

**Current Conditions and Outlook for Global
Corporate and Sovereign Debt Markets;
Estimating Defaults and Applications**

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Credit Market Seminar

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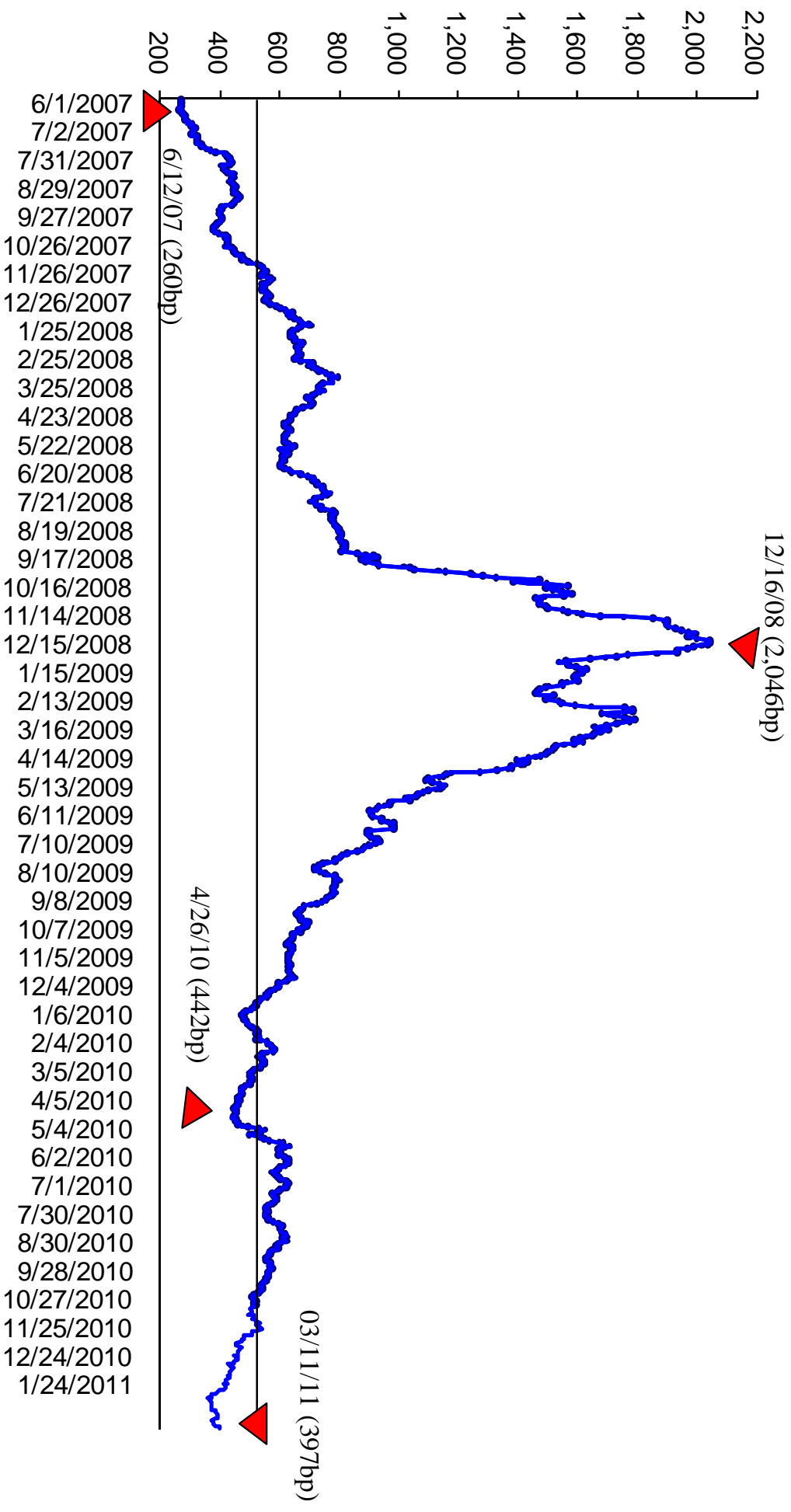
New York

March 16, 2011

***DEFAULT & CREDIT
MARKET OUTLOOK***

YTM Spread Between High Yield Markets & 10 Year Treasury Notes

June 01, 2007 – March 11, 2011



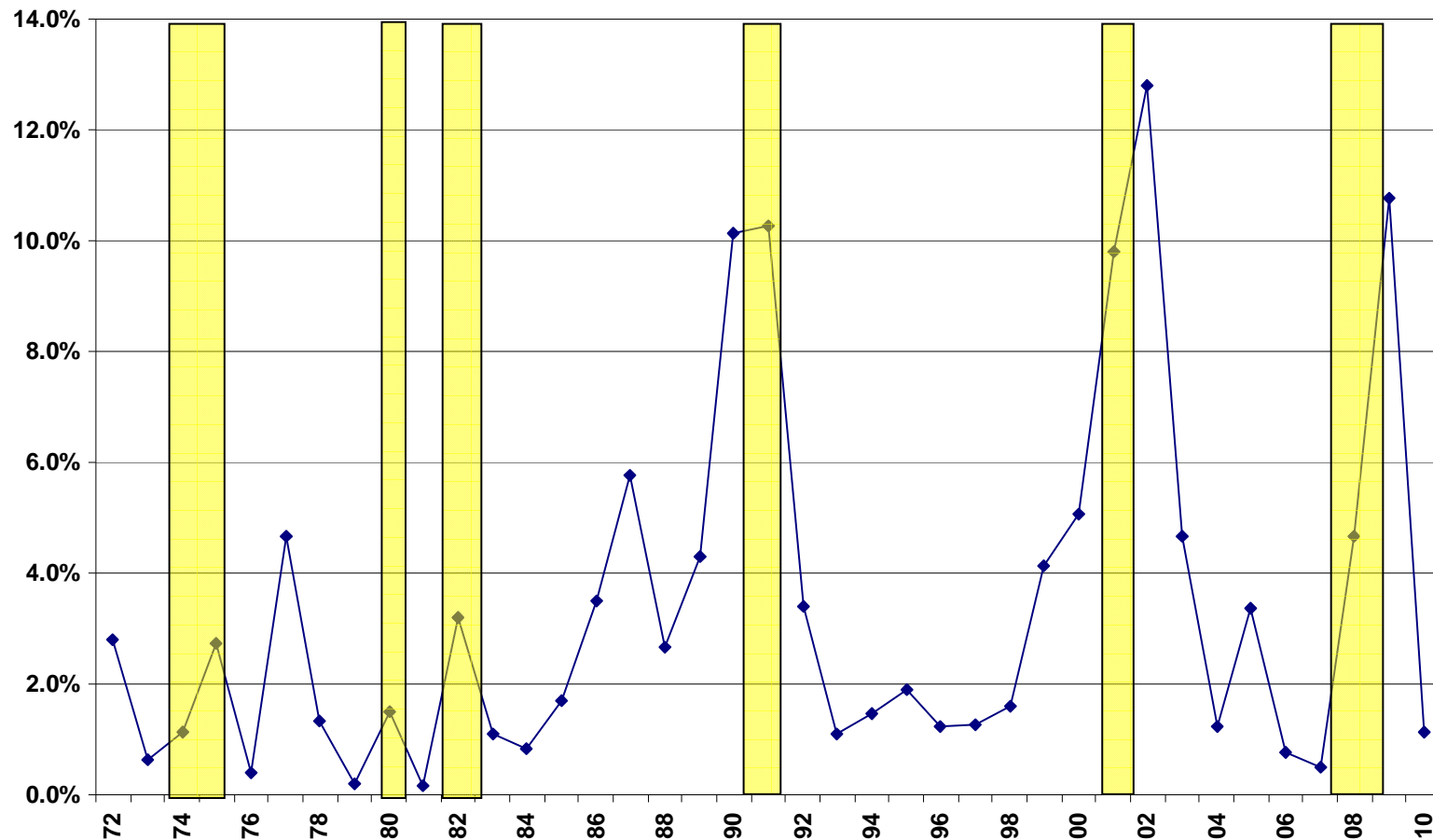
Source: Citigroup Yieldbook Index Data

Major Risks Going Forward (For 2011)

- Real Economy – Primarily U.S. (Double-Dip?): Impact on Default Rates & Credit Availability
- Sovereign Debt Crisis – Europe
- Contagion Between Markets – Debt and Equity
- Maturity Schedule On Private and Public Debt
- Inflation and Rise in Interest Rates
- Municipal Bond Default Risk
- Uncertainties (non-quantifiable)

Historical Default Rates and Recession Periods in the U.S.

HIGH YIELD BOND MARKET (1972 – 2010)



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

*All rates annual.

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

Historical Default Rates

Straight Bonds Only Excluding Defaulted Issues From Par Value Outstanding, (US\$ millions)
1971 – 2011 (3/11)

