	10.16%
2003	20.57%	8.85%	8.85%	6.84%	6.85%	22.96%	7.16%	9.57%
2004	18.11%	7.95%	8.42%	5.99%	5.96%	20.76%	7.09%	8.60%
2005	16.93%	7.53%	7.85%	5.31%	5.39%	18.62%	6.12%	8.20%
2006	15.06%	6.15%	7.21%	4.25%	4.83%	18.54%	6.01%	8.16%
2007	14.23%	5.01%	6.39%	3.44%	4.44%	20.16%	6.91%	8.61%
2008	16.34%	5.73%	6.56%	4.34%	4.54%	19.57%	7.97%	9.40%
2009	17.66%	6.94%	7.19%	5.39%	5.30%	18.26%	7.37%	8.58%
2010	17.41%	7.06%	7.48%	5.22%	5.22%	15.80%	7.36%	8.34%
2011	15.98%	7.03%	7.24%	4.84%	4.83%	15.51%	6.81%	7.89%
2012	15.34%	7.00%	7.15%	4.74%	4.59%	14.42%	6.57%	7.78%
2013	16.54%	7.80%	7.89%	5.44%	5.13%	15.07%	6.62%	8.11%
2014	18.03%	8.44%	8.50%	6.32%	5.80%	17.55%	7.47%	9.05%
2015	18.81%	9.33%	9.19%	6.65%	6.36%	18.22%	8.92%	9.74%
2016	18.99%	9.46%	9.27%	6.83%	6.26%	18.98%	9.04%	10.31%
2017	19.42%	9.29%	9.65%	7.06%	6.95%	19.19%	9.40%	10.41%
2018	19.15%	9.06%	9.61%	6.84%	7.09%	18.14%	8.23%	9.56%
2019	19.23%	9.19%	9.93%	6.97%	7.46%	17.89%	8.59%	9.82%
2020	20.53%	9.41%	10.05%	7.20%	7.70%	18.90%	7.41%	8.77%
2021	20.21%	8.19%	9.33%	6.17%	6.85%	20.29%	6.48%	8.17%
Average	16.25%	6.54%	6.88%	4.95%	5.02%	20.44%	6.34%	8.24%

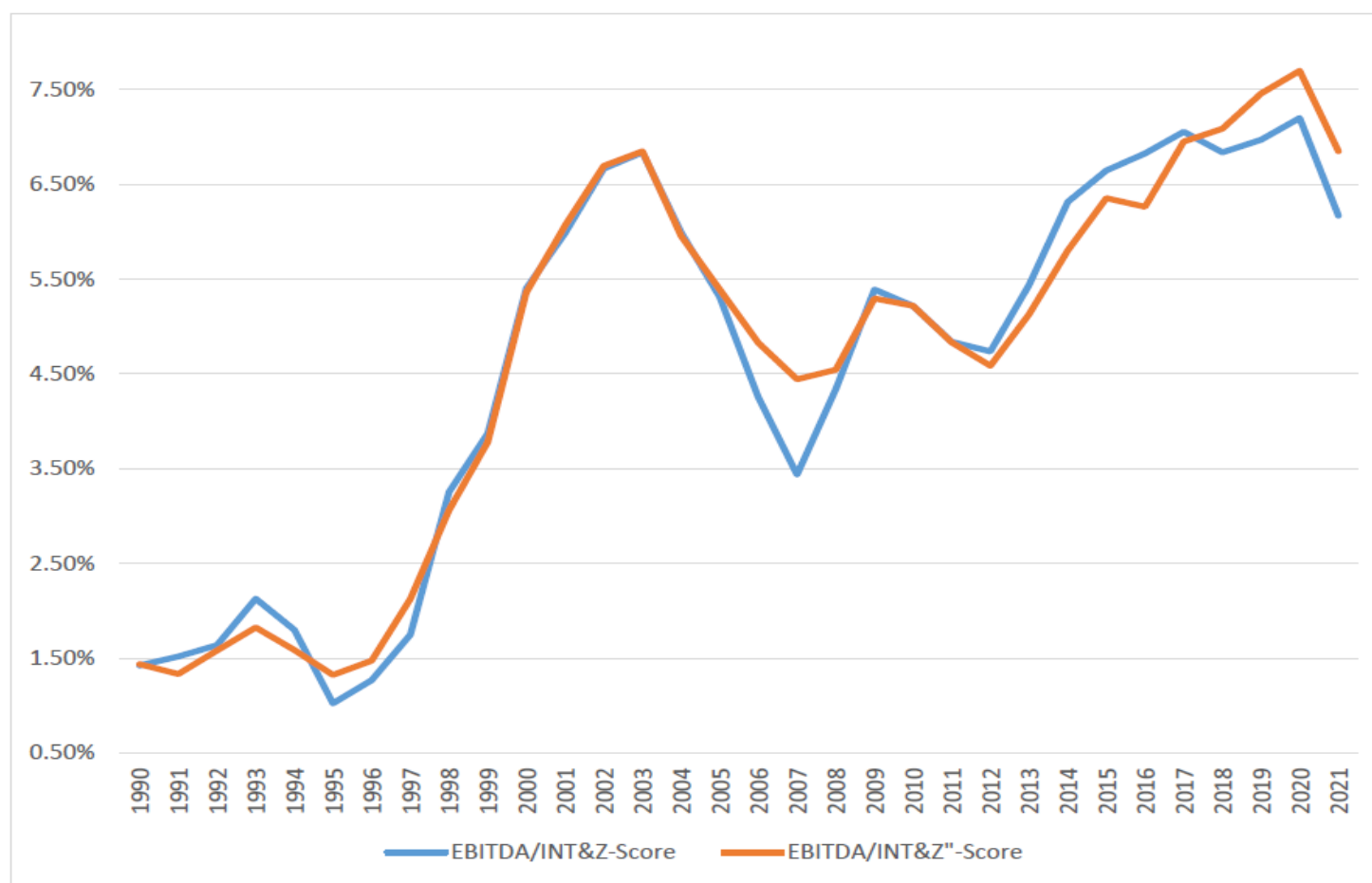
# Zombie Ratios Using the Traditional Interest Coverage Ratio (EBITDA/Interest) Compared To the Z Score Metric: Aggregate for the 20 Largest Countries: 1990-2021



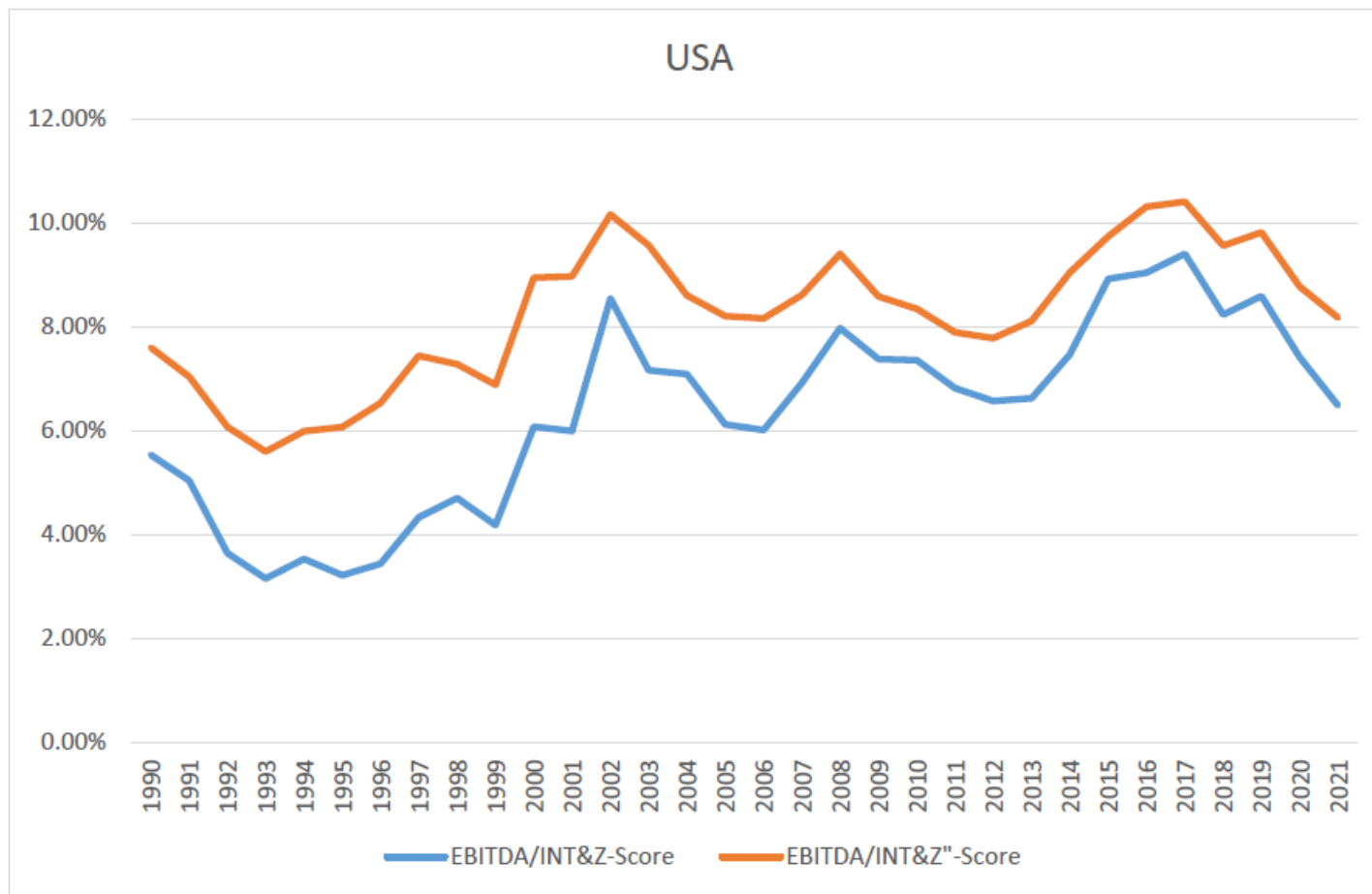


# FRACTION OF ZOMBIE FIRMS — GLOBAL EVIDENCE

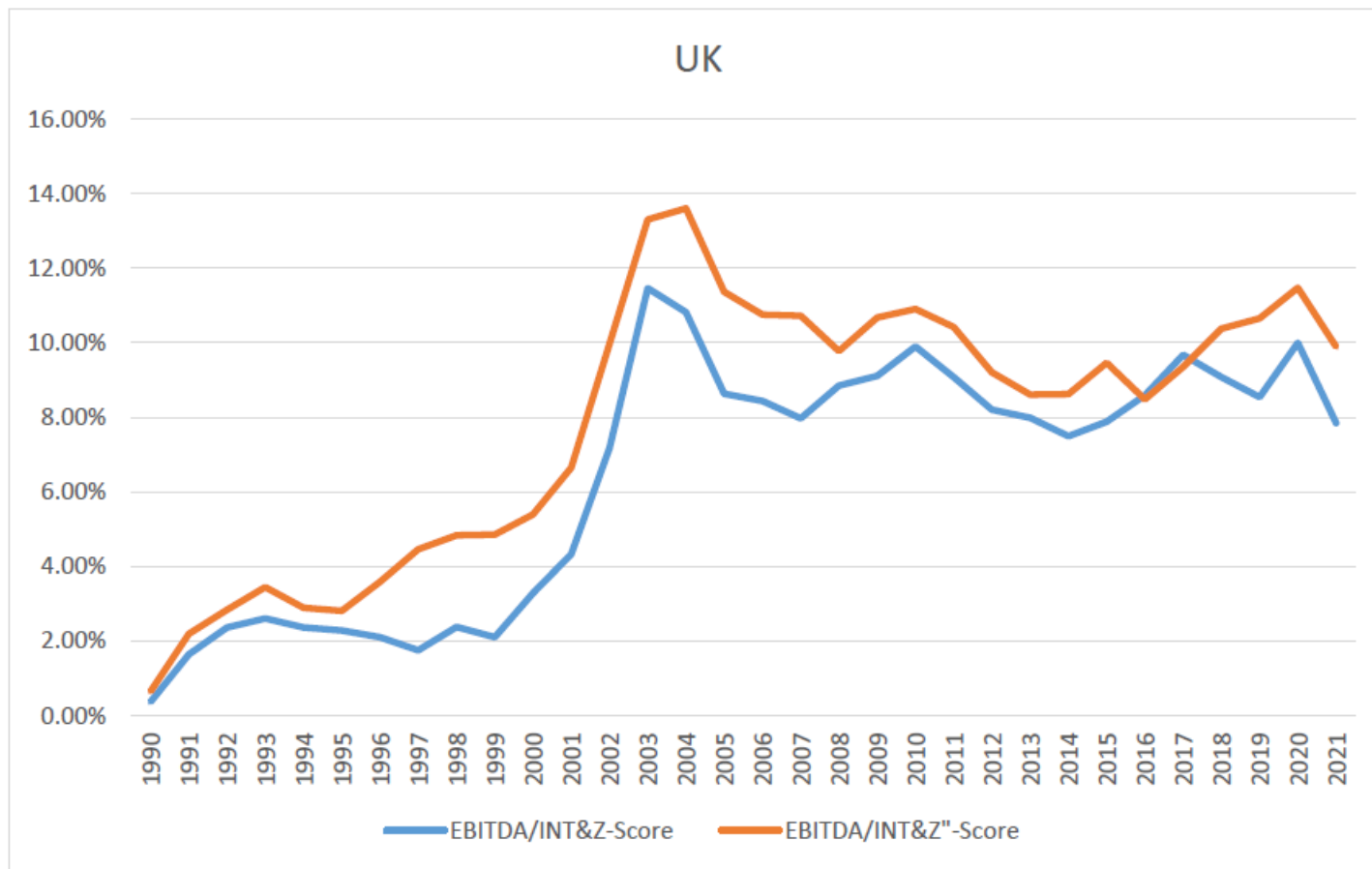
The figure shows the average fraction of zombie firms of the 20 largest GDP countries in the world from 1990 to 2021. A zombie firm is defined as a firm with a three-year moving average interest coverage ratio that is less than one and has either three-year average Z-score or Z"-score that is less than zero.



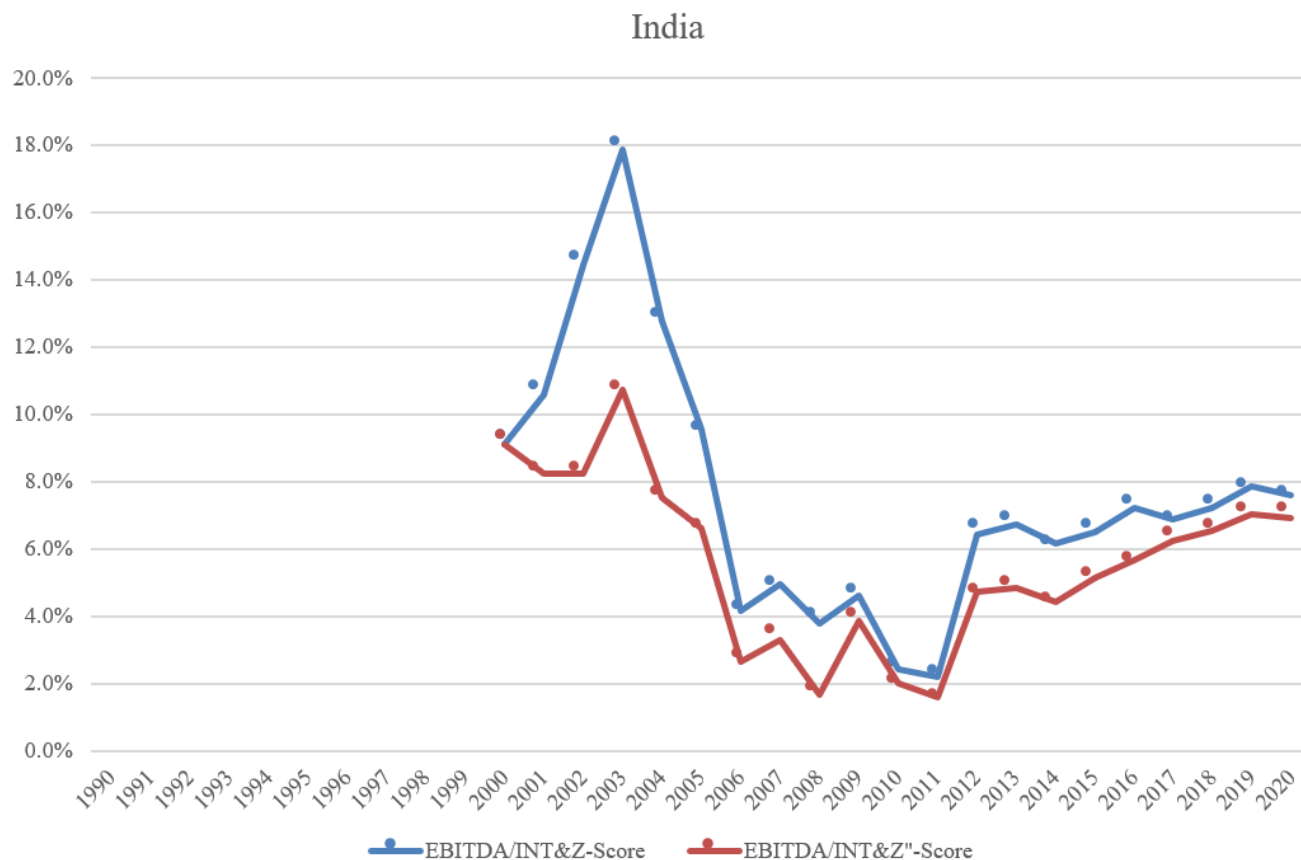
# Ratio of Zombie Companies Based on Interest Coverage Ratio $<1.0$ and Z-Score $<0.0$ Dual Filter Approach: U.S.A. 1990 - 2021



# Ratio of Zombie Companies Based on Interest Coverage Ratio $<1.0$ and Z-Score $<0.0$ Dual Filter Approach: UK 1990 - 2021



# Ratio of Zombie Companies Based on Interest Coverage Ratio $<1.0$ and Z-Score $<0.0$ Dual Filter Approach: India 1990 - 2020



# **DETERMINANTS OF ZOMBIE FIRM RATIOS OF LISTED COMPANIES – BASED ON CROSS SECTIONAL & TIME SERIES REGRESSIONS**

**Results Are Controlled for GDP Growth**

<b>Determinant Variable.</b>	<b>Impact (Association)</b>
• <b>Cyclicalitity</b>	<b>(-) - (Negative)</b>
• <b>Firm Size.</b>	<b>(+) - (Positive)</b>
• <b>Sovereign rating (IV grade)</b>	<b>(-) - (Negative)</b>
• <b>Financing Channels (Debt Issuance)</b>	<b>(+) - (Positive)</b>
• <b>Creditor Rights &amp; Debt Enforcement</b>	<b>(-) - (Negative)</b>
• <b>Bankruptcy Code Reforms Over Time</b>	<b>(-) - (Negative)</b>

## Post-Zombie Fate: U.S. Zombie Firms: 1990-2021

Post-Zombie Fate	No. of Firms.	% of Total	Avg. Time (Years) After First Identified As Zombie
Bankrupt	505	15.30%	4.7
Delisted	1,397	42.20%	3.7
M&A	1,039	31.40%	5.5
Recovered	365	11.10%	3.9
<b>Total Firms</b>	<b>3,306</b>	<b>100.00%</b>	-----

# ZOMBIE FIRMS AROUND THE WORLD

## By Firm Size in 2019

This table reports the fraction of zombie firms by firms size using interest coverage ratio (IC) and Z"-score model. Small firms are those with sales less than or equal to \$50 million, and large firms are those with sales more than \$50 million. Our sample includes all publicly traded firms with nonmissing three-year moving average of EBITDA interest coverage, Z-score, and Z"-score from 1990 to 2020 in 20 countries that have the largest nominal GDP in 2019. Definitions of variables are provided in Table 1.

Nation	2019 GDP Rank	Small-Medium Firms (SMEs)			Large Firms			Fraction of SMEs
		N. Firms	IC	IC & Z"	N. Firms	IC	IC & Z"	
United States	1	315	60.00%	42.54%	1641	9.81%	3.53%	16.10%
China	2	369	34.42%	10.84%	3448	8.79%	0.87%	9.69%
Japan	3	352	17.33%	2.27%	2356	1.95%	0.13%	13.00%
Germany	4	136	39.71%	13.24%	315	7.30%	1.27%	30.16%
India	5	1279	23.46%	9.38%	1117	9.76%	4.30%	53.38%
United Kingdom	6	367	55.59%	24.80%	536	7.84%	0.93%	40.64%
France	7	192	64.06%	28.13%	305	5.25%	0.66%	38.63%
Italy	8	83	22.89%	8.43%	190	6.84%	1.05%	30.40%
Brazil	9	17	64.71%	52.94%	128	14.84%	3.13%	11.72%
Canada	10	1257	60.46%	40.89%	404	17.33%	3.96%	75.68%
Russian Federation	11	19	42.11%	10.53%	126	7.14%	3.17%	13.10%
Korea, Rep	12	632	48.58%	10.28%	1422	10.48%	0.70%	30.77%
Australia	13	969	56.86%	32.92%	350	13.43%	4.00%	73.46%
Spain	14	35	31.43%	11.43%	89	10.11%	0.00%	28.23%
Mexico	15	0	0.00%	0.00%	83	1.20%	0.00%	0.00%
Indonesia	16	166	22.89%	4.22%	304	9.54%	2.63%	35.32%
Netherlands	17	18	50.00%	22.22%	69	10.14%	4.35%	20.69%
Saudi Arabia	18	25	24.00%	0.00%	104	7.69%	0.00%	19.38%
Turkey	19	117	35.04%	8.55%	149	11.41%	3.36%	43.98%
Switzerland	20	23	73.91%	39.13%	145	8.28%	0.69%	13.69%
<b>Average</b>		<b>6371</b>	<b>41.37%</b>	<b>18.64%</b>	<b>13281</b>	<b>8.96%</b>	<b>1.94%</b>	<b>29.90%</b>
<b>Weighted Average</b>			<b>44.52%</b>	<b>22.21%</b>		<b>8.21%</b>	<b>1.63%</b>	

# **IMPACT OF COVID-19 PANDEMIC ON GLOBAL ZOMBIE RATIOS**

- **Very Small Impact Overall on Global Zombie Ratios**
  - **Global Average Change of Zombie Ratio from 2019 to 2020 - + 0.12%**
  - **10 Countries Had An Increase of Zombies**
  - **8 Countries Had A Decrease of Zombies**
  - **2 Countries Had No Change of Zombies**
- **Reasons For Small Change During the Pandemic?**



# CONCLUDING REMARKS

- **"Zombie firm trends are clearly cyclical with spikes in zombies as economic growth declines."**
- **We Propose a Two-Step, Dual-Filter Measure for Identifying and Quantifying Zombie Firms on a Global and Country Basis**
- **The Dual-Filter Approach Involves a 3-Year Moving Average Cash-Flow Interest Coverage Ratio  $< 1.0$  AND A High Default Probability Forecast (Z-Scores  $< 0/0$ )**
- **We find That The Average Proportion of Publicly Traded Firms from the 20 Largest Global Economies Increased Significantly in The Past 30 Years From 1.5% in 1990 to About 7.0% in 2021. Is this a Trivial Amount, or Not?**
- **U.S. Zombie Firms Increased from About 6.0% of Listed Companies in 1990 to About 8% in 2021; Countries like Japan, China and Germany Had Considerably Lower Zombie Ratios**
- **Smaller Firms Are More Likely To Be Zombies than Larger Companies, Impacting Certain Countries More Than Others, eg. Australia and Canada**
- **Global Zombieism Did not Increase Much During The COVID-19 Pandemic From 2019 to 2020 but Did Decrease in 2021 as the World's Economies Recovered from the Pandemic Recession"**
- **Our Results Have Important Implications For Policy Makers, Legislators, And Financial Economists**