

Edward I. Altman, Brenda J. Kuehne

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Defaults and Returns in the High-Yield Bond Market: Third-Quarter 2013 Review



Edward I. Altman

New York University Salomon Center, Stern School of Business, US

Brenda J. Kuehne

New York University Salomon Center, Stern School of Business, US

Abstract

Defaults in the third quarter of 2013 were \$5.13 billion, resulting in a quarterly high-yield bond default rate of 0.37%, higher than the rates both one year (0.24%) and one quarter (0.23%) earlier. However, this continues a trend of low defaults, during which the quarterly default rates were below 0.50% in thirteen out of the last fifteen quarters, with only the fourth-quarters of 2011 and 2012 default rates higher than this level. The trailing 12-month default rate on our \$1.4 trillion high-yield bond market increased to 1.40%, up from 1.28% as of mid-year 2013. The outlook is for continued low default rates but single digit returns for the entire year of 2013.

Keywords: High-Yield Bonds, Defaults, Recoveries, Credit Risk.

JEL Codes: G15; G21; G33.

1 Defaults, Default Rates, and Recoveries

High-yield bond defaults increased in the third quarter, rising from \$3.17 billion of new defaults in the prior quarter to \$5.13 billion. The resulting year-to-date (three-quarter) default rate was 0.84% (Tab. 1). For all 2013, the default rate was 1.04%. The third quarter default rate (0.37%) was higher than the rates both one year (0.24%) and one quarter (0.23%) earlier. This continues a trend of extremely low defaults, during which the quarterly default rates were below 0.50% in thirteen out of the last fifteen quarters, with only the fourth-quarter 2011 and 2012 default rates higher than this level (see Appendix A in Altman and Kuehne, 2013). A related statistical reason for the continued low, year-to-date default rate is the impressive increase in high-yield bonds issuance – more than \$349 billion issued in the last 12 months. The North American dollar-denominated default rate for the last 12 months was 1.40%, lower than the 12-month issuer-denominated default

Corresponding author: Edward I. Altman, ealtman@stern.nyu.edu, New York University Salomon Center, NYU Stern School of Business, 44 West 4th Street, New York, NY 10012, USA, 212 998-0709.

Brenda J. Kuehne, bkuehne@stern.nyu.edu.

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Table 1: Historical Default Rates – Straight Bonds Only, not Including Defaulted Issues in Par Value Outstanding, 1971-3Q 2013 (Dollars in Millions)

Year	Par Value		Default Rates (%)
	Outstanding ⁽¹⁾ (\$)	Defaults (\$)	
2013 (3Q)	1,392,212	11,744	0.844
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	96,858	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
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
			Standard Deviation (%)
Arithmetic Average Default Rate	1971 to 2012	3.191	3.149
	1978 to 2012	3.441	3.335
	1985 to 2012	4.005	3.477
Weighted Average Default Rate ⁽²⁾	1971 to 2012	3.821	
	1978 to 2012	3.828	
	1985 to 2012	3.850	
Median Annual Default Rate	1971 to 2012	1.664	

Note: ⁽¹⁾ As of midyear, except for 2013, when the amount outstanding is as of year-end 2012. ⁽²⁾ Weighted by par value of amount outstanding for each year.

Source: NYU Salomon Center.

rates calculated by both Moody's (2.83%) and S&P (2.3%). Fitch's dollar-denominated default rate for the last 12 months was 1.7%, with a 1.1% year-to-date default rate, while Moody's last 12-month dollar denominated default rate was 1.70%.

As we have shown in past research¹ and indicated in past reports, when the credit markets are in a strong and benign state, dollar-denominated default rates fall to lower levels than do issuer rates. The reverse happens in highly stressed conditions when the dollar rate usually exceeds issuer rates. Hence, dollar default rates are more volatile, less easily modeled, but still quite relevant, especially to investors who concentrate on investments of specific sizes which are not average for the market.

Ten high-yield issuers defaulted in the third quarter (see Appendix B in Altman and Kuehne, 2013), compared to eleven in the second quarter, and six in the period one year prior. The largest issuers to default this year have been Cengage Learning Acquisitions Inc., with defaults of \$1.9 billion, Energy Future Holdings Corp. (all distressed exchanges), with defaults of \$1.4 billion, Urbi Desarrollos Urbanos SAB de CV, with defaults of \$950 million, Exide Technologies, with defaults of \$675 million, FriendFinder Networks, Inc., with defaults of \$543 million, and Rotech Healthcare with \$520 million in total bond defaults. The remaining defaulted issuers thus far in 2013 each had bond default totals of less than \$500 million.

In our default statistics, we include those bonds from distressed exchanges actually tendered. Thus far in 2013, there have been three distressed exchanges, comprising \$2.0 billion of defaults (17.3% of the total). See Appendix C (Altman and Kuehne, 2013) for the list of 2013 bond distressed exchanges.

The default rate for the last 12 months in the US leveraged loan market was 1.78% based on issuers, and 2.41% weighted by issuance, according to S&P/LSTA calculations. These rates represent an increase to those at the end of the second-quarter 2013 (1.49% and 1.37%, respectively). In a reversal of the trend over the majority of the prior three years, the dollar-denominated loan default rate exceeded the issuer-denominated rate due to relatively large defaults by only three issuers – Cengage Learning Acquisition, Longview Power, and Gatehouse Media. There were ten leveraged loan defaults (by issuer) in the first nine months of 2013 (see Appendix D in Altman and Kuehne, 2013). According to our comparison of high-yield bond defaults (see Appendix B in Altman and Kuehne, 2013) and leveraged loan defaults (Appendix D), in the first nine months of the year, two firms, Dex One Corp. and Rural/Metro Corp. defaulted on both bonds and institutional leveraged loans.

Figure 1 shows the quarterly and four-quarter moving average default rate since 1989. The spike in default rates experienced during the most recent recession has subsided over the past three years and returned to much below-average levels. At present, if we simply extrapolate the third-quarter default rate for the rest of the year, the 2013 rate (1.12%) will be lower than that of one year prior (Tab. 1). If, however, one very large and much discussed issuer defaults in the fourth quarter (i.e. TXU and most of its subsidiaries), the 2013 default rate will easily reach 2.0%. TXU did not default in 2013, but its problems have not been solved.

¹ M. Verde, P. Mancuso and E. Altman, *High Yield Bonds: Default and Loss Rate Comparison – Mid-Cap Versus Large-Cap Issuers*, November 11, 2005, Fitch.

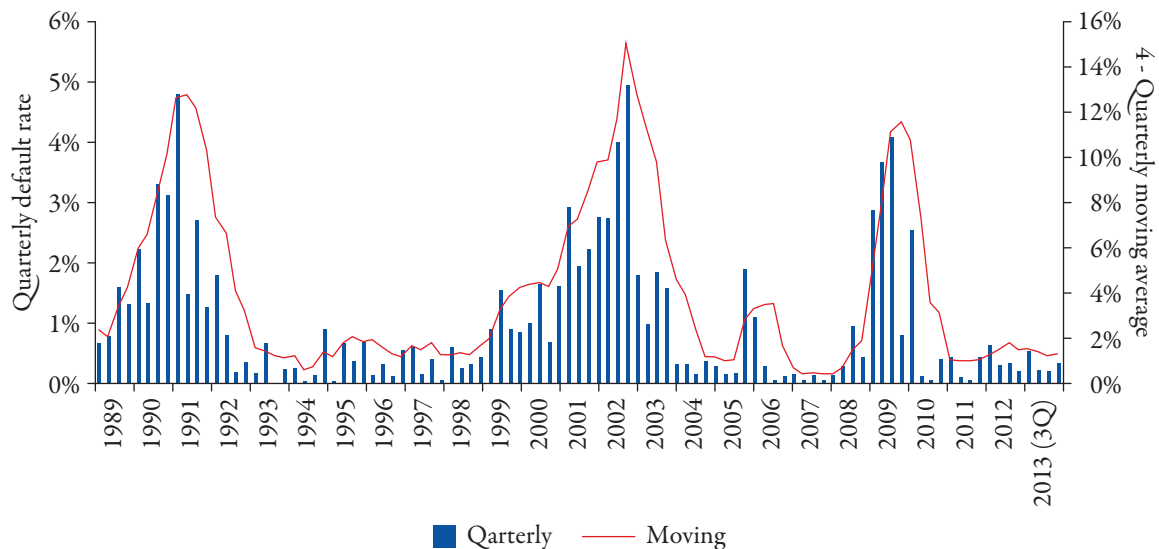


Figure 1: Quarterly Default Rate and the Four-Quarter Moving Average Default Rate, 1989-3Q2013.

Source: NYU Salomon Center.

Our forecast for the next 12 months ending September 30, 2014 is for a default rate of 2.65%. If the extremely liquid markets of the past three years persist, and the proportion of low-rated companies that are able to tap both the debt and equity markets for refinancing continues, our forecast will likely be on the high-side. We will explore at a later stage the statistical associations that support our relatively high expected defaults, which are somewhat above that of other forecasts. Associated to this forecast, there are several important risks on the horizon (see discussion later) and technical factors that have caused the required yield spread on high-yield bonds to be beyond what the miniscule recent default rates imply.

2 Bankruptcies

The total liabilities for Chapter 11 bankruptcies decreased to \$32.9 billion for the first three quarters of 2013 from \$59.1 billion for the comparable period one year prior. Figure 2 shows there were 49 filings in the first nine months where liabilities were greater than \$100 million (with ten more than \$1 billion), compared with 53 one year earlier, and 69 for all of 2012. Cengage Learning Acquisitions, Inc. was the largest bankruptcy filing in the first nine months of 2013, with \$5.80 billion in liabilities. Appendix E (Altman and Kuehne, 2013) lists this year's Chapter 11 bankruptcies with liabilities greater than \$100 million.

2.1 Bankruptcy Trends

From Figure 2 and Table 2, we see clearly that both the number and dollar liabilities of Chapter 11 filings has decreased markedly since the «heady» years of 2008/2009,

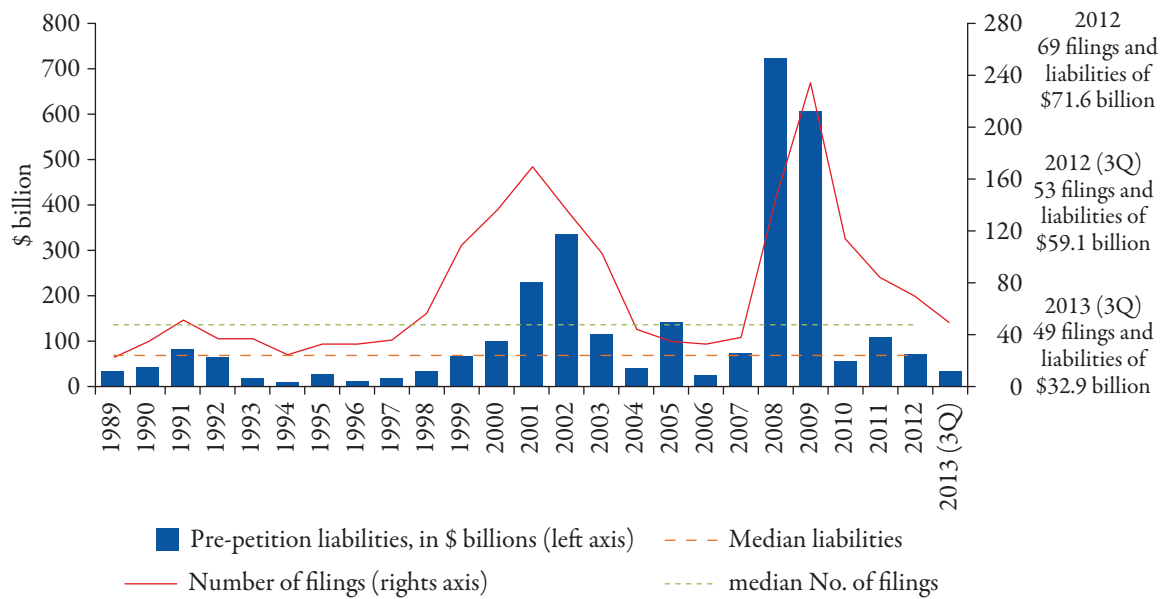


Figure 2: Total Filings and Liabilities⁽¹⁾ of Companies Filing for Chapter 11 Bankruptcy, 1989-3Q 2013.

Note: ⁽¹⁾ Minimum \$100 million in liabilities.

Sources: Appendix E and the NYU Salomon Center Bankruptcy Filings Database.

as well as when compared to the leveraged-recession years in the early 2000's. However, the last three years' number of filings with liabilities greater than \$100 million has actually been greater than the median number of filings in the period 1989-2012 (also since 1978, not shown), and the total dollar amount of liabilities have been, for most recent years, slightly above the median liabilities. Both medians are shown by the horizontal lines in Figure 2. For the previously mentioned period, the median annual number of filings is 48, and the median dollar amount of liabilities is \$67.6 million. The last two years (2011 and 2012) number of filings has been lower, however, than the median for the more recent period (1998-2012).

The issue of bankruptcy trends and their impact on the entire corporate bankruptcy system is, of course, more complicated than simply the number and dollar value of filings. For example, the time spent in reorganization from filing to emergence, the number and impact of prepackaged Chapter 11 filings, the success, or not, of the reorganization, as well as the role of senior creditors, are all factors that need further analysis and commentary. We plan to publish comprehensive statistics on these trends in our forthcoming annual report. We expect these analyses will be relevant and, we hope, helpful as the profession and the American Bankruptcy Institute (ABI) continues its hearings on the Bankruptcy process (see the ABI's website for a detailed description of the numerous subcommittees setup to analyze the current situation of the US bankruptcy system and transcripts of the various hearings held to date). Indeed, one of the more controversial subjects of these hearings is the role and impact of hedge funds on the bankruptcy process. We participated in one of those hearings in October, 2012, held at the LSTA Annual meeting in New York, as well as in a Law School symposium held at St. John's University on October 4, 2013².

² The latter's proceedings will be published in the February, 2014 issue of the *ABI Law Review*, 72.

Table 2: Chapter 11 Filing Statistics⁽¹⁾

Year	Number of Filings	Pre-Petition Liabilities (\$ Millions)	Number of Filings ≥ \$1B	≥\$1B/Total Filings (%)
1989	22	33,539	10	45
1990	35	41,115	10	29
1991	51	81,158	11	22
1992	37	64,224	14	38
1993	37	17,701	4	11
1994	24	8,396	1	4
1995	32	27,153	7	22
1996	32	11,687	0	0
1997	36	18,866	5	14
1998	56	32,038	6	11
1999	109	70,957	19	17
2000	136	98,896	23	17
2001	169	228,604	38	22
2002	135	336,612	41	30
2003	102	115,172	26	25
2004	44	39,550	11	25
2005	35	142,625	11	31
2006	32	22,322	4	13
2007	38	72,646	8	21
2008	145	724,010	24	17
2009	234	603,992	50	21
2010	114	56,981	14	12
2011	84	109,119	7	8
2012	69	71,613	14	20
2013 (3Q)	49	32,902	10	20
Mean No. of Filings, 1989-2012	75	–	15	20
Median No. of Filings, 1989-2012	48	–	11	21
Median No. of Filings, 1998-2012	102	–	14	–
Mean Liabilities, 1989-2012	–	\$126,207	–	–
Median Liabilities, 1989-2012	–	\$67,591	–	–

Note: ⁽¹⁾ Minimum \$100 million in liabilities.

Source: NYU Salomon Center Bankruptcy Filings Database.

2.2 Industry Defaults

Seven of the defaulting issuers were communications and media companies, five were energy companies; general manufacturing, healthcare and real estate/construction companies each had three defaulting issuers. Financial service, and leisure/entertainment, companies each had two defaulting issuers. The remaining four issuers to default within the first nine months of 2013 were spread equally over the auto/motor carrier, miscellaneous, transportation (non-auto) and utilities industries (see Fig. 5 in Altman and Kuehne, 2013). Appendix F and Figure 6 in Altman and Kuehne (2013) present, respectively, a more detailed breakdown of all 29 defaulting issuers and the dollar amount of defaulted issues by industry from 1990 to the present. The communications and media industry dominates these historical totals, primarily the result of the telecom meltdown during 2000-02, followed by financial services. However, historically the largest number of defaulting issuers (303), by far, is in the general manufacturing sector, followed by communications and media (211).

Table 3: Third-Quarter 2013 Default Loss Rate (%)

	Unadjusted for Fallen Angels	Only Fallen Angels	All Except Fallen Angels	Price Adjusted for Fallen Angels
Background Data				
Average Default Rate	0.844	0.633	0.844	0.824
Average Price at Default ⁽¹⁾	55.744	0.000	55.564	55.564
Average Price at Downgrade ⁽²⁾		0.000		
Average Recovery	55.744	0.000	55.564	55.564
Average Loss of Principal	44.256	0.000	44.436	44.436
Average Coupon Payment	10.185	0.632	10.601	10.174
Default Loss Computation				
Default Rate	0.844	0.633	0.844	0.824
X Loss of Principal	44.256	0.000	44.436	44.436
Default Loss of Principal	0.373	0.000	0.375	0.366
Default Rate	0.844	0.633	0.844	0.824
X Loss of 1/2 Coupon	5.093	0.316	5.300	5.087
Default Loss of Coupon	0.043	0.002	0.045	0.042
Default Loss of Principal and Coupon	0.416	0.002	0.420	0.408

Note: ⁽¹⁾ If default date price is not available, end-of-month price is used, when available. No fallen angels were able to be priced thus far in 2013. ⁽²⁾ Downgrade to non-investment grade.

Source: NYU Salomon Center and various dealer quotes.

2.3 Fallen Angel Defaults

Two of the defaulted issues from twenty-nine issuers thus far in 2013 were rated investment grade at issuance. We investigate the fallen angel proportion of defaults from 1977 to the present based upon number of issues (Fig. 7 in Altman and Kuehne, 2013). The average annual percentage from 1977 to the present is approximately 26%, with just 4% thus far this year.

2.4 Default Losses and Recoveries

The weighted-average recovery rate on defaulting issues so far in 2013 has decreased since the second quarter. Still, the recovery rate (weighted-average price at default) was 55.7% for the first nine months of 2013 (Tab. 3), well above the historical average since 1978 of 45.7%. The resultant default loss for the first nine months of the year was 41.6bp, lower than the 50bp loss for the same period one year ago. This loss includes the foregone coupon of 4.3bp and is for all high-yield company defaults. If we adjust for fallen angel defaults (2 issues), the loss would have been 40.8bp (Tab. 3).

Table 4 shows loss statistics since 1978 (through 2012), with an arithmetic average annual loss rate of 2.29% (2.54% on a weighted-average basis), significantly higher than the losses experienced in the period from 2010-2012, and also thus far in 2013.

The analysis of average recovery by seniority for 1978-2013 (see Fig. 10 in Altman and Kuehne, 2013) shows that 21 of the defaulting issues were senior secured (53% of all defaults), with a recovery rate of 72.2%, compared to a historical average of 58.8%. The large discrepancy in the recovery rate on this seniority, versus the historical average, was attributable to the fact that four issues, with 35% of the actual weighting, occurred as part of a distressed exchange (see discussion below). Seventeen were senior unsecured (43% of

Table 4: Default Rates and Losses, 1978-3Q 2013 (Dollars in Millions)

Year	Par Value Outstanding ⁽¹⁾ (\$)	Par Value of Default (\$)	Default Rate (%)	Weighted Price After Default (\$)	Weighted Coupon (%)	Default Loss (%) ⁽²⁾
2013 (3Q)	1,392,212	11,744	0.84	55.7	10.19	0.42
2012	1,212,362	19,647	1.62	57.8	8.97	0.76
2011	1,354,649	17,963	1.33	60.3	9.10	0.59
2010	1,221,569	13,809	1.13	46.6	10.59	0.66
2009	1,152,952	123,878	10.74	36.1	8.16	7.30
2008	1,091,000	50,763	4.65	42.5	8.23	2.83
2007	1,075,400	5,473	0.51	66.6	9.64	0.19
2006	993,600	7,559	0.76	65.3	9.33	0.30
2005	1,073,000	36,209	3.37	61.1	8.61	1.46
2004	933,100	11,657	1.25	57.7	10.30	0.59
2003	825,000	38,451	4.66	45.5	9.55	2.76
2002	757,000	96,858	12.79	25.3	9.37	10.15
2001	649,000	63,609	9.80	25.5	9.18	7.76
2000	597,200	30,295	5.07	26.4	8.54	3.95
1999	567,400	23,532	4.15	27.9	10.55	3.21
1998	465,500	7,464	1.60	35.9	9.46	1.10
1997	335,400	4,200	1.25	54.2	11.87	0.65
1996	271,000	3,336	1.23	51.9	8.92	0.65
1995	240,000	4,551	1.90	40.6	11.83	1.24
1994	235,000	3,418	1.45	39.4	10.25	0.96
1993	206,907	2,287	1.11	56.6	12.98	0.56
1992	163,000	5,545	3.40	50.1	12.32	1.91
1991	183,600	18,862	10.27	36.0	11.59	7.16
1990	181,000	18,354	10.14	23.4	12.94	8.42
1989	189,258	8,110	4.29	38.3	13.40	2.93
1988	148,187	3,944	2.66	43.6	11.91	1.66
1987	129,557	7,486	5.78	75.9	12.07	1.74
1986	90,243	3,156	3.50	34.5	10.61	2.48
1985	58,088	992	1.71	45.9	13.69	1.04
1984	40,939	344	0.84	48.6	12.23	0.48
1983	27,492	301	1.09	55.7	10.11	0.54
1982	18,109	577	3.19	38.6	9.61	2.11
1981	17,115	27	0.16	72.0	15.75	0.15
1980	14,935	224	1.50	21.1	8.43	1.25
1979	10,356	20	0.19	31.0	10.63	0.14
1978	8,946	119	1.33	60.0	8.38	0.59
Arithmetic Average 1978-2012			3.44	45.65	10.55	2.29
Weighted Average 1978-2012			3.83			2.54

Note: ⁽¹⁾ Excludes defaulted issues. ⁽²⁾ Default loss rate adjusted for fallen angels is 9.3% in 2002, 1.82% in 2003, 0.59% in 2004, 1.56% in 2005, 0.039% in 2006, 0.20% in 2007, 3.42% in 2008, 7.38% in 2009, 0.66% in 2010, 0.58% in 2011, 0.86% in 2012 and 0.41% in the third-quarter 2013.

Source: NYU Salomon Center.

the total), with a recovery rate of 33.7%, compared to a historical average of 38.9%. Two were senior subordinated, with an average recovery of 27.3%, compared to a historical average of 31.0%. There were no priced defaults in the first nine months of 2013 in either the subordinated or discount and zero coupon categories. The historical average recoveries on these two classes were 30.6% and 25.8%, respectively. Thirteen issues could not be priced.

3 Distressed Exchanges in 2013

Distressed exchanges (DEs) in the first nine months of 2013 accounted for 10.3% of the defaulted issuers (3 out of 29), and 17.3% of the defaulted dollar amount. From 1984

Table 5: High-Yield Bond Distressed Exchange Default and Recovery Statistics, 1984-3Q 2013

Year	D/E Defaults (\$)	Total Defaults (\$)	D/E Defaults (%) to Total \$	D/E Defaults (No. of Issuers)	Total Defaults (No. of Issuers)	D/E Defaults (%) to Total No. of Issuers	D/E Recovery Rate ⁽¹⁾	All Recovery Rate ⁽²⁾	Difference Between D/E & All Default Recovery Rate
2013 (3Q)	2,031.39	11,744.47	17.3	3	29	10.3	91.69	55.74	35.95
2012	4,157.21	19,647.08	21.2	10	33	30.3	68.48	57.84	10.64
2011	1,713.90	17,963.00	9.5	8	32	25.0	79.47	60.28	19.18
2010	4,971.48	13,808.63	36.0	7	34	20.6	65.5	46.62	18.98
2009	22,960.13	123,878.02	18.5	45	119	37.8	42.49	36.08	6.41
2008	30,329.42	50,763.26	59.7	14	64	21.9	52.41	42.50	9.91
2007	146.83	5,473.00	2.7	1	19	5.3	85.17	66.65	18.52
2006	0.00	7,559.00	0.0	0	0	0	NA	NA	NA
2005	0.00	36,209.00	0.0	0	0	0	NA	NA	NA
2004	537.88	11,657.00	4.6	5	39	12.8	58.05	57.72	0.33
2003	1,034.94	38,451.00	2.7	7	86	8.1	78.52	45.58	32.94
2002	764.80	96,858.00	0.8	3	112	2.7	61.22	25.30	35.92
2001	1,267.60	63,609.00	2.0	5	156	3.2	33.12	25.62	7.50
2000	50.00	30,295.00	0.2	1	107	0.9	77.00	26.74	50.26
1999	2,118.40	23,532.00	9.0	6	98	6.1	65.39	27.90	37.49
1998	461.10	7,464.00	6.2	2	37	5.4	17.34	40.46	(23.12)
1997	0.00	4,200.00	0.0	0	0	0.0	NA	NA	NA
1996	0.00	3,336.00	0.0	0	0	0.0	NA	NA	NA
1995	0.00	4,551.00	0.0	0	0	0.0	NA	NA	NA
1994	0.00	3,418.00	0.0	0	0	0.0	NA	NA	NA
1993	0.00	2,287.00	0.0	0	0	0.0	NA	NA	NA
1992	0.00	5,545.00	0.0	0	0	0.0	NA	NA	NA
1991	76.00	18,862.00	0.4	1	62	1.6	31.30	40.67	(9.37)
1990	1,044.00	18,354.00	5.7	7	47	14.9	43.15	24.66	18.49
1989	548.90	8,110.00	6.8	7	26	26.9	44.53	35.97	8.56
1988	390.30	3,944.00	9.9	3	24	12.5	28.40	43.45	(15.05)
1987	33.60	7,486.00	0.4	2	15	13.3	40.70	66.63	(25.93)
1986	114.80	3,156.00	3.6	4	23	17.4	47.68	36.60	11.08
1985	323.30	992.00	32.6	2	19	10.5	55.04	41.78	13.26
1984	100.10	344.00	29.1	1	12	8.3	44.12	50.62	(6.50)
Totals/Averages	82,082.25	643,496.46	12.8	144	1,227	11.7	56.06 ^b	44.28 ^b	11.79

Note: NA: Not Applicable. ⁽¹⁾ Weighted average recovery rates for each year. ⁽²⁾ Arithmetic average of the weighted average annual recovery rates; only those years with DEs counted. The arithmetic average of each individual DE (144) for the entire sample period was 50.97% and the average for the non-DE defaults was 37.30%.

Source: NYU Salomon Center.

through the third quarter of 2013, DEs accounted for about 11.7% of all defaulting issuers and 12.8% of all defaulted dollar amounts (Tab. 5). Table 5 indicates the «popular» re-emergence of DEs in 2008-2013 as compared to the last 29 years. Indeed, during this almost six year period, more than 60% (87 of 144) of all DEs since 1984 took place. About 28% of all issuer defaults (87/311) were DEs in the last six years.

The concept of a DE has taken on an added level of importance and urgency of late, especially as to whether such events will trigger a default in the credit default swap (CDS) market. Since early 2009, such events in the US corporate bond market do *not* constitute a default event, as per the typical ISDA specification. However, whereas a «voluntary» DE in Europe would probably *not* be considered a default in the now crucial sovereign debt market, it has been ruled that if a debt restructuring is agreed upon between a governmental authority and a sufficient number of holders of such obligation to bind *all* holders, otherwise making it «mandatory», CDS can be triggered because it

is not truly voluntary for all. Such was the case with Greece's debt restructuring default in March 2012.

Important too, is the performance of a firm subsequent to completing a DE. As discussed in an earlier study³, data would appear to indicate that a DE is oftentimes just a short-term fix, unable to prevent future bankruptcy filings or acquisitions. Please see our 2011 annual report⁴ for our updated discussion of events subsequent to completing a DE. In this study we reported that a subsequent Chapter 7 or 11 bankruptcy filing occurs in about 46% of all successful DE's, hardly an admirable outcome. We plan to update our DE statistics and subsequent firm performance in our year-end report.

3.1 Recovery Rates on Distressed Exchanges

Because DEs are not as dramatic a reflection of a firm's distressed status as a bankruptcy or nonpayment of cash interest on debt, one might expect the recovery rate on DE defaults to be higher than other, more serious distressed situations. That is exactly what we observe. Of course, one reason for the larger recoveries in DEs is that lenders need to be offered a «premium» in order to be persuaded to participate in the exchange.

Table 5 shows the arithmetic average recovery rate on all DE defaults was 56.1% for 1984-2013 (first nine months), compared to 44.3% for all defaults, and 37.3% for all non-DE defaults (not shown). These differences are easily statistically significant at the .01 level. Compared to year-end 2012, the recovery rate on DEs in the first nine months of 2013 equaled 91.7% versus 68.5%, and 46.5% versus 55.4% on non-DE defaults. So, while DE recovery rates have spiked considerably so far in 2013, the default recovery rate has declined on the remaining more traditional defaults.

3.2 Age of Defaults

Table 6 summarizes the age distribution of defaults after original issuance from 1991 through the first half of 2013. The defaults thus far in 2013 appear to follow the normal pattern of low defaults in the first year after issuance followed by increased default rates in years two through five. Through the third quarter, seventy percent of defaults occurred within two and five years after issuance, with 14 of those issues (26% of total) defaulting in the third year, historically the largest default period. The long-term historical pattern, highlighting the most vulnerable years as two through five (see Fig. 13 in Altman e Kuehne 2013).

³ E. Altman and B. Karlin, 'The Re-emergence of Distressed Exchanges in Corporate Restructurings', NYU Salomon Center Working Paper, 2009 (see E. Altman's website, <http://www.stern.nyu.edu/~ealtman>) and published in *The Journal of Credit Risk*, Summer 2009.

⁴ E. Altman and B. Kuehne, *Defaults and Returns in the High-Yield Bond and Distressed Debt Market: The Year 2011 in Review and Outlook*, Paulson & Co. and NYU Salomon Center, February 03, 2012.

Table 6: Distribution of Years to Default from Original Issuance Date (By Years of Default), 1991-3Q 13

Years to Default	1991		1992		1993/1994		1995		1996/1997		1998		1999	
	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total
1	0	0	0	0	3	8	1	3	7	14	2	6	32	26
2	18	13	0	0	6	16	9	28	7	14	5	15	37	30
3	26	19	7	13	5	14	7	22	7	14	10	30	15	12
4	29	21	10	19	2	5	3	9	17	36	3	9	14	11
5	35	26	8	15	4	11	1	3	4	8	10	30	7	6
6	10	7	12	22	8	22	2	6	5	10	2	6	8	6
7	4	3	5	9	7	19	2	6	0	0	1	3	10	8
8	10	7	4	7	0	0	2	6	0	0	0	0	2	2
9	3	2	0	0	0	0	4	13	0	0	0	0	0	0
10+	2	1	8	15	2	5	1	3	2	4	0	0	0	0
Total	137	100	54	100	37	100	32	100	49	100	33	100	125	100
Years to Default	2000		2001		2002		2003		2004		2005		2006/2007	
	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total
1	19	10	40	12	29	8	18	9	8	10	16	9	3	3
2	51	28	69	21	51	15	30	15	7	9	13	7	5	6
3	56	31	87	26	61	18	26	13	8	10	9	6	12	14
4	14	8	65	19	56	16	23	11	6	8	22	12	14	16
5	13	7	27	8	45	13	40	20	10	13	14	8	7	8
6	5	3	14	4	21	6	20	10	16	21	17	9	13	15
7	12	7	21	6	8	2	25	12	9	12	13	7	8	9
8	4	2	5	1	7	2	3	1	6	8	11	6	12	14
9	3	2	4	1	12	3	5	2	1	1	5	3	7	8
10+	6	3	3	1	54	16	13	6	6	8	64	34	6	7
Total	183	100	335	100	344	100	203	100	77	100	184	100	87	100
Years to Default	2008		2009		2010		2011		2012		2013 (3Q)		1991-2013 (3Q)	
	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total
1	9	6	20	5	1	2	5	6	2	3	3	6	218	8
2	18	12	39	10	6	11	6	8	8	12	10	19	395	15
3	34	22	66	16	12	22	5	6	12	18	14	26	479	18
4	30	19	61	15	9	16	2	3	3	4	11	21	394	15
5	20	13	50	12	6	11	9	11	2	3	2	4	314	12
6	10	6	58	14	5	9	10	13	10	15	2	4	248	9
7	9	6	15	4	9	16	10	13	7	10	8	15	183	7
8	6	4	18	4	2	4	10	13	9	13	2	4	113	4
9	7	5	16	5	2	4	1	1	4	6	1	2	75	3
10+	11	7	62	15	3	5	21	27	11	16	0	0	275	10
Total	154	100	405	100	55	100	79	100	68	100	53	100	2,694	100

Source: NYU Salomon Center.

4 Returns, Yields, and Spreads

Table 7 shows the return on high-yield bonds through the first nine months of 2013 was 3.64%⁵. The excess return (loss) compared to 10-yr US Treasury bonds was 9.17%, widening by 276bp since the end of the second quarter, when the excess return was 6.41%, and 182bp higher than the spread one year earlier, when the excess return was 7.35%.

⁵ Returns have subsequently increased considerably to over 6% in October as the FED has not indicated any intention to «taper» its liquidity injections into the economy in 2013.

Table 7: Annual Returns, Yields, and Spreads on 10-Yr Treasury and High-Yield Bonds⁽¹⁾, 1978-3Q 2013

Year	Return (%)			Yield to Maturity (%)		
	High Yield	Treasury	Excess Returns	High Yield	Treasury	Spread
2013 (9/30)	3.64	(5.53)	9.17	6.85	2.62	4.23
2012	15.17	4.23	10.95	6.80	1.74	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	5.13
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 1978-2012	11.06	8.47	2.60	11.83	6.59	5.25
Standard Deviation	14.93	11.33	17.96	3.32	2.97	2.84
Compound Annual Average 1978-2012	10.11	7.91	2.19	-	-	-

Note: ⁽¹⁾ End-of-year yields.

Source: Citi Yieldbook and authors' compilations.

Yield spreads for high-yield bonds over the same 10-yr Treasury benchmark (on a yield-to-maturity basis) were 4.23% as of the end of September, tightening 33bp from second-quarter end, and also narrowing 128bp from one year earlier. A steady rise in yield on Treasury bonds combined with a decline in the yield in high-yield bonds over the past year accounted for this spread narrowing.

Figure 3 shows the yield-spread trend from its all-time low of 260bp in June 2007, to the peak spread of 2,046bp in December 2008, its steady decline through the first-quarter 2011, then an ascent starting in May of that year as treasury yields slowly dropped to then historical lows, in our time series (1.88%)⁶, and the threat of one or more European

⁶ Ten-year Treasury yields dropped even further to 1.40% as of July 24, 2012.

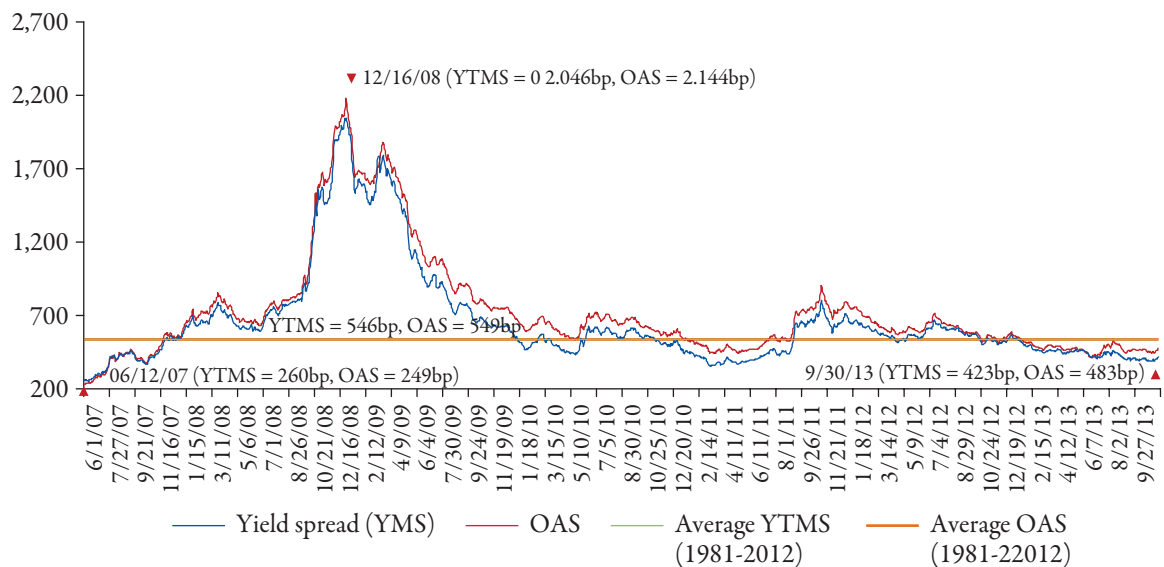


Figure 3: YTM and Option-Adjusted Spreads Between High-Yield Bonds and US Treasury Notes, 1 Jun 07-30 Sep 13.

Sources: Citi Yieldbook and Bank of America Merrill Lynch Index Data.

sovereign defaults escalated. We also show the option-adjusted yield spread in Figure 3 (483bp at third-quarter-end 2013). All of these spreads continued to fall in October.

5 A Continuing Investment Dilemma

Normally, in a credit environment of extremely low default risk, both in terms of recent statistics and near-term future estimates, yield spreads should be much below average and the outlook for risky debt markets fairly bullish. The yield spread as of September 30, 2013 (Fig. 15) is exactly that, having dropped from above average levels (525bp average) during the fourth-quarter 2012 to 423bp by the end of the third quarter. However, we feel that there are still some important risks going into the future. These risks (see Fig. 16 in Altman and Kuehne, 2013) include concerns about the sluggish growth in the US economy, European sovereign and banking default risk, LBO and covenant-lite risk, the refinancing needs of the federal and municipal government sectors in the US and the looming specter of inflation and rising interest rates, albeit probably not within the next 12-18 months. These risks would seem to justify at least a normal, or just slightly below normal, required return, risk premium.

The stock market now looks fairly valued, with P/E ratios of about 16. There still seems to be excellent growth in many corporate profits and interest rates are still at extremely low levels. With all of the above in mind, one could be fairly bullish about the stock market's prospects, yet bearish, or at least not very optimistic about risky bond markets, especially high-yield given its lofty price level, in which the average price continues to be above par value. Considering investment choices between various capital markets, it is instructive to observe historical correlations with particular scrutiny of the most recent past.

We analyze the correlation between the S&P 500 stock index monthly returns vs. both high-yield and defaulted debt indexes (see Fig. 17 in Altman and Kuehne, 2013). The latter are based on our Altman-Kuehne Defaulted Bond and the Combined Defaulted Bond and Bank Loan Indexes. The periods covered are the last three stressed credit cycles: 1990/1991, 2001/2002, and the most recent 2008/2009 (through June). We also observe the correlations for the recovery period since April 2009, and other past recoveries (not shown here), as well as the entire sample period 1987-2013. The results are quite revealing.

Typically during stressed credit cycles (and also the subsequent recovery), correlations between the stock market and risky debt markets are quite low –12% in 1990/1991, 23% in 2001/2002, and, not shown, –16% and 43% in their subsequent recoveries. Over the entire sample period since we have been tracking defaulted debt as an asset class (1987-present), the correlation between the S&P 500 and defaulted bond returns is only 41%, and a moderate 59% for the high-yield market and stock market returns. However, in the most recent economic and financial collapse of 2008-early 2009, the latter's correlation spiked enormously to 73%. In the most recent cycle (January 2010-September 2013), the correlation between defaulted bonds and bank loans and the S&P 500 Stock Index was 60% and 77% between the S&P 500 and Citi's High-Yield Bond Index! On any given day, it is likely that if there is bad news about financial or default related uncertainties, both risky bond and stock markets decline, with a flight to quality, and the opposite is true if the news is positive, as it has been of late.

Our dilemma, much as it has been for the past two years, is that if we are to be concerned about risky debt in the near future, how can we be bullish about the stock market? A more positive spin on the correlation pattern is that the optimistic stock market outlook will dominate bond market uncertainties and both will prosper in the near-term future, especially in a benign credit environment.

5.1 The US Economy

Not much has changed since we commented on the US economy in our most recent year-end report. There have been some signs of a slowdown in the economy but, for the most part, the near-term prospects of a US economic recession has been significantly reduced. Congress has agreed upon some tax increases, spending cuts have taken place, and the so-called fiscal cliff has been avoided, at least for the time being, as has the debt limit debate. Most economists are predicting growth rates of about 2% for 2013, although the second half of the year has been somewhat problematic with the economy less dynamic than many had predicted. Indeed, with the construction industry and real estate markets continuing to accelerate, the outlook for the economy is for continued tepid growth, but the stock market has remained buoyant. Unemployment remains a problem area and the FED is likely to continue its efforts to provide liquidity to the system.

Economic growth rates in the rest of the developed world are mixed, as they have been for some time now. Still, some signs of recovery in Europe and renewed optimism

about Chinese growth have led to a vigorous growth in global stock markets, with the US one of the strongest.

Therefore, on balance, our concern about the prospect of a real-economy recession catalyst to rising default rates and lower default recoveries has diminished, although not to the point that there are no longer relevant considerations – even in Europe, as we will explain. Additionally, there is still the looming problem of a political stalemate in the US Congress.

6 Latest Take on the Euro

A little over two years ago, I wrote about the European debt crisis and predicted for the first time that Italy would be either the hero or villain of the Euro. I felt then, as I do now, that the escalation of the crisis would come down to whether one of the key Southern European countries would be able to survive, without a bailout, the onslaught of a capital market «attack». Based on the inherent strengths of its fundamental competitive and wealth attributes, I concluded that Italy would be the «fulcrum country», with a 70% chance to emerge successfully, enabling the Euro itself to survive. Between the end of 2010 and the fall of 2012, unfortunately, Italy's fundamentals deteriorated dramatically, its economy was in a double-dip recession, with unemployment over 10%, and even top European politicians were saying that the Euro's survival was at the critical stage.

My increased pessimism was based upon our «bottom-up» approach toward assessing the health of any sovereign. Recently, Professor Herbert Rijken of the Free University of Amsterdam and I began suggesting that financial and political analysts should not focus solely on the traditional macroeconomic metrics like Debt/GDP or Deficits/GDP, but also to monitor the health of the sovereign based on the condition of its private sector – both its non-financial corporate sector and its privately owned banks. After all, if the corporate sector is healthy, it can pay more taxes from profits and hire more workers, as well as provide vital new investments. On the other hand, if a significant proportion of a sovereign's private sector is on the verge of financial distress and bankruptcy, or needs increased capital itself, it cannot hope to contribute much, particularly if companies are asked to increase tax payments.

We developed an index of individual firm probability of default, based on an updated version of our Z-Score approach. We then observed the median (50th percentile) and 75th percentile firm's probability of default (PD) for the non-financial, listed-firm, population in each of nine European countries, as well as in the USA, for the years 2008-2010. The results were extremely revealing with the highest risk countries, Greece and Portugal, followed by Italy and Spain, showing the most troubling corporate PDs as of year-end 2008, even before the financial world showed much concern with these sovereigns and before the Greek PM informed the world, that its budget deficit was 12.7% (double the previous estimate).

Our updated bottom-up results, based on company fundamentals, yield-spreads, and equity values, through 2010 were startling and highly indicative of the profound deterioration of many European nations in just 18 months, with Spain and Italy «leading the way»

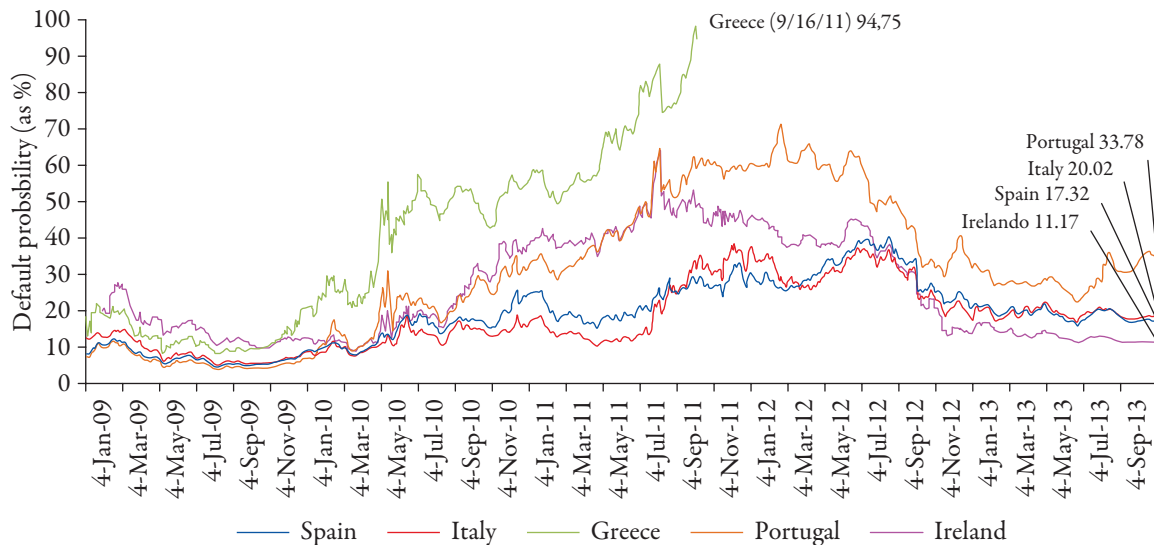


Figure 4: Five-Year Implied Probabilities of Default (PD)⁽¹⁾ from Capital Market CDS Spreads, Jan 2009-Sep 30, 2013.

Note: ⁽¹⁾ Assumes 40% Recovery Rate. PD computed as $1 - e^{-5s/(1-R)}$.

Source: Bloomberg and NYU Salomon Center.

down. For example, the 75th percentile listed non-financial company in Italy (e.g., indicative of the 25% most risky companies), as of year-end 2010, had a PD of 14.1% over a five-year horizon i.e., 25% of the private sector's PDs was greater than 14.1%. In the following 18 months, that figure spiked to 25.4%, (third only in Europe to Greece's astounding 47.0% and Portugal's 32.3%), a deterioration of 80.1%, the second largest drop in Europe (Spain dropped by 89.4%). It is worth noting that these are the largest, and arguably the most solvent enterprises. A weakened banking sector, with its own profitability and capital challenges, will be hard pressed to support such a problematic corporate sector. While Italy's global competitiveness is far stronger than that of Greece, Portugal and Spain, the problem is that unlike these smaller vulnerable countries, Italy is quite likely «too big to save.» Thus, while we focus on the private sector, the world's markets, as well as European politicians, were traumatized by Italy's escalating cost of new debt financing that exceeded the thought to be unsustainable 6.0% level for 10-year bonds in July, 2012. Furthermore, the implied 5-year PD from CDS spreads for Italy was near 35% and close to 40% for Spain.

Pressures on interest rates have come down dramatically of late due to EU Central Bank actions, and CDS implied default rates have tumbled by about 20 percentage points for many countries (e.g. Italy and Spain) since their all-time high levels in summer 2012. As of third quarter-end 2013, Italy's implied probability of default based on 5-year CDS spreads fell to just 20.02%, and Spain's to 17.32% (Fig. 4). As of late October, these implied default probabilities have dropped further to near 15%.

There is no question that the role of the ECB has been critical in the reduction of market pressures on the so-called PIIGS countries, with the required interest rates for sovereign debt investors tumbling to quite attractive levels, ones that have not been seen in several years. The same is true for CDS spreads, now at levels that imply about a 15%

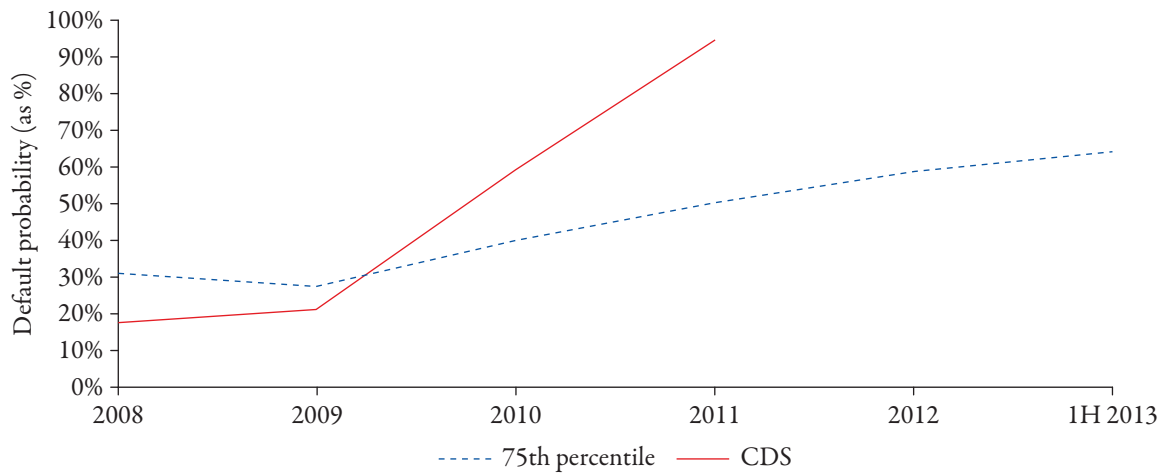


Figure 5: Greece: Five-Year Implied Probabilities of Default (PD)⁽¹⁾ from Sovereign CDS Spreads vs. 75th Percentile Corporate PD, 2008-1H 2013.

Note: ⁽¹⁾ Assumes 40% Recovery Rate. PD computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg and NYU Salomon Center.

5-year probability of default for the key countries of Spain and Italy, a percentage last seen in June, 2011 (assuming a 40% recovery rate – see Fig. 4).

Have the fundamentals of growth, unemployment and corporate health really improved – at all? We think not, in many countries, although the political climate is positive in respect to the support and guarantees made by the stronger European nations and, as mentioned earlier, the explicit support of the lender of last resort – the ECB. Local elections, e.g. Italy’s national election February, 2013, however, showed clear signs that the austerity programs, i.e. fiscal consolidation, dictated by several of the stronger European nations have become widely unpopular. Even the IMF seems to be lowering its austerity requirements for the nations that it lends to, and those trends are likely to continue.

We have now updated our probability of default estimates for a number of southern European countries through the first half of 2013. These are shown in Figures 5 through 9 for all five of the PIIGS countries. Also shown are the implied PDs from their CDS spreads. Note that our 75th percentile PD for Spain is now at levels that approximate the CDS implied PDs, and that they have not improved measurably in recent years. Italy, on the contrary, has improved somewhat by our metric (Fig. 9), or at least has not continued to deteriorate. We feel that despite reduced capital market pressures, a closely related country default, like in Greece or Portugal, could trigger a renewed crisis in the larger, vulnerable countries. This is especially relevant if fundamental flaws and lack of competitive improvements are not addressed meaningfully.

We are convinced that in order to assess the default probability of a sovereign’s debt, one should consider both macro-based measures and the bottom-up firm fundamental analytics that we have proposed. What this all means for Europe, in general, and Spain and Italy in particular, is that this region is not «out-of-the-woods» yet, despite encouraging interest rate and CDS trends. Hence, the region’s impact on our high-yield spreads is still a serious concern, especially if default rates in the US start moving up in the next 6-12 months.

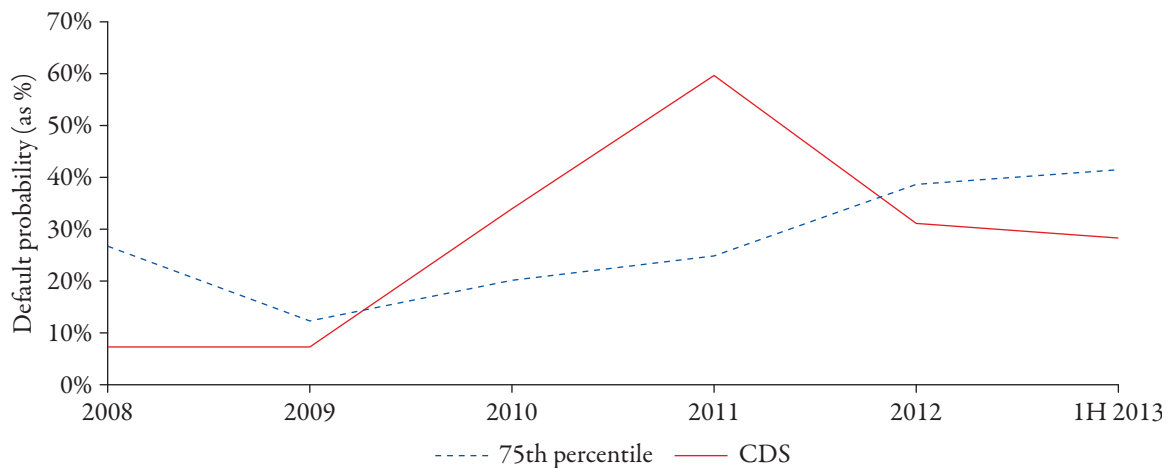


Figure 6: Portugal: Five-Year Implied Probabilities of Default (PD)⁽¹⁾ from Sovereign CDS Spreads vs. 75th Percentile Corporate PD, 2008-1H 2013.

Note: ⁽¹⁾ Assumes 40% Recovery Rate. PD computed as $1 - e^{-5^*s/(1-R)}$.

Source: Bloomberg and NYU Salomon Center.

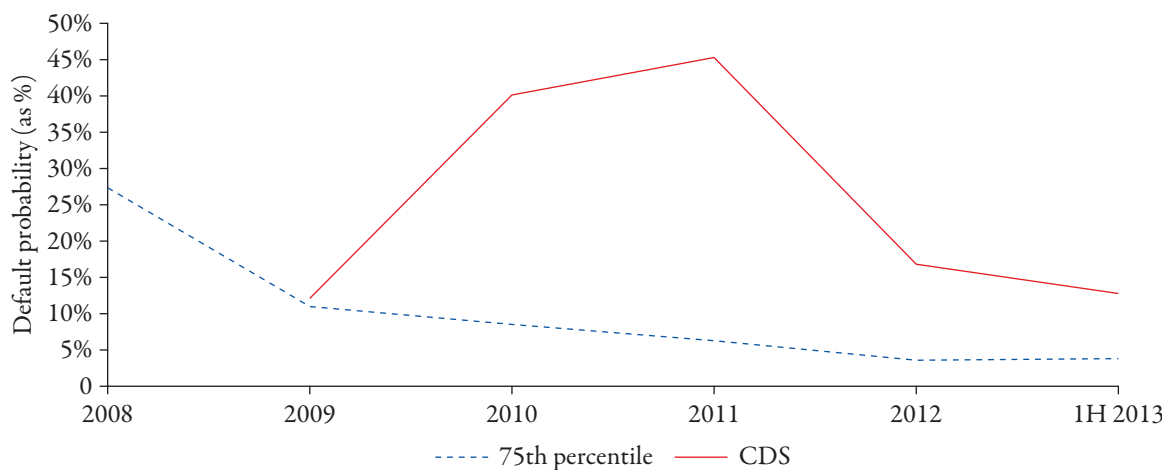


Figure 7: Ireland: Five-Year Implied Probabilities of Default (PD)⁽¹⁾ from Sovereign CDS Spreads vs. 75th Percentile Corporate PD, 2008-1H 2013.

Note: ⁽¹⁾ Assumes 40% Recovery Rate. PD computed as $1 - e^{-5^*s/(1-R)}$.

Source: Bloomberg and NYU Salomon Center.

7 Recent LBO Activity and Related Credit Risk Measures

With the abundance of risky debt liquidity, near record low high-yield bond and leveraged loan interest rates and rising, but not outrageous, stock price multiples, it is no surprise that leverage buyout/private equity deals are increasing again, as is the debt raised to finance these acquisitions. According to S&P *Capital IQ* data, the number of LBO deals financed has increased annually since 2009, when 23 deals were recorded, to 97 in 2012, and 72 thus far in 2013 (Q3). The number of deals observed in the first nine months of 2013 was 31% greater than in the same period a year prior – 72 versus 55. Likewise, though fluctuating on a quarterly basis, the dollar amount involved in these

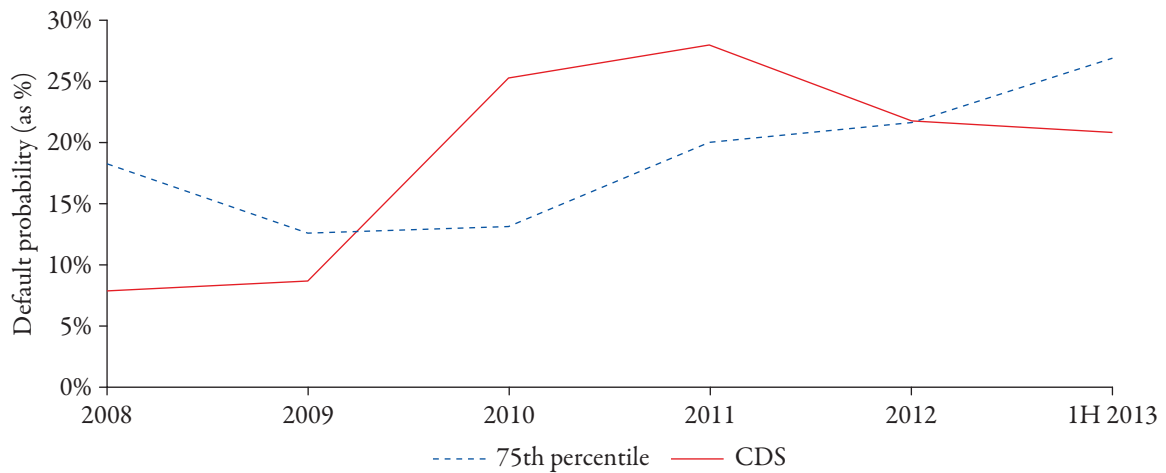


Figure 8: Spain: Five-Year Implied Probabilities of Default (PD)⁽¹⁾ from Sovereign CDS Spreads vs. 75th Percentile Corporate PD, 2008-1H 2013.

Note: ⁽¹⁾ Assumes 40% Recovery Rate. PD computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg and NYU Salomon Center.

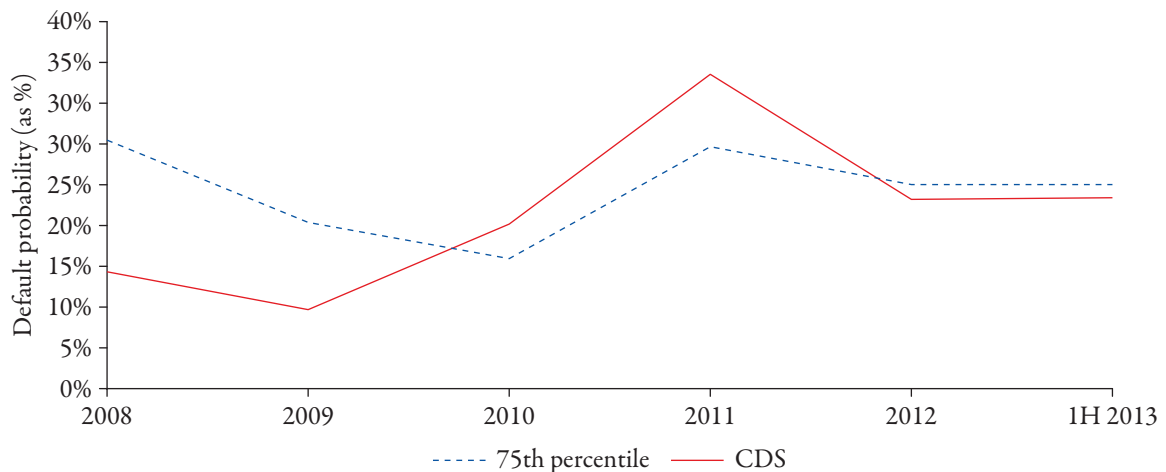


Figure 9: Italy: Five-Year Implied Probabilities of Default (PD)⁽¹⁾ from Sovereign CDS Spreads vs. 75th Percentile Corporate PD, 2008-1H 2013.

Note: ⁽¹⁾ Assumes 40% Recovery Rate. PD computed as $1 - e^{(-5*s/(1-R))}$.

Source: Bloomberg and NYU Salomon Center.

deals increased from \$12.8 billion in 2009 to \$98.0 billion in 2012, with over \$139 billion already financed in the first nine months of 2013! Investors and banks seem more and more comfortable with lending for highly leveraged deals. Bank of America Merrill Lynch estimates that about \$60 billion was raised in the high-yield bond market for acquisitions/LBOs in 2012, about one-sixth of all high-yield bond financing. The amount of institutional leveraged loans raised for those acquisitions/LBOs is estimated to be about \$97 billion out of \$295 billion raised in the loan market in 2012 (approximately one-third). S&P *Capital IQ* estimates that of \$139 billion in total leveraged buyout volume in the first nine months of 2013, \$76 billion was raised through the issuance of leveraged loans. What’s more, the collateralized loan structured-finance (CLO) market

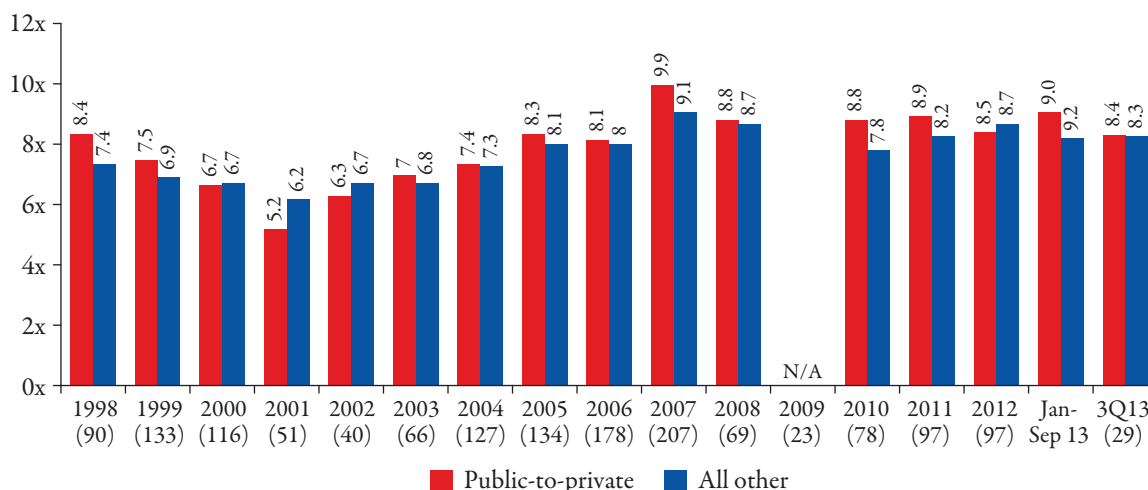


Figure 10: Purchase Price Multiples Excluding Fees for LBO Transactions, 1998-3Q 2013.

Source: S&P Capital IQ LCD.

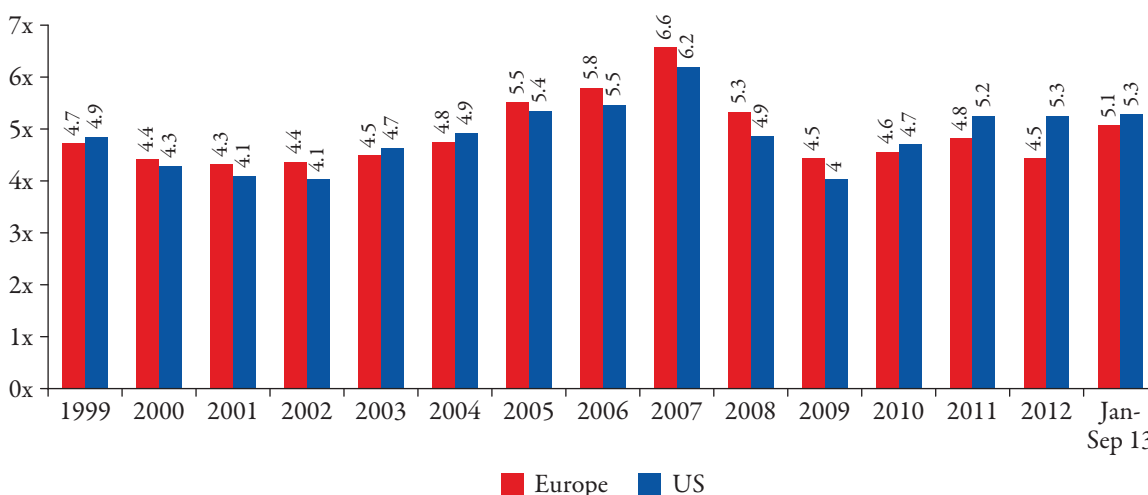


Figure 11: Average Total Debt Leverage Ratio for LBOs: Europe and US with EBITDA of €/\$50M or More, 1999-3Q 2013.

Source: S&P Capital IQ LCD.

returned with over \$50 billion of activity in 2012 and a strong pipeline coming into 2013, with almost \$63 billion of activity occurring in the first nine months of this year, representing 115 deals, eclipsing the 111 deals completed in all of 2012.

Figures 10 and 11 show that this resurgence in LBO activity has resulted in higher risk metrics – in other words – increased credit risk. For example, though not shown, Purchase Price Multiples increased in the fourth-quarter 2012 to 9.2 times, a level we had not seen since 2007! Additionally, this level of purchase price to EBITDA (cash flow proxy) did not drop as much as one might have thought in the aftermath of the great financial crisis of 2008/2009 (S&P does not list purchase price multiples in 2009 when there were just 23 deals). While this shows great confidence on the part of private-equity acquirers, it also indicates an increasing tendency to take on debt to finance these more costly buyouts. Indeed,

Figure 11 indicates that the average buyout in the US in 2012 had a debt to EBITDA ratio of 5.3, and thus far in 2013 this ratio is 5.3 times as well, only slightly lower than 2005/06 when the LBO market was «on fire»⁷. So far in 2013, the leveraged proportion of total financing of LBOs has been 63%, up slightly from just below 60% in 2012.

Of course, advocates of the LBO market and its current low-risk environment point toward the current low interest rates on new high-yield bonds and leveraged loans. Indeed, the 2012 end-of-year average yield-to-maturity on high-yield bonds was at an all-time low at 6.8%, though it has risen slightly in 2013 to end the first nine months at 6.85%, compared to 9.69% in 2007, 7.82% in 2006, and 8.44% in 2005 (see Fig. 9). These levels are important for fixed-rate, long-term, newly issued high-yield bonds, compared to shorter-term and variable rate leveraged loans. Still, one must also be cognizant of coverage ratios, even in a lower interest rate LBO deal, especially if inflation is a distinct possibility.

With respect to inflation, we are concerned with its impact on defaults, both in the near and longer term. As long as the government, and especially the FED, keeps their toes on the liquidity accelerator, we do not expect too much of an increase in near-term interest rates. Fairly robust economic growth, as some expect, could very well motivate a reduction in government-sponsored and financed liquidity, however, causing pressure on interest rates as this powerful demand lessens. Higher interest rates will affect firms that cannot pass on these higher costs to customers – something to watch.

8 New Issues and Other Changes in the Size of the High-Yield Market

US high-yield bond issuance in the third quarter was \$84.7 billion, marginally lower than the prior quarter (\$85.5 billion), and much lower than new issuance during the same period last year (\$95.3 billion). Leveraged loan issuance (both institutional and «pro rata» – syndicated to banks and finance companies – secured, non-investment grade loans) decreased, as well, in the third quarter to \$125.1 billion, compared to approximately \$163.7 billion during the prior quarter, but was comparable to the \$126.2 billion issued in the third quarter of 2012. Though both the bond and loan markets witnessed a slight decrease in the amounts of new issuance in the third quarter of 2013, the loan market appears to remain a slightly more favored vehicle used by high-yield, risky debt issuers. This has been a very gradual switch from the source of risky debt issuance in 2009; banks seem intent on catching up to bond markets, especially in the refinancing of near-term maturing leveraged loans.

The size of the high-yield bond market, adjusting for fallen angels, rising stars, defaults, and other changes, was approximately \$1.41 trillion at the end of September 2013, according to our calculations (Fig. 26 in Altman and Kuehne, 2013). This represents an increase from three months earlier of approximately \$16 billion, primarily due to the amount of newly issued debt greatly exceeding defaults and other exits from the market. In a reversal of the prior quarter, the amount of upgrades to investment grade (rising

⁷ Europe's LBO Debt Leverage Ratio was considerably lower in 2012 at 4.5 times, about the same as in 2009-2011, and much lower than the 6.6 times in 2007.

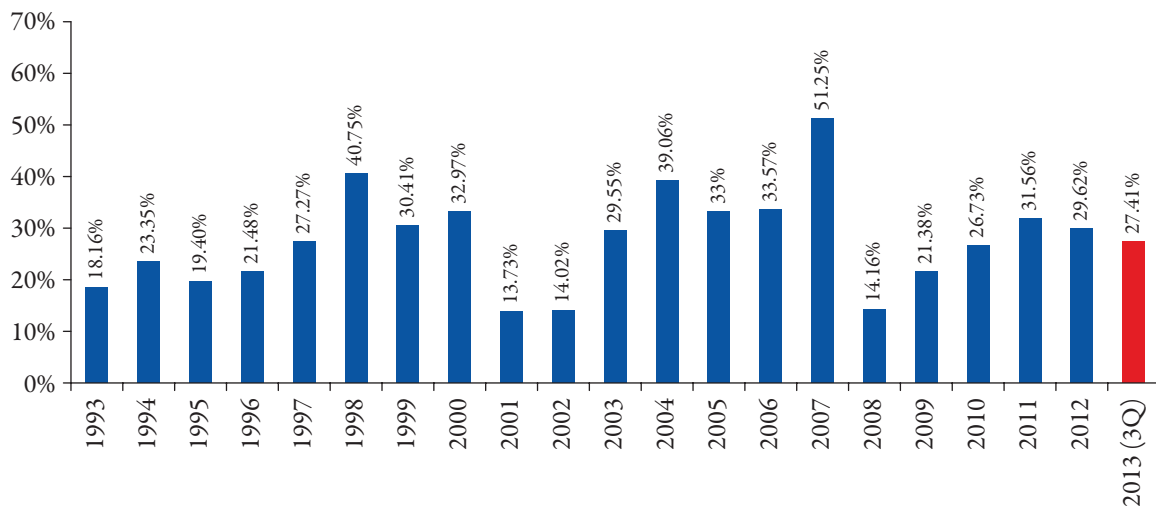


Figure 12: Percentage of New High-Yield Issuance Rated B or Below, 1993-3Q 2013 (Based on the Amount of Issuance).

Source: S&P *Capital IQ LCD*.

stars) exceeded downgrades (fallen angels) perhaps indicating a perceived improvement in credit fundamentals.

Figure 12 shows the proportion of new issues rated B- or lower by S&P for the first nine months of 2013, and annually for 1993-2012. The proportion of this low-quality segment was 27.41% as of the end of the third-quarter 2013, slightly lower than the proportion of 29.62% for all of last year, but above the average of 24.69% for the last five years. The current percentage is marginally below the historical average (27.6%), and below the median (28.4%) year-end levels.

9 Proportion and Size of Defaulted and Distressed Public and Private Debt

The defaulted and distressed debt segment of the high-yield and defaulted debt market in the United States was about 20.6% at the end of the third quarter of 2013, slightly lower than both the proportion of 21.3% three months earlier, and 25.8% of one year earlier (Figure 28 in Altman and Kuehne, 2013). A steady decrease had occurred in this metric from December 31, 2008 through the first-quarter 2011 due to a drop in the distress ratio of issues trading at least 1,000bp over comparable duration US Treasury bonds. However, this ratio rose from 4.2% at the end of the first-quarter 2011, to 18.9% during the third quarter, but then steadily decreased to a level of 10.29% as of the end of the first-quarter 2012. As had happened the prior two years, the ratio rose slightly in the second quarter of 2012 to 10.99%, but then steadily decreased, ending the first quarter 2013 at a level of 5.74%. For the fourth consecutive year, this metric «rebounded», ever so slightly, in the second quarter to 5.91%, but ended the third-quarter 2013 lower at 5.32%. This 5.3% level is based on the combined high-yield and defaulted bond population. The distress ratio for just the high-yield market was 6.3%, a decrease from December 31, 2011 when it was 17.9%, its highest year-end

level since 2008⁸, and a slight increase from the prior quarter level of 7.0%, as well. This level is based on number of issues, with comparable levels based on issuers and dollar amount⁹.

The defaulted bond total is calculated by adding the new defaults of 2013 (\$11.74 billion) to the existing defaulted bonds as of year-end 2012, subtracting the bonds of firms whose reorganization plans were deemed effective and who have emerged from Chapter 11 (\$8.51 billion – see Appendix G in Altman and Kuehne, 2013) and, finally, by deducting the value of bonds that defaulted as part of a distressed exchange (DE) during the year (\$2.03 billion). The latter, while part of our defaulted total, do not trade after the exchange, or trade as non-defaulted debt. In the first nine months of 2013, the defaulted bond proportion decreased slightly to 15.3%, primarily due to the amount of emergencies and restructurings offsetting new, non-DE defaults.

In Altman and Kuehne (2013) Figure 29 shows our estimate of the size of the defaulted and distressed debt markets for both public and privately issued debt. At \$253.60 billion as of September 30, 2013, the face value amount of public defaulted bonds was \$1.2 billion more than at year-end 2012 (\$252.39 billion).

The distressed proportion of the total high-yield bond market decreased in the third quarter as spreads narrowed. The estimated face value amount of distressed public debt is \$88.4 billion, down by 9% in the quarter from a second quarter total of \$97.2 billion, and down 37% from one year earlier (September 2012, \$140.1 billion).

Our private debt estimate is based on a 2:1 ratio of private-to-public debt among troubled companies. Applying this ratio to our public debt totals, we estimate that the face value of private defaulted and distressed debt is \$683.9 billion (see Fig. 29 in Altman and Kuehne, 2013). The total face value of the combined public and private, defaulted and distressed debt amounted to \$1.03 trillion as of September 30, 2013, down \$23.2 billion in one quarter, and down \$162.4 billion from one year earlier (\$1.19 trillion).

Our market value estimates are based on current market conditions for public and private defaulted and distressed bond and loan markets, and our Altman-Kuehne indexes for these securities. Consistent with our current observations of both newly defaulted and existing defaulted loan issues in our index, we have chosen to leave the market/face value ratios unchanged from the second-quarter 2013. When applied, the average price of our public bonds and private loans indexes results in a market value estimate of defaulted and distressed debt of \$685.1 billion – down slightly from both the prior quarter, and more significantly from twelve months earlier.

⁸ A study by J. Gonzalez-Heres, P. Chen and S. Shin, 'Revisiting the Altman Definition of Distressed Debt and a New Mechanism for Measuring the Liquidity Premium of the High Yield Market', *Journal of Fixed Income*, Fall 2010, shows that about 50% of all distress-rated firms default within about four years. The paper also discusses and analyzes the importance of market liquidity in explaining the volatility in the distressed ratio.

⁹ Source: Bank of America Merrill Lynch. The distress ratio used prior to 3Q 2011 had included all USD-denominated debt, without regard to where issuance took place. From that report forward, the ratio calculation only includes USD-denominated debt issued by companies domiciled in the US. See also our later discussion on the distress ratio. This study, and a new one, by the same authors, plus Edward Altman, 'The Return/Volatility Analysis of Distressed Corporate Debt Portfolios', *Journal of Portfolio Management*, forthcoming Spring 2014, and Professor Altman's website, show the empirical superiority of distressed debt portfolios over high-yield and equity strategies.

Estimates for the total face and market values of defaulted and distressed debt from 1990-2013 (see Fig. 30 in Altman and Kuehne, 2013), show that the current volumes are below those observed since the end of 2008, but are still larger than any other year in our data series prior to then.

10 Recent Performance of Defaulted Debt Securities

Through the first nine months of 2013, the Altman-Kuehne Defaulted Bond Index was up an impressive 27.94%. Defaulted bank loans provided lower year-to-date gains of 2.76%. Our combined, long-only index of defaulted bonds and bank loans was up 16.84% for the first nine months¹⁰. Surveying a total of five distressed and defaulted debt indexes, including our own, the average performance of distressed securities, and the funds that specialize in these instruments, was a positive 12.33% through the first nine months of 2013. The average market/face value ratios for both defaulted bonds and loans remain above historical average levels – benchmarks that had not been reached for almost five years prior to the first-quarter 2013. See our year-end reports for more complete data on these statistics.

11 Distressed Bond Investment Performance (2003-3Q 2013)

Distressed debt investing is a somewhat ambiguous asset class designation as it oftentimes refers to any security that has been issued by high risk corporate entities or those that are currently involved in some type of restructuring or bankruptcy process. It can refer to equity as well as debt securities, or derivatives of such securities. At the same time, there is a precise definition of distressed bonds, that we first specified in 1990, referring to bonds whose yield-to-maturity spread (or option-adjusted spread) is at least 1,000bp – currently about 12.5% absolute yield. Today, most of the rating agencies and many of the broker-dealers who trade distressed securities have established indexes of these $\geq 1,000$ bp spread bonds, and report the percentage of high-yield bonds that are in this category – currently about 6.5% of the high-yield bond market. Indeed, later in this report, we show a time series of Distressed Bonds (Fig. 13) and how the percentages correlate with subsequent default rates (Fig. 14). We thought it instructive to discuss Distressed Bonds as an asset class, albeit a subcategory of the high-yield bond market, and to update its recent historical return performance and comparisons to other risky debt and equity asset classes.

Figure 31 reported in Altman and Kuehne (2013) shows the last ten-year, five-year and three-year return performance of Distressed Bonds and its comparison to Defaulted Bonds and Bank Loans, the S&P 500 Equity Index and the Citi High-Yield Bond Index. We also show their nine months 2013 performance. Over the period 2003-2012, Dis-

¹⁰ This compares to an average return for the first nine months of 2013 from four Distressed Debt Hedge Fund indexes (Dow Jones/Credit Suisse, Greenwich Alternative Investments, Hennessee, and HFR) of 11.20%. This Hedge Fund index average is based on «net» hedge fund returns, while our Combined Index is «gross» returns. Also, the four Hedge Fund Distressed Indexes include many strategies in addition to defaulted bonds, such as short sales, equities, international securities and liquid investments like cash equivalents.

tressed Bond's arithmetic average annual return was a quite impressive 23.29%, compared to 19.22% for Defaulted Bonds, 11.96% for our Combined Index of Defaulted Bonds and Bank Loans, 12.15% for Citi's High-Yield Bond Index and 8.84% for the S&P 500. Distressed Debt's return also outperformed all of these other asset classes based on a geometric-mean calculation for this same ten-year period, though the geometric-mean return is lower at 15.11% – similar lower geometric means (assumes reinvestment each year) can be observed for all asset classes due to the negative years' returns. In the case of Distressed Bonds, there were negative returns in four of the ten years. Also, there were four negative return years for Defaulted Bonds, three for the Combined Index and one each for the High-Yield and S&P 500 indexes. Despite higher volatility, the 10-year Sharpe ratio is still highest for the Distressed Bond class (0.36), followed by the High-Yield (0.30), Defaulted Bonds (0.29), Combined Bonds and Loans (0.21) and the S&P (0.16). Similar comparative results can be observed for the last five-year and three-year periods, although the rankings below the Distressed Bond class vary somewhat.

We have included in Figure 31 (see Altman and Kuehne, 2013) an update on the returns through September, 2013 for the various debt and equity classes. These returns, however, are not included in the average annual return calculations. In the first nine months of 2013, Distressed Bonds returned 7.38%. We will return to Distressed Bonds at a later point when we estimate future default rates.

Forecasting aggregate default and recovery rates is a tricky exercise that can be based on a «bottom-up» approach on individual issues and issuers or a macro, «top-down» approach – or both. For practical and track-record reasons, we have chosen the top-down approach using several techniques (models) which include aggregate amounts of new issuance over the last decade stratified by the major ratings categories (mortality statistics). We also analyze the information content of market-based measures, such as yield spreads and distress ratios, to forecast the near-term default performance of the market. These three techniques are then averaged to arrive at our single default rate estimate, although the range of possible outcomes can be observed as well. Our default rate estimates are then used as inputs to form the basis for estimates of aggregate recovery rates on corporate high-yield bond defaults.

12 Mortality Rate-Based Forecast

Using our standard mortality rate forecasting method for 2008, our forecast of 4.64% for the high-yield bond default rate was remarkably close to the actual 2008 rate, which came in at 4.65% (Tab. 8). We then had expected the next year's 2009 default rate forecast would be on the low side, using the same mortality rate methodology. After all, the mortality rate incidences of the past had been based on six recession periods covering only about six-and-a-half years of the 38 in our sample period (1971-2008). Therefore, a non-recessionary, macroeconomic climate dominates our statistics. With a severe recession in place coming into 2009, we expected the mortality rate methodology to underestimate the actual default results. Indeed, the actual default rate was 10.74% in 2009 compared to our forecast of 7.98%, a respectable under-estimate. Since

Table 8: Mortality Rate-Based Forecasts and Actual Results of Default and Recovery Rates in the High-Yield Bond Market, 2008-2012

Year	Default Rate (%)	Default Amount (\$ Billions)	Recovery Rate (%)
2008 (Forecast)	4.64	53.1	39.6 ^a
2008 (Actual)	4.65	50.2	42.5 ^a
2009 (Forecast)	7.98	92.0	30.0
2009 (Actual)	10.77	124.1	36.1
2010 (Forecast)	5.06	62.5	34.9
2010 (Actual)	1.13	13.8	46.6
2011 (Forecast)	3.90	54.8	37.6
2011 (Actual)	1.31	17.8	60.3
2012 (Forecast)	4.10	54.3	37.1
2012 (Actual)	1.62	19.6	57.8
2013 (Forecast)	3.73	47.7	38.1

Note: ^a Based on the log-linear and linear default/recovery rate regressions (See Fig. 20 of our 2012 Annual Report).

Source: Mortality Rates (Fig. 26 of our 2012 Annual Report), and Authors' Estimates of Market Size in 2013.

the mortality method is an actuarial smoothing technique, we know that it will not be sensitive to abnormal conditions. In 2010-2012, our estimates were higher than the actual default rate as the high-yield bond market was buoyed by exceptional levels of government inspired liquidity. For these reasons, we also, when appropriate, consider recession scenario analyses and market-based statistics to provide useful estimates of future results.

Utilizing our updated mortality rate statistics (see our 2012 annual report)¹¹, and inputting new issuance statistics per rating class over the past ten years, we estimated as of year-end 2012 that the 2013 default rate would be 3.73%, with a recovery rate of about 38.1% (Tab. 8). Our forecast also utilizes an estimate of the expected size of the high-yield bond market for 2013. Since we only forecast default rates using our first technique (mortality approach) once per year, this 3.73% rate will remain unchanged until year-end 2013.

13 Market-Based Methods for Forecasting Defaults

We recently introduced two alternative methods for forecasting default rates. The first relies on the market's spread on high-yield bonds compared to 10-yr US Treasuries. The second utilizes the proportion of high-yield bonds selling at 1,000bp over 10-yr US Treasuries (distress ratio). In both cases, we regress the market-based measure in period (t) on the subsequent one-year default rate in period ($t + 1$).

In our most recent annual report, we once again updated our regression model to include 2011's data. Using the December 31, 2012 spread of 5.06% in our updated regression model resulted in a one-year forecast for December 2013 of 3.32%. Inputting the third quarter-