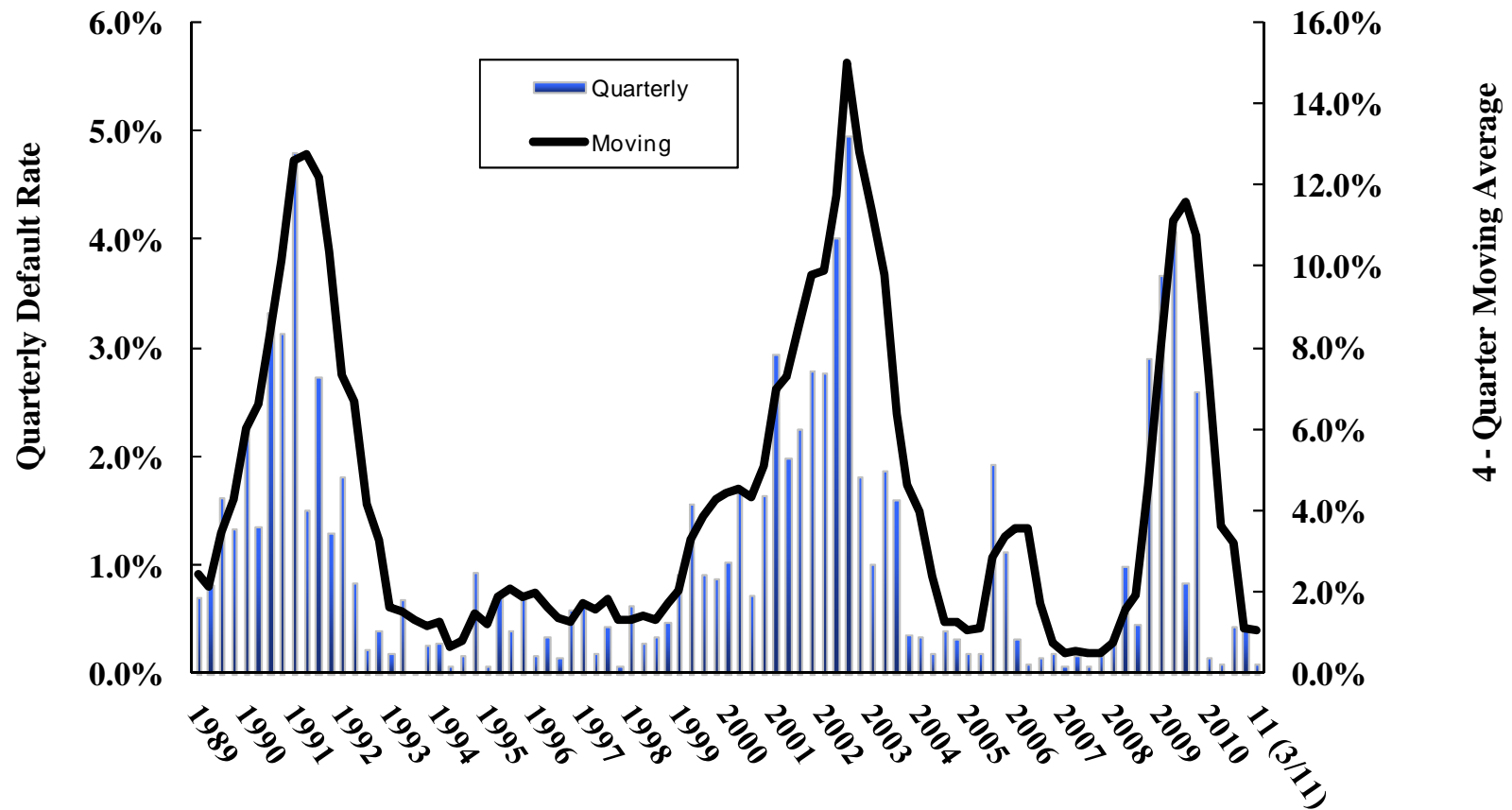
Year	Par Value Outstanding*	Par Value Defaults	Default Rates (%)	Year	Par Value Outstanding ^a	Par Value Defaults	Default Rates (%)
2011 (3/11)	\$1,277,841	\$1,127	0.088%				
2010	\$1,221,569	\$13,809	1.130	1984	\$40,939	\$344	0.840
2009	\$1,152,952	\$124,130	10.766	1983	\$27,492	\$301	1.095
2008	\$1,091,000	\$50,763	4.653	1982	\$18,109	\$577	3.186
2007	\$1,075,400	\$5,473	0.509	1981	\$17,115	\$27	0.158
2006	\$993,600	\$7,559	0.761	1980	\$14,935	\$224	1.500
2005	\$1,073,000	\$36,181	3.372	1979	\$10,356	\$20	0.193
2004	\$933,100	\$11,657	1.249	1978	\$8,946	\$119	1.330
2003	\$825,000	\$38,451	4.661	1977	\$8,157	\$381	4.671
2002	\$757,000	\$96,855	12.795	1976	\$7,735	\$30	0.388
2001	\$649,000	\$63,609	9.801	1975	\$7,471	\$204	2.731
2000	\$597,200	\$30,295	5.073	1974	\$10,894	\$123	1.129
1999	\$567,400	\$23,532	4.147	1973	\$7,824	\$49	0.626
1998	\$465,500	\$7,464	1.603	1972	\$6,928	\$193	2.786
1997	\$335,400	\$4,200	1.252	1971	\$6,602	\$82	1.242
1996	\$271,000	\$3,336	1.231				
1995	\$240,000	\$4,551	1.896				Standard Deviation (%)
1994	\$235,000	\$3,418	1.454				
1993	\$206,907	\$2,287	1.105	Arithmetic Average Default Rate			
1992	\$163,000	\$5,545	3.402	1971 to 2010		3.277%	3.204%
1991	\$183,600	\$18,862	10.273	1978 to 2010		3.561%	3.399%
1990	\$181,000	\$18,354	10.140	1985 to 2010		4.200%	3.535%
1989	\$189,258	\$8,110	4.285				
1988	\$148,187	\$3,944	2.662	Weighted Average Default Rate*			
1987	\$129,557	\$7,486	5.778	1971 to 2010		4.254%	
1986	\$90,243	\$3,156	3.497	1978 to 2010		4.264%	
1985	\$58,088	\$992	1.708	1985 to 2010		4.294%	
				Median Annual Default Rate			
				1971 to 2010		1.802%	

* Weighted by par value of amount outstanding for each year.

Source: Author's compilation and Citigroup/Credit Suisse estimates

Default Rates on High-Yield Bonds

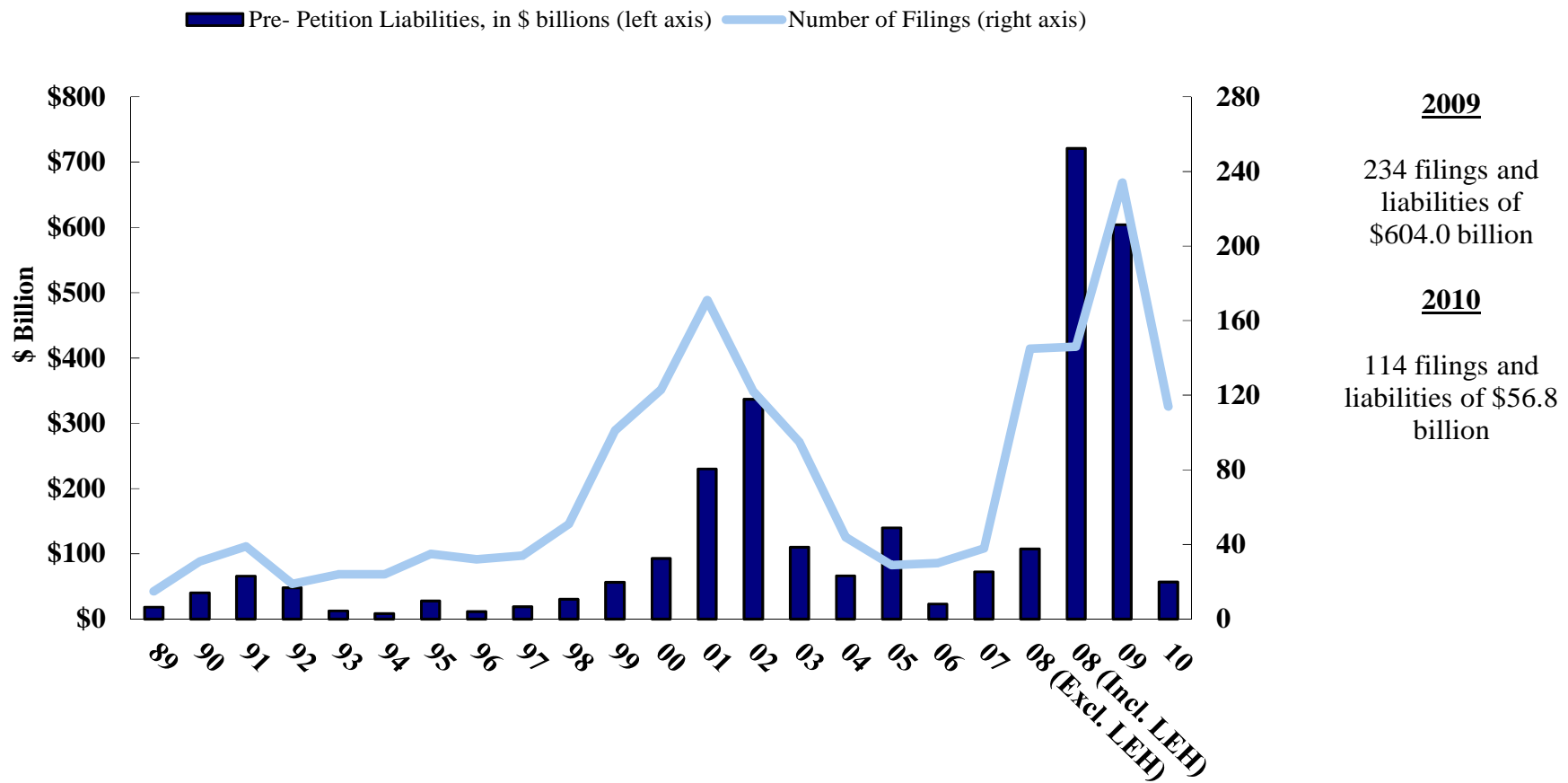
**QUARTERLY DEFAULT RATE AND FOUR QUARTER MOVING AVERAGE
1989 – 2011 (March 11th)**



Source: Author's Compilations

Filings for Chapter 11

Number of Filings and Pre-petition Liabilities of Public Companies 1989 – 2010



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

10 Largest Bankruptcy Filings

January 01 – March 04, 2011

Company	Date	Total Liabilities (\$mm)
MSR Resort & Golf Course, LLC	01-Feb	1,900.00
Borders Group, Inc.	16-Feb	1,293.11
Appleseed's Intermediate Hldgs, LLC	19-Jan	750.00 ^a
Terrestar Corp.	16-Feb	494.51
Constar International, Inc.	11-Jan	414.00
FRE Real Estate, Inc.	04-Jan	250.00 ^b
Summit Business Media Holding Co.	25-Jan	250.00 ^b
Ultimate Acquisition Partners, LP	26-Jan	250.00 ^b
AES Thames, LLC	01-Feb	250.00 ^b
Miramar Real Estate Mgmt., Inc.	02-Mar	250.00 ^b

^aLiabilities between \$500 million & \$1 billion according to petition. Midpoint of range used as estimate. ^bLiabilities of \$100-500 million according to petition. Midpoint of range used as estimate.

New Issuance: U.S. High Yield Bond Market

2000 – 2011 (2/28)

Annual	Total	Ratings			
		BB	B	CCC	NR
2000	39,263.6	11,951.5	20,728.6	2,685.0	3,898.5
2001	73,328.0	29,391.0	40,764.7	1,797.2	1,375.0
2002	55,345.2	14,502.6	38,584.7	1,970.0	288.0
2003	121,164.0	24,818.0	82,056.5	9,957.0	4,332.4
2004	119,872.7	25,711.0	64,694.8	26,069.9	3,397.0
2005	81,541.8	18,615.0	45,941.2	15,750.9	1,234.7
2006	131,915.9	37,761.2	67,377.3	25,319.2	1,458.2
2007	132,689.1	23,713.2	55,830.8	49,627.6	3,517.5
2008	50,747.2	12,165.0	25,093.1	11,034.4	2,454.6
2009	127,419.3	54,273.5	62,277.4	10,248.4	620.0
2010 (1Q)	58,377.0	24,824.3	26,872.5	6,505.2	175.0
(2Q)	39,508.9	8,055.0	23,413.9	7,180.0	860.0
(3Q)	61,051.6	24,401.6	30,525.0	5,840.0	285.0
(4Q)	70,369.8	16,909.0	36,043.3	15,521.5	1,896.1
2010 Totals	229,307.4	74,189.9	116,854.7	35,046.8	3,216.1
2011 (2/28)	42,258.8	5,001.3	27,947.5	7,835.0	1,475.0

Major Risks Going Forward (For 2011)

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SOVEREIGN RISK APPLICATION

Financial Health of the Private, Non-Financial Sector: Selected European Countries and U.S.A. in 2010/2009

(Z-Metrics PD Estimates and Implied PDs from CDS Spreads)

Country	No. of Listed Companies		Z-Metrics PD Estimates: Five-Year Public Model*				Five-Year Implied PD from CDS Spread ^{**†}	
			2010	2009	2010	2009	2010	2009
	2010	2009	Median PD	Median PD	Std. Dev.	Std. Dev.	2010	2009
Netherlands	61	60	3.33%	5.62%	7.52%	9.33%	2.83%	6.06%
U.K.	442	433	3.62%	5.75%	11.60%	12.70%	6.52%	8.13%
U.S.A.	2226	2171	3.93%	6.97%	9.51%	15.15%	3.28%	4.47%
France	297	294	5.51%	7.22%	9.72%	12.34%	3.75%	4.05%
Germany	289	286	5.54%	7.34%	13.10%	15.16%	2.67%	3.66%
Spain	82	78	6.44%	7.39%	9.63%	11.26%	9.39%	8.07%
Ireland	28	26	6.45%	7.46%	16.29%	16.30%	12.20%	17.00%
Italy	155	154	7.99%	10.51%	10.20%	14.11%	8.69%	11.20%
Portugal	30	30	9.36%	12.07%	7.25%	12.44%	10.90%	7.39%
Greece	79	77	10.60%	11.57%	14.40%	12.99%	24.10%	13.22%

* Based on median Z-Metrics PDs from January 1 – June 30, 2009 and January 1 – April 30, 2010.

** Assuming a 40% recovery rate; based on the median CDS spread observed for first six months of 2009 and first three months of 2010.

† PD Computed as $1 - e^{(-5*s)/(1-R)}$

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

**Median Percent Change in Various Country Stock
Market Index Values and Z-Metrics' PDs
(First Six Months of 2010 Vs. 2009)**

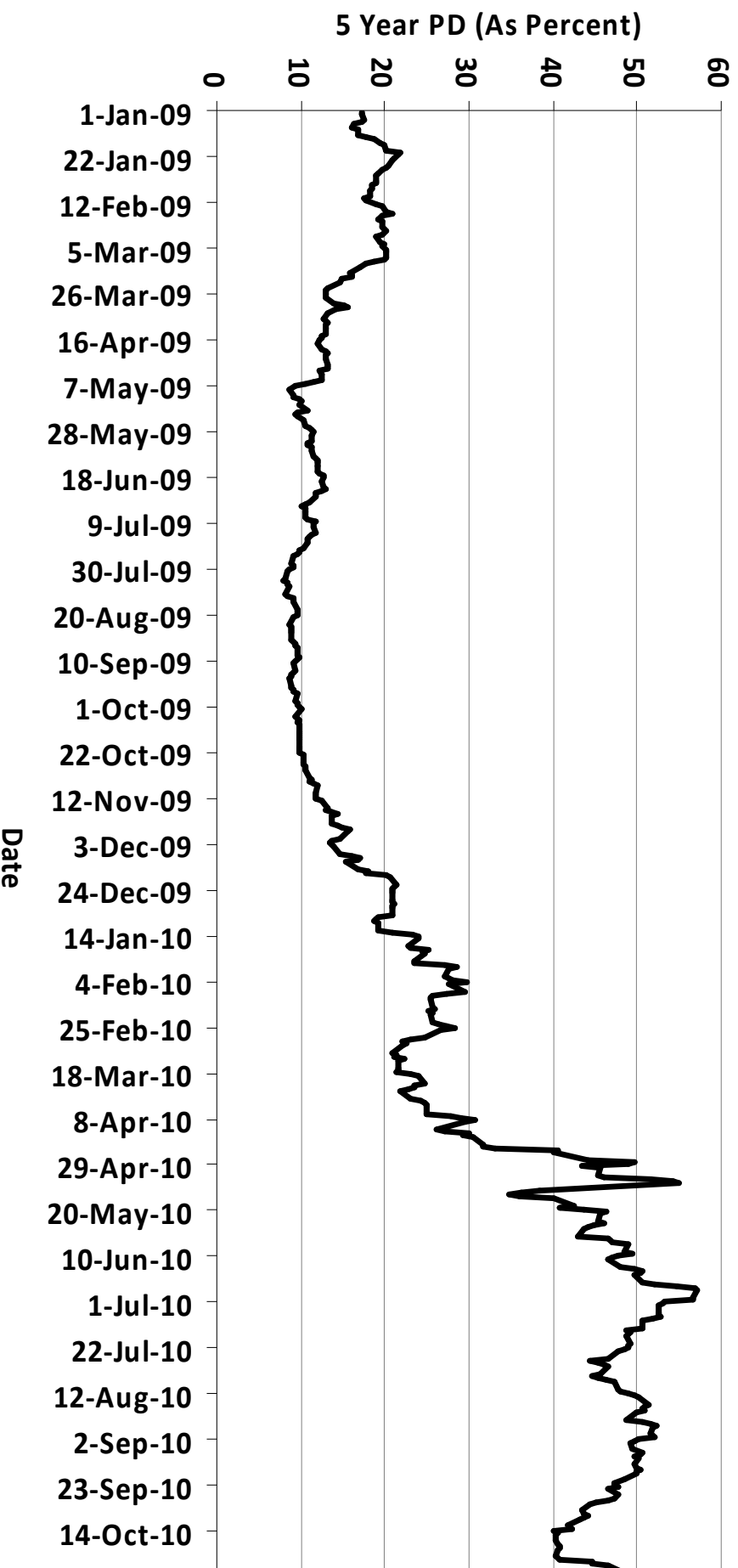
Country	Index	Median Percent Change (2010 vs. 2009)*	Median Z-Metrics PDs: Percent Change (2010 vs. 2009)*
France	CAC40	24.1%	-23.6%
Germany	DAX	31.8%	-24.5%
Greece	ASE	5.5%	-8.4%
Ireland	ISEQ	26.2%	-7.4%
Italy	FTSEMIB	18.2%	-24.0%
Netherlands	AEX	34.4%	-25.3%
Portugal	PSI-20	17.8%	-22.4%
Spain	IBEX35	20.9%	-12.9%
U.K.	FTSE100	27.8%	-37.6%
U.S.A.	S&P500	31.9%	-43.6%

*Median of the various trading day stock index values and PDs

Sources: Z-Metrics Model calculations from RiskMetrics (MSCI) Group, Bloomberg for stock index values

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

Greece, Jan 2009 - Oct 2010



Financial Health of the Corporate, Non-Financial Sector of Selected Asian Countries (2010 Results)

Country	No. of Listed Companies	Z-Metrics Five Year Probability of Default			Five Year Implied PD from CDs Spread
		Median PD	Mean PD	Std. Dev. PD	
Hong Kong	135	2.79%	5.47%	6.92%	3.75%
India (State Bank of)	610	4.29%	7.56%	8.50%	12.47%
Singapore	202	3.46%	7.65%	10.58%	3.69%

Sources: Author Calculations from MSCI Group, Compustat Data

Recent Five-Year Probability of Default (PD) Implied From CDS Spreads

(December 15, 2010 Results)

Country	Five Year Implied PD from CDs Spread
Netherlands	3.66%
United Kingdom	4.68%
USA	2.27%
France	6.65%
Germany	3.19%
Spain	19.45%
Ireland	33.67%
Italy	11.63%
Portugal	26.40%
Greece	51.79%

Sources: Author Calculations from *MSCI Group, Compustat Data*

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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 – 02/2011 (23 obs.)	Defaulted Bond and Bank Loan Index	70%	65%
	S&P 500 Stock Index	67%	
Full Sample Period 01/1987 – 02/2011 (290 obs.)	Defaulted Bond and Bank Loan Index ^c	65%	40%
	S&P 500 Stock Index	57%	
Most Recent Cycle 04/2010 – 12/2010 (11 obs.)	Defaulted Bond and Bank Loan Index	85%	76%
	S&P 500 Stock Index	81%	

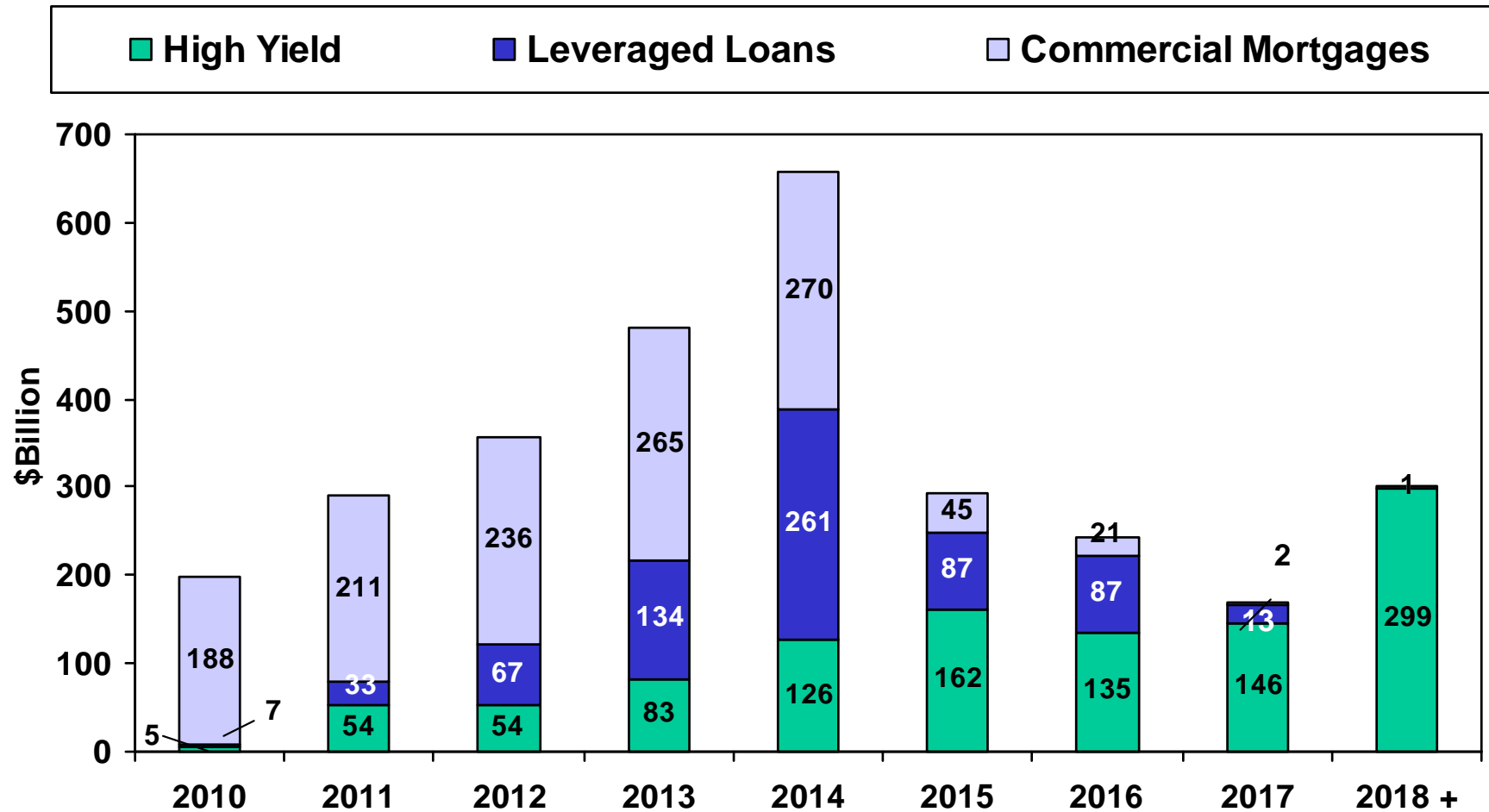
^aCorrelation between Defaulted Bond Index and S&P 500 was -16% during recovery period. ^bCorrelation between Defaulted Bond and Bank Loan Index and S&P 500 was 43% during recovery period. ^cBased on only the Defaulted Bond Index from 01/1987 – 12/1995.
Source: E. Altman, NYU Salomon Center

Major Risks Going Forward (For 2011)

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Upcoming Debt Maturities: 2010-2018

High-Yield Bond, Leveraged Loan and Commercial Mortgage Maturities (\$ in billions)



Source: J.P. Morgan & MarkIt as of September 17, 2010; S&P LCD.

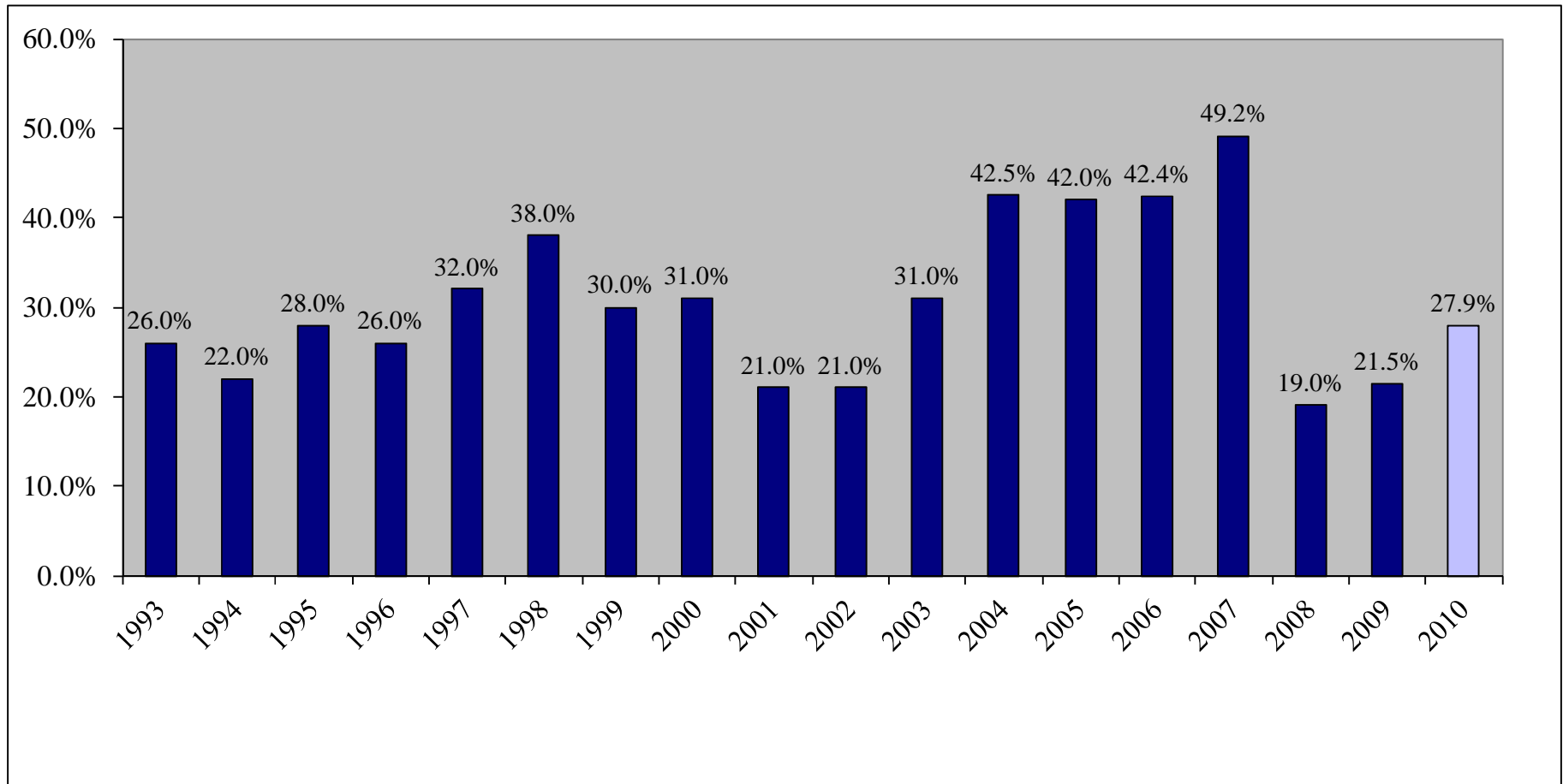
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DEFAULT RATE FORECASTING

Method 1: Mortality Rate Analysis

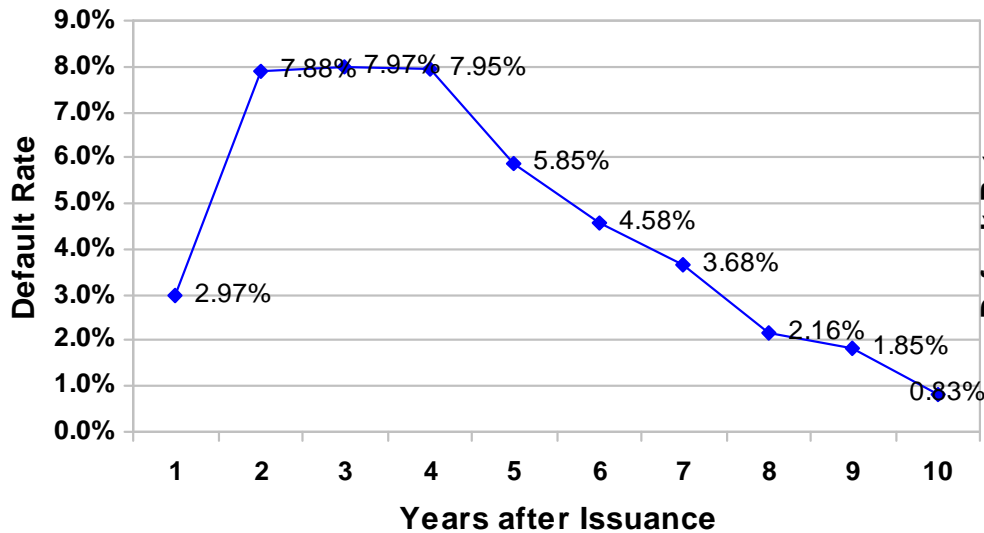
New Issues Rated B- or Below as Percentage of all New Issues (1993 – 2010)



Source: Standard & Poor's Global Fixed Income Research

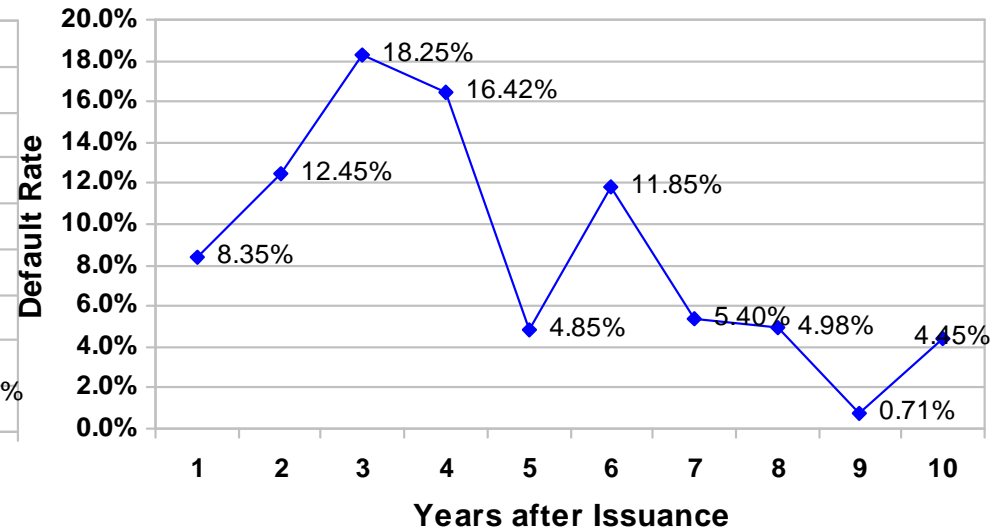
Default Lag After Issuance: 'B' & 'CCC' Rated Corporate Bonds

Default Lag after Issuance for 'B' Ratings



Source: Altman Mortality Tables (1971-2010)

Default Lag after Issuance for 'CCC' Ratings



Source: Altman Mortality Tables (1971-2010)

Mortality Rates by Original Rating

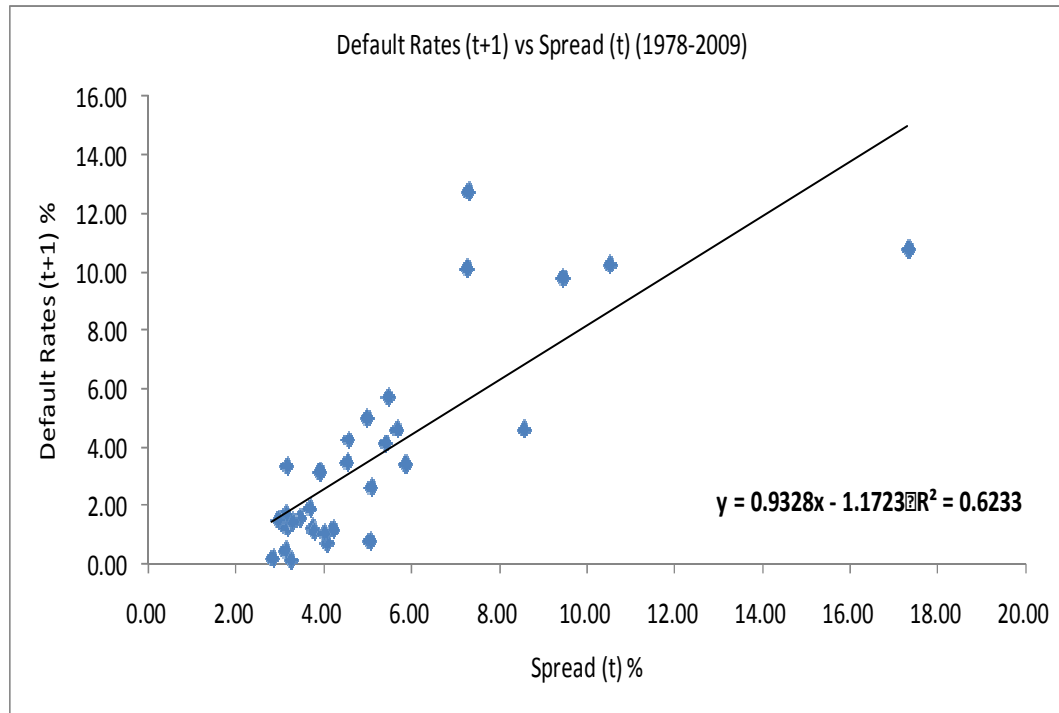
All Rated Corporate Bonds*
1971-2010

Years After Issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.02%	0.04%	0.05%	0.05%	0.05%	0.05%
AA	Marginal	0.00%	0.00%	0.26%	0.11%	0.02%	0.01%	0.01%	0.01%	0.03%	0.01%
	Cumulative	0.00%	0.00%	0.26%	0.37%	0.39%	0.40%	0.41%	0.42%	0.45%	0.46%
A	Marginal	0.01%	0.07%	0.17%	0.18%	0.14%	0.11%	0.04%	0.31%	0.11%	0.07%
	Cumulative	0.01%	0.08%	0.25%	0.43%	0.57%	0.68%	0.72%	1.03%	1.13%	1.20%
BBB	Marginal	0.38%	2.50%	1.38%	1.06%	0.59%	0.28%	0.32%	0.18%	0.17%	0.36%
	Cumulative	0.38%	2.87%	4.21%	5.23%	5.79%	6.05%	6.35%	6.52%	6.68%	7.01%
BB	Marginal	1.03%	2.10%	3.97%	2.02%	2.38%	1.48%	1.53%	1.12%	1.52%	3.21%
	Cumulative	1.03%	3.11%	6.95%	8.83%	11.00%	12.32%	13.66%	14.63%	15.93%	18.63%
B	Marginal	2.97%	7.88%	7.97%	7.95%	5.85%	4.58%	3.68%	2.16%	1.85%	0.83%
	Cumulative	2.97%	10.62%	17.74%	24.28%	28.71%	31.97%	34.48%	35.89%	37.08%	37.60%
CCC	Marginal	8.35%	12.45%	18.25%	16.42%	4.85%	11.85%	5.40%	4.98%	0.71%	4.45%
	Cumulative	8.35%	19.76%	34.40%	45.17%	47.83%	54.02%	56.50%	58.67%	58.96%	60.78%

*Rated by S&P at Issuance
Based on 2,572 issues

Updated Market-Based Annual Default Rate Forecast **Annual Default Rate (t+1) versus High-Yield Spreads (t)**



The regression equation is
Default Rate = - 1.17 + 0.93 * Spread

Predictor	Coef	SE Coef	T	P
Constant	-1.1723	0.8075	-1.4518	0.1573
Spread	0.9328	0.1347	6.9266	0.0000

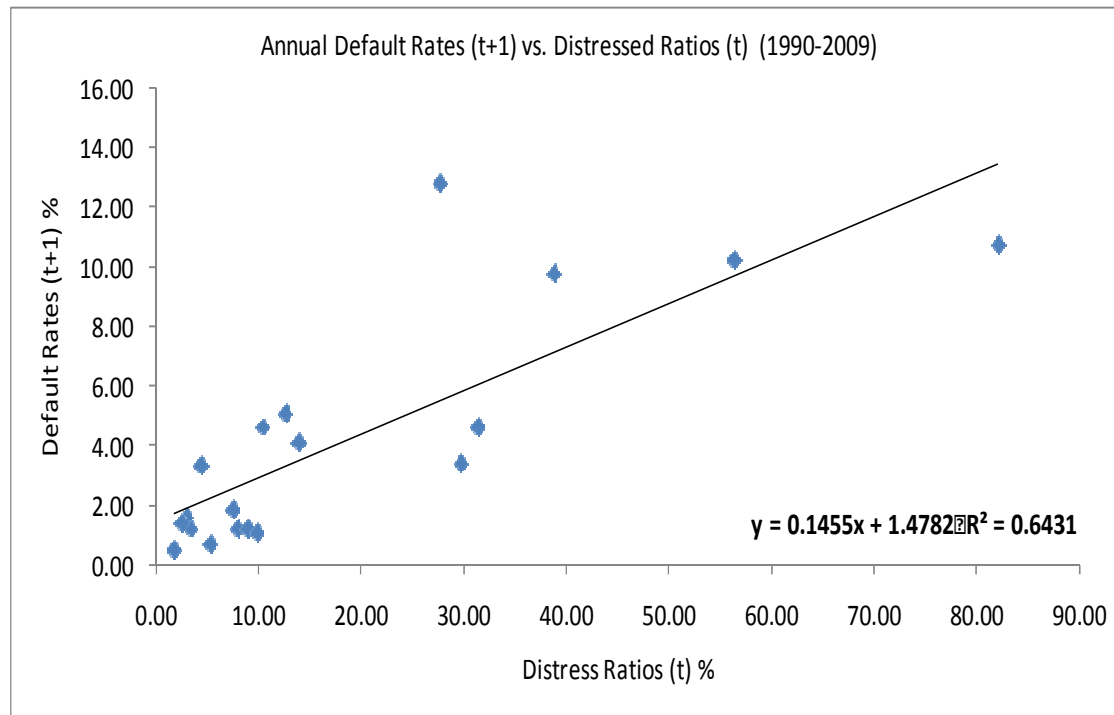
S = 2.1914 R-Sq = 62.3% R-Sq(adj) = 61.0%

Application

- Yield spread (12/31/2007) of 566bps, forecast P_D for 2008 = **4.11%** vs. actual of 4.65%
- Yield spread (12/31/2008) of 1,731bps, forecast P_D for 2009 = **14.97%** vs. actual of 10.77%
- Yield spread (12/31/2009) of 513bps, forecast P_D for 2010 = **3.61%** vs. actual of 1.13%
- Yield spread (12/31/2010) of 458bps, forecast P_D for 2011 = **3.10%**

Updated Market-Based Annual Default Rate Forecast

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



The regression equation is

$$\text{Default Rate} = 1.48 + 0.15 * \text{Distress Ratio}$$

Predictor	Coef	SE Coef	T	P
Constant	1.4782	0.7352	2.0105	0.0605
Spread	0.1455	0.0263	5.5347	0.0000

S = 2.3745 R-Sq = 64.3% R-Sq(adj) = 62.2%

Application

- Distress ratio (12/31/2007) of 10.42%, forecast P_D for 2008 = **3.00%** vs. actual of 4.65%
- Distress ratio (12/31/2008) of 82.05%, forecast P_D for 2009 = **13.42%** vs. actual of 10.77%
- Distress ratio (12/31/2009) of 15.28%, forecast P_D for 2010 = **3.70%** vs. actual of 1.13%
- Distress ratio (12/31/2010) of 7.62%, forecast P_D for 2011 = **2.59%**

Default and Recovery Forecasts: Summary of Forecast Models

Model	2010 Recession Scenario Default Rate Forecast as of 12/31/2009	2010 No Recession Default Rate Forecast as of 12/31/2009	2011 Default Rate Forecast as of 12/31/2010	2012 (02/28) Default Rate Forecast as of 02/28/2011
Mortality Rate	5.06%	5.06%	3.90%	3.90%
Recession Scenarios	14.00%	n/r	n/r	n/r
Yield-Spread	3.61% ^a	3.61% ^a	3.10% ^c	2.37% ^e
Distress Ratio	3.70% ^b	3.70% ^b	2.59% ^d	2.07% ^f
Average of Models Recovery Rates*	6.59% 32.0%	4.12% 37.1%	3.20% 39.8%	2.78% 41.3%

* Recovery rate based on the log Linear equation between default and recovery rates, see Altman, et al (2005) Journal of Business, November and Slide 42. ^a Based on Dec. 31, 2009 yield-spread of 513.16bp. ^b Based on Dec. 31, 2009 Distress Ratio of 15.3%. ^c Based on Dec. 31, 2010 yield-spread of 458.0bp. ^d Based on Dec. 31, 2010 Distress Ratio of 7.62%. ^e Based on Mar. 04, 2011 yield-spread of 380bp. ^f Based on Feb. 28, 2011 Distress Ratio of 4.1%.

Source: All Corporate Bond Issuance and Authors' Estimates of Market Size in 2010 & 2011.

***FINANCIAL
DISTRESS
PREDICTION***

Financial Distress Prediction Applications

- Lenders
- Investors
- Security Analysts
- Regulators & Gov't Agencies
- Auditors
- Credit Rating Agencies
- Sovereign Risk (Bottom-Up)
- Advisors
- Researchers
- M&A
- Purchasers, Suppliers
- MANAGERS
- LITIGATION SUPPORT

Litigation Support

- Default Likelihood
- Failing Company Doctrine: Anti-Trust
- Zone of Insolvency
- Avoiding Chapter 22

Key Industrial Financial Ratios

(U.S. Industrial Long-term Debt)

Three Year Medians (2007-2009)	AAA	AA	A	BBB	BB	B	CCC
EBIT Interest Coverage(x)	30.5	18.3	11.0	5.8	3.5	1.4	0.4
EBITDA Interest Coverage (x)	33.5	20.5	14.3	7.6	5.2	2.3	1.1
Funds from Operations/Total Debt (%)	200.7	73.4	53	34.0	25.3	12.0	2.5
Free Operating Cash Flow/Total Debt (%)	157.8	49.8	34.0	17.0	11.9	3.2	(3.6)
Total Debt/EBITDA (x)	0.4	1.1	1.5	2.3	3.0	5.3	8.6
Return on Capital (%)	34.2	25.4	21.1	14.1	12.2	8.3	2.7
Total Debt/Total Debt + Equity (%)	15.1	34.7	35.7	44.7	50.4	73.1	98.9

Source: Standard & Poor's, Creditstats: 2009 Adjusted Key US Industrial and Utility Financial Ratios

“Z” Score Component Definitions

<u>Variable</u>	<u>Definition</u>	<u>Weighting Factor</u>
X ₁ - - - - -	Working Capital <hr/> Total Assets	1.2
X ₂ - - - - -	Retained Earnings <hr/> Total Assets	1.4
X ₃ - - - - -	EBIT <hr/> Total Assets	3.3
X ₄ - - - - -	Market Value of Equity <hr/> Book Value of Total Liabilities	0.6
X ₅ - - - - -	Sales <hr/> Total Assets	1.0

Zones of Discrimination: Original Z - Score Model

$Z > 2.99$ - “Safe” Zone

$1.8 < Z < 2.99$ - “Grey” Zone

$Z < 1.80$ - “Distress” Zone

Estimating Probability of Default (PD) and Probability of Loss Given Defaults (LGD)

Method #1

- Credit scores on new or existing debt
- Bond rating equivalents on new issues (Mortality) or existing issues (Rating Agency)
- Utilizing mortality or cumulative default rates to estimate marginal and cumulative defaults

or

Method #2

- Credit scores on new or existing debt
- Direct estimation of the probability of default
- Based on PDs, assign a rating

Average Z-Score by S&P Bond Rating

S&P 500: 1992 - 2005

<u>Rating</u>	<u>2004-2005</u>	<u>1996-2001</u>	<u>1992-1995</u>
AAA	5.31	5.60	4.80
AA	4.99	4.73	4.15
A	4.22	3.74	3.87
BBB	3.37	2.81	2.75
BB	2.27	2.38	2.25
B	1.79	1.80	1.87
B-	1.34	1.31	1.38
CCC+	0.90	0.82	0.89
CCC	0.45	0.33	0.40
D	-0.19	-0.20	0.05

Method #1

Marginal and Cumulative Mortality Rate Actuarial Approach

$$\mathbf{MMR}_{(t)} = \frac{\text{Total value of defaulting debt in year } (t)}{\text{total value of the population at the start of the year } (t)}$$

MMR = Marginal Mortality Rate

One can measure the cumulative mortality rate (CMR) over a specific time period (1,2,..., T years) by subtracting the product of the surviving populations of each of the previous years from one (1.0), that is,

$$CMR_{(t)} = 1 - \prod_{t=1} SR_{(t)},$$

here $CMR_{(t)}$ = Cumulative Mortality Rate in (t) ,
 $SR_{(t)}$ = Survival Rate in (t) , $1 - MMR_{(t)}$

Mortality Rates by Original Rating

All Rated Corporate Bonds*
1971-2010

		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.02%	0.04%	0.05%	0.05%	0.05%	0.05%
AA	Marginal	0.00%	0.00%	0.26%	0.11%	0.02%	0.01%	0.01%	0.01%	0.03%	0.01%
	Cumulative	0.00%	0.00%	0.26%	0.37%	0.39%	0.40%	0.41%	0.42%	0.45%	0.46%
A	Marginal	0.01%	0.07%	0.17%	0.18%	0.14%	0.11%	0.04%	0.31%	0.11%	0.07%
	Cumulative	0.01%	0.08%	0.25%	0.43%	0.57%	0.68%	0.72%	1.03%	1.13%	1.20%
BBB	Marginal	0.38%	2.50%	1.38%	1.06%	0.59%	0.28%	0.32%	0.18%	0.17%	0.36%
	Cumulative	0.38%	2.87%	4.21%	5.23%	5.79%	6.05%	6.35%	6.52%	6.68%	7.01%
BB	Marginal	1.03%	2.10%	3.97%	2.02%	2.38%	1.48%	1.53%	1.12%	1.52%	3.21%
	Cumulative	1.03%	3.11%	6.95%	8.83%	11.00%	12.32%	13.66%	14.63%	15.93%	18.63%
B	Marginal	2.97%	7.88%	7.97%	7.95%	5.85%	4.58%	3.68%	2.16%	1.85%	0.83%
	Cumulative	2.97%	10.62%	17.74%	24.28%	28.71%	31.97%	34.48%	35.89%	37.08%	37.60%
CCC	Marginal	8.35%	12.45%	18.25%	16.42%	4.85%	11.85%	5.40%	4.98%	0.71%	4.45%
	Cumulative	8.35%	19.76%	34.40%	45.17%	47.83%	54.02%	56.50%	58.67%	58.96%	60.78%

*Rated by S&P at Issuance
Based on 2,572 issues
Source: Standard & Poor's (New York) and Author's Compilation

Z' Score

Private Firm Model

$$Z' = .717X_1 + .847X_2 + 3.107X_3 + .420X_4 + .998X_5$$

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

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

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

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

$$X_5 = \frac{\text{Sales}}{\text{Total Assets}}$$

$Z' > 2.90$ - "Safe" Zone

$1.23 < Z' < 2.90$ - "Grey" Zone

$Z' < 1.23$ - "Distress" Zone

Z'' Score Model for Manufacturers, Non-Manufacturer Industrials; Developed and Emerging Market Credits

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

$X_1 =$ Current Assets - Current Liabilities

Total Assets

$X_2 =$ Retained Earnings

Total Assets

$X_3 =$ Earnings Before Interest and Taxes

Total Assets

$X_4 =$ Book Value of Equity

Total Liabilities

$Z'' > 2.60$ - "Safe" Zone

$1.1 < Z'' < 2.60$ - "Grey" Zone

$Z'' < 1.1$ - "Distress" Zone

US Bond Rating Equivalent Based on Z'' Score Model

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

Rating	Average 1996 Z''-Score ⁽¹⁾	Average 2006 Z''-Score ⁽¹⁾
AAA/AA+	8.15 (8)	7.51 (14)
AA/AA-	7.16 (33)	7.78 (20)
A+	6.85 (24)	7.76 (26)
A	6.65 (42)	7.53 (61)
A-	6.4 (38)	7.10 (65)
BBB+	6.25 (38)	6.47 (74)
BBB	5.85 (59)	6.41 (99)
BBB-	5.65 (52)	6.36 (76)
BB+	5.25 (34)	6.25 (68)
BB	4.95 (25)	6.17 (114)
BB-	4.75 (65)	5.65 (173)
B+	4.5 (78)	5.05 (164)
B	4.15 (115)	4.29 (139)
B-	3.75 (95)	3.68 (62)
CCC+	3.2 (23)	2.98 (16)
CCC	2.5 (10)	2.20 (8)
CCC-	1.75 (6)	1.62 (0) ⁽²⁾
CC/D	0 (14)	-1.04 (5)

Sources: Compustat, Company Filings and S&P

⁽¹⁾ Sample Size in Parentheses

⁽²⁾ Interpolated between CCC and CC/D

U.S. Automotive Industry: Z, Z''-Scores and Bond Rating Equivalents (BRE)

Ford and GM: Z and Z'' Score Tracking

	Ford		GM	
	Z-Scores	BRE	Z-Scores	BRE
12/31/10	1.47	B-	1.56	B
12/31/09	1.09	CCC+	0.28	CCC
12/31/08	0.69	CCC+	(0.63)	D
12/31/07	0.98	CCC+	0.77	CCC+
12/31/06	0.83	CCC+	1.12	B-
12/31/05	1.15	B-	0.96	CCC+
	Z''-Scores	BRE	Z''-Scores	BRE
12/31/10	5.55	BB-	4.60	B+
12/31/09	5.47	BB-	2.72	CCC+
12/31/08	4.39	B	(3.61)	D
12/31/07	5.47	BB-	1.85	CCC-
12/31/06	5.17	B+	3.39	B-
12/31/05	5.54	BB-	6.59	BBB+

Note: Consolidated Annual Results

Data Source: Bloomberg, Edgar

U.S. Automotive Industry: Z, Z''-Scores and Bond Rating Equivalents (BRE) – Non-Consolidated Data

Ford and GM: Z and Z'' Score Tracking

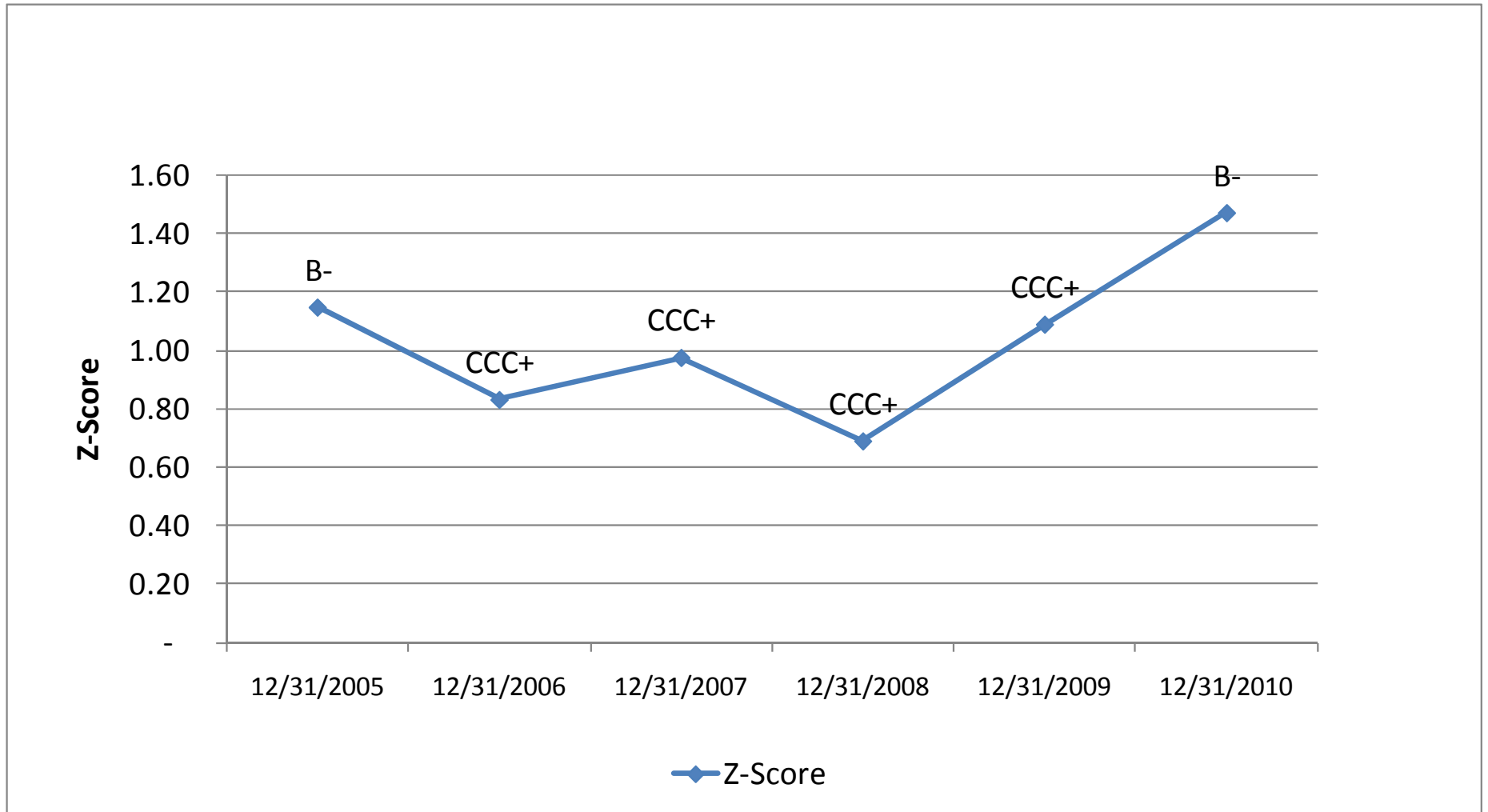
	Ford		GM	
	Z-Scores	BRE	Z-Scores	BRE
12/31/10	2.49	BB	1.59	B
12/31/09	1.22	B-	0.28	CCC
12/31/08	0.81	CCC+	(0.63)	D
12/31/07	1.28	B-	0.77	CCC+
12/31/06	0.78	CCC+	0.88	CCC+
12/31/05	1.40	B-	0.51	CCC
	Z''-Scores	BRE	Z''-Scores	BRE
12/31/10	3.34	B-	4.19	B
12/31/09	2.49	CCC	2.72	CCC+
12/31/08	0.07	D	(3.61)	D
12/31/07	3.15	CCC+	1.26	CCC-
12/31/06	2.34	CCC	2.68	CCC+
12/31/05	3.13	CCC+	1.74	CCC-

Note: Automotive Sector Annual Results Only

Data Source: Bloomberg, Edgar

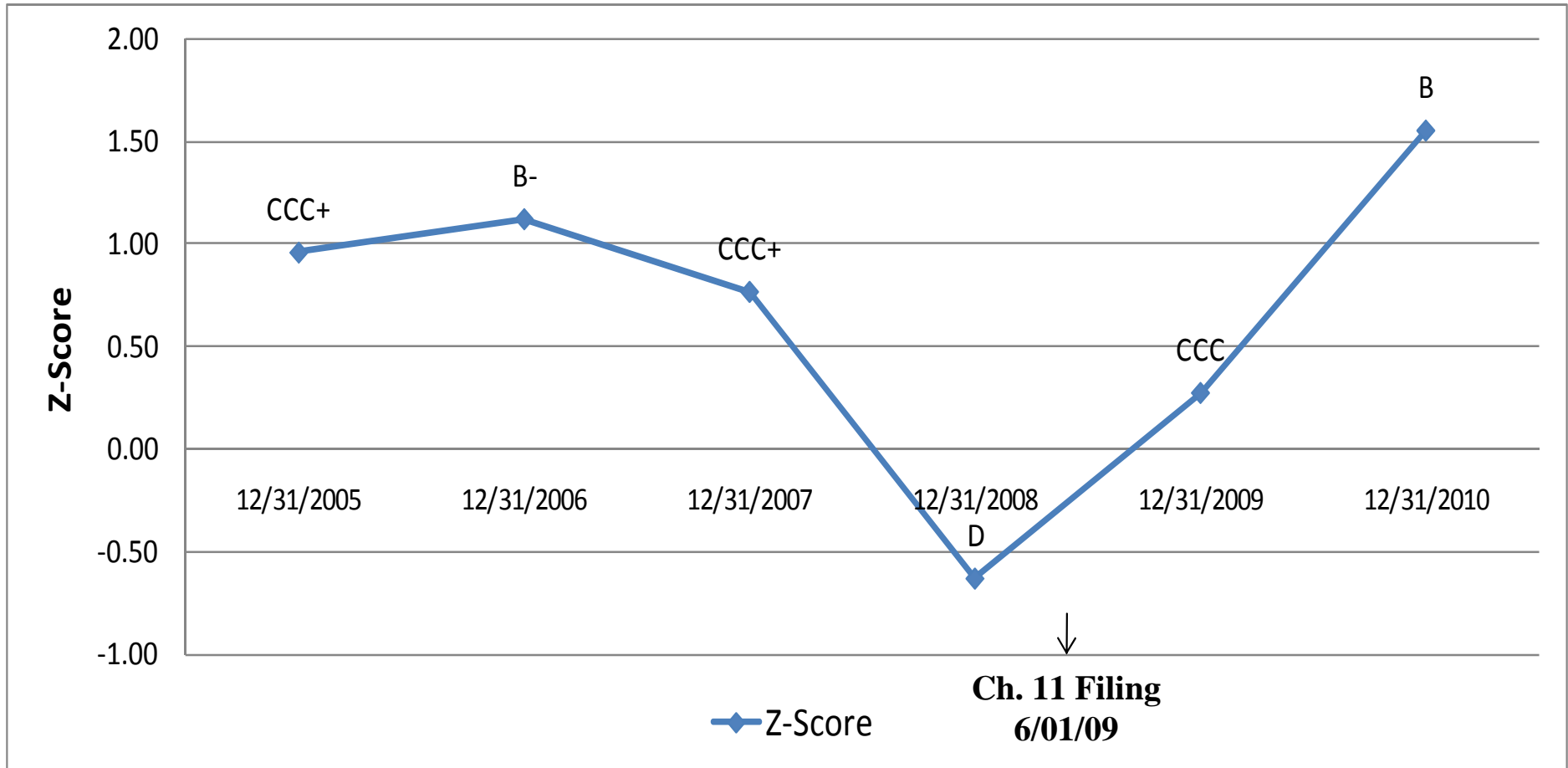
Z-Score Model Applied to Ford (Consolidated Data): Bond Rating Equivalents and Scores from 2005 - 2010

Z- Score: Ford Motor Co.



Z-Score Model Applied to GM (Consolidated Data): Bond Rating Equivalents and Scores from 2005 - 2010

Z- Score: General Motors Co.



**Post-Chapter 11 Bankruptcy
Performance:
Avoiding Chapter 22**

Chapter 22's, 33's & 44's in the U.S.

1984-2010

Year	Chapter 22's	Chapter 33's	Chapter 44's
1984 – 1989	18	0	0
1990	10	0	0
1991	9	0	0
1992	6	0	0
1993	8	0	0
1994	5	0	0
1995	9	0	0
1996	12	2	0
1997	5	0	0
1998	2	1	0
1999	10	0	0
2000	12	1	0
2001	17	2	0
2002	11	0	1
2003	17	1	0
2004	6	0	0
2005	9	1	0
2006	4	0	0
2007	8	1	0
2008	19	0	0
2009	18	1	1
2010	<u>10</u>	<u>1</u>	<u>0</u>
Totals	225	11	2

Sources: The Bankruptcy Almanac, annually, Boston: New Generation Research and Altman and Hotchkiss *Corporate Financial Distress and Bankruptcy*, J. Wiley, Hoboken, NJ., (2005).⁴⁸

Chapter 33s

Company	Bankruptcy Date	Confirm Date	Assets (\$ mm)
Anchor Glass Container Corp. (2005)	08/08/05	04/18/06	657
(2002)	04/15/02	08/09/02	536
(1996)	09/13/96	11/25/97	1,208
Grand Union Co. (2000)	10/03/00	10/08/02	1,089
(1998)	06/24/98	08/05/02	1,061
(1995)	01/25/95	05/31/95	1,394
Harvard Industries, Inc. (2002)	01/16/02	02/26/04	277
(1997)	05/08/97	10/15/98	618
(1991)	04/11/91	08/10/92	533
PLVTZ, Inc. (Levitz) (2007)	11/08/07	10/27/08	178
Levitz Home Furnishings, Inc. (2005)	10/11/05	12/15/05	245
(1997)	09/05/97	02/06/01	934
Memorex Telex Corp. (1996)	10/15/96	10/09/98	268
(1994)	02/11/94	03/14/94	1,139
(1992)	01/06/92	02/07/92	1,643

Chapter 33s (continued)

Company		Bankruptcy Date	Confirm Date	Assets (\$ mm)
Salant Corp.	(1998)	12/29/98	04/16/99	657
	(1990)	06/27/90	07/30/93	536
	(1985)	02/22/85	05/19/97	1,208
Samuels Jewelers, Inc.	(2003)	08/04/03	03/30/04	1,089
Barry's Jewelers, Inc.	(1997)	05/11/97	12/22/98	1,061
	(1992)	02/26/92	06/19/92	1,394
The Penn Traffic Co.	(2009)	11/18/09	11/01/10	277
	(2003)	05/30/03	03/17/05	618
	(1999)	03/01/99	05/27/99	533
Trans World Airlines	(2001)	01/10/01	06/18/02	178
	(1995)	06/30/95	08/04/95	245
	(1992)	01/31/92	08/11/93	934
United Mechanics & Mfg.	(1996)	02/22/96	04/19/97	268
	(1990)	11/02/90	08/16/91	1,139
	(1977)	07/01/77	unknown	1,643

Z" Scores for Chapter 11's

This table lists a sample of firms, and their Z"-Scores that emerged from bankruptcy and did not file for bankruptcy protection a second time

	CHAPTER-11 Company Name	Effective Date	Z"-Score After Emergence	Bond Rating Equivalent	Z"-Score 1-Year Post	Bond Rating Equivalent
1	Boonton Electronics	11/18/94	7.67	AAA/AA+	7.63	AA
2	CAI Wireless Systems, Inc.	10/14/98	2.12	CCC-	na	na
3	Cherokee Corp	06/01/93	4.00	B	2.09	CCC-
4	Consolidated Hydro, Inc.	11/07/97	3.90	B-	4.81	BB-
5	El Paso Electronic	02/12/96	4.38	B+	4.75	BB-
6	Elsinore Corporation	02/28/97	3.65	B-	4.18	B
7	Emcor	10/03/94	4.03	B	4.38	B+
8	Emerson Radio	08/09/94	5.42	BB+	4.08	B
9	Fansteel, Inc.	12/22/03	0.72	D	2.67	CCC
10	Flagstar Companies, Inc.	01/07/98	2.90	CCC+	(0.44)	D
11	Gantos	03/07/95	6.58	A	6.17	BBB+
12	Gentek, Inc.	10/07/03	4.51	B+	2.19	CCC
13	Grant Geophysical	09/30/97	4.49	B+	4.14	B
14	Harnischfeger Industries, Inc.	07/13/01	5.70	BBB-	5.30	BB+
15	Hayes Lemmerz International	05/12/03	4.38	B+	0.18	CC/D
16	Heartland Wireless Communications, Inc.	04/05/99	6.11	BBB+	5.01	BB
17	Hexcel Corporation	01/12/95	4.83	BB-	4.45	B+
18	Hvide Marine, Inc.	12/15/99	3.69	B-	3.64	B-
19	Imperial Sugar Co. TX	08/29/01	3.98	B	5.00	BB
20	Kaiser Group International, Inc.	12/18/00	6.94	A+	4.23	B
21	Kash N'Karry	12/12/94	4.20	B	4.60	B+
22	Kitty Hawk Inc.	09/30/02	6.19	BBB+	7.39	AA
23	Krystal Company	04/22/97	3.46	CCC+	9.41	AAA
24	Laidlaw, Inc.	02/28/03	4.40	B+	5.55	BBB-
25	Loehmann's Holdings Inc. DE	10/31/00	5.48	BBB-	6.24	BBB+
26	Loewen Group International, Inc.	01/02/02	3.09	CCC+	3.62	B-
27	Lone Star Industries	03/01/94	5.16	BB+	6.19	BBB+
28	Magellan Health Services, Inc.	10/08/03	4.96	BB	7.89	AAA/AA+
29	NRG Energy	11/24/03	3.75	B-	1.22	CCC-
30	Paragon Trade Brands, Inc.	01/28/00	5.72	BBB-	na	na
31	Pathmark Stores Inc.	09/18/00	4.12	B	2.47	CCC
32	Peregrine Systems, Inc.	07/18/03	4.28	B	3.47	CCC+
33	Petroleum Geo Services ASA	10/21/03	4.32	B	5.48	BBB-
34	PhoneTel	11/18/99	3.54	B-	4.30	B
35	Polymre Group, Inc.	01/03/03	2.35	CCC	2.09	CCC-
36	Redback Networks, Inc.	12/22/03	6.56	A	6.19	BBB+
37	Safety Components International	10/11/00	6.13	BBB+	5.13	BB+
38	Southern Mineral Corp.	08/01/00	5.38	BB+	na	na
39	Stage Stores Inc. NV	08/24/01	9.98	AAA	11.78	AAA
40	Sterling Chemicals Inc. New	12/19/02	4.98	BB	3.58	B-
41	Stratosphere Corporation	10/04/98	8.16	AAA	8.56	AAA
42	Tele mundo	07/20/94	5.00	BB	4.98	BB
43	Teletrac, Inc.	09/15/99	3.82	B-	2.54	CCC
44	Vista Eyecare, Inc.	05/31/01	3.41	CCC+	3.34	CCC+
45	Warnaco Group, Inc.	01/16/03	4.27	B	4.62	B+
	Number of Bankruptcies		45		42	
	Average Z Score		4.73	B+	4.65	B+
	Median Z Score		4.38		4.53	
	Standard Deviation		1.63		2.55	

Source: Authors compilation from CapitalIQ data

Z''-Scores for Chapter 11s

Summary of Results

	Emerge		Emerge + 1	
Number of Bankruptcies	45		42	
Average Z – Score	4.73	B+	4.65	B+
Median Z-Score	1.38		4.53	
Standard Deviation	1.63		2.55	

Source: Authors compilation from CapitalIQ data.

Z' Scores for Chapter 22's

This table lists a sample of firms that filed for bankruptcy protection at least two times and their Z'-Scores just after emergence and a year later

CHAPTER-22 Company Name	Effective Date	Z'-Score After Emergence	Bond Rating Equivalent	Z'-Score 1-Year Post	Bond Rating Equivalent	Re-filing Date	Period Between Emergence and Second Filing		
							Years	Months	Days
1 American Banknote Corporation	11/21/00	0.34	D	0.35	D	04/08/05	4	4	18
2 Ames Department Stores, Inc.	12/18/92	4.74	BB-	6.31	BBB+	08/20/01	8	8	2
3 Anacomp Inc.	06/04/96	3.72	B-	2.93	CCC+	10/19/01	5	4	15
4 Anchor Glass Container Corp.	11/25/97	3.62	B-	3.73	B-	04/15/02	4	4	21
5 Anchor Glass Container Corp.	08/09/02	3.61	B-	4.05	B	08/08/05	2	11	30
6 ATA Holdings Inc.	01/31/06	3.18	CCC+	3.40	CCC+	04/02/08	2	2	2
7 Brendle's Inc.	12/20/93	6.65	A	6.60	A	04/16/96	2	3	27
8 Coho Energy	03/21/00	1.71	CCC-	(3.27)	D	02/24/03	2	11	3
9 Eagle Food Centers, Inc.	07/10/00	2.49	CCC	3.45	CCC+	03/25/04	3	8	15
10 Edison Brothers Stores Inc.	09/26/97	4.19	B	2.85	CCC	03/09/99	1	5	11
11 Galey & Lord	02/10/04	(0.66)	D	0.28	D	03/05/04	0	0	24
12 Grand Union Company	05/31/95	2.81	CCC	1.90	CCC-	06/24/98	3	0	24
13 Grand Union Company	08/05/98	3.41	CCC+	0.76	D	10/03/00	2	1	28
14 Harvard Industries	08/10/92	2.38	CCC	1.10	CCC-	05/08/97	4	8	28
15 Harvard Industries	10/15/98	1.21	CCC-	0.80	D	01/16/02	3	3	1
16 Heartland Wireless	03/15/99	3.87	B-	5.25	BB+	09/05/03	4	5	21
17 Homeland Holding Corp.	07/16/96	4.73	BB-	4.18	B	08/01/01	5	0	16
18 Ithaca Industries	12/16/96	7.21	AA/AA-	6.86	A+	05/09/00	3	4	23
19 Lamonts Apparels	12/18/97	2.83	CCC	2.16	CCC	01/04/00	2	0	17
20 McleodUSA Inc.	04/18/02	(2.77)	D	3.42	CCC+	12/16/05	3	7	28
21 MemorexTelex	02/07/92	(0.49)	D	1.37	CCC-	02/11/94	2	0	4
22 MemorexTelex	03/14/94	0.62	D	(1.30)	D	10/15/96	2	7	1
23 Payless Cashways Inc.	12/02/97	5.19	BB+	5.64	BBB-	06/04/01	3	6	2
24 Penn Traffic Company	05/27/99	4.39	B+	3.73	B-	03/17/05	5	9	18
25 Pillowtex Corporation	05/02/02	2.78	CCC	na	na	07/30/03	1	2	28
26 Planet Hollywood Int'l, Inc.	01/21/00	(8.24)	D	(6.77)	D	10/19/01	1	8	28
27 Rymer Foods	04/07/93	4.44	B+	4.14	B	07/08/97	4	3	1
28 Salant	07/30/93	6.52	A-	5.80	BBB	12/29/98	5	4	29
29 Smith Corona	02/28/97	5.36	BB+	3.92	B-	05/23/00	3	2	25
30 Solo Serve	07/06/95	2.98	CCC+	1.50	CCC-	01/20/99	3	6	14
31 Steakhouse Partners	12/19/03	1.41	CCC-	1.19	CCC-	05/15/08	4	4	26
32 Todays Man, Inc.	12/12/97	7.24	AA-	9.12	AAA	05/06/04	6	4	24
33 Tokheim Corp.	10/09/00	3.90	B-	(0.57)	D	11/21/02	2	1	12
34 Trans World Airlines	08/11/93	(1.33)	D	1.98	CCC-	06/30/95	1	10	19
35 Trans World Airlines	08/04/95	3.05	CCC+	2.09	CCC-	01/10/01	5	5	6
36 Trism	12/09/99	(2.06)	D	(1.02)	D	12/18/01	2	0	9
37 United Merchants	08/16/91	(1.51)	D	0.63	D	02/22/96	4	6	6
38 US Airways Group, Inc.	03/18/03	2.63	CCC	1.84	CCC-	09/16/05	2	5	29
39 USG Corp.	04/23/93	3.48	CCC+	3.82	B-	06/25/01	8	2	2
40 Westmoreland Coal Company	12/22/94	2.18	CCC	(4.36)	D	12/23/96	2	0	1
41 Warehouse Entertainment, Inc.	12/16/96	7.59	AA/AA-	7.95	AA+	01/20/03	6	1	4

Number of Bankruptcies	41		40			Years	Months	Days
Average Z Score	2.67	CCC	2.45	CCC	Average	3	4	16
Median Z Score	3.05		2.51					
Standard Deviation	3.06		3.18					

Source: Authors compilation from CapitalIQ data

Z''-Scores for Chapter 22s

Summary of Results

	Emerge		Emerge + 1					
Number of Bankruptcies	41		40			Years	Months	Days
Average Z-Score	2.67	CCC	2.45	CCC	Average	3	4	16
Median Z-Score	3.05		2.51					
Standard Deviation	3.06		3.18					

Source: Authors compilation from CapitalIQ data.

Difference in Means Test Between Chapter 22 vs Chapter 11 Results

	<u>Z'-Score</u> <u>After Emergence</u>	<u>Z'-Score</u> <u>1-Year Post Emergence</u>
Chapter 11 Mean (Chapter 11 Std. Deviation)	4.73 (1.63)	4.65 (2.55)
Chapter 22 Mean (Chapter 22 Std. Deviation)	2.67 (3.05)	2.45 (3.18)
t-test^(*)	3.84 ^(**)	3.60 ^(**)

(*)

$$t = \frac{\bar{X}_{11} - \bar{X}_{22}}{\sqrt{\frac{Var_{11}}{n_{11}} + \frac{Var_{22}}{n_{22}}}}$$

(**) Significant at the .01 level

Source: Tables VII(a) and VII(b).

Difference in Means and Tests of Specific Performance and Risk Levels: Chapter 22 Firms vs. Chapter 11's (Data from Year of Emergence)

Variable	Chapter 11 Sample	Standard Error	Chapter 22 Sample	Standard Error	Difference in Means Test (t-test)	P- Value
X₁ = Working Capital/TA	0.15	0.16	0.09	0.28	1.24	0.22
X₂ = Retained Earnings/TA	(0.09)	0.22	(0.22)	0.39	1.88**	0.06**
X₃ = EBIT/TA	0.01	0.07	(0.07)	0.19	2.49*	0.02*
X₄ = Book Equity/Total Liabilities	0.74	1.08	0.27	0.39	2.71*	0.01*

*Significant at .01 level, ** significant at .10 level

Source: Author's calculations from firms listed in Tables VII (a) and VII (b), Capital IQ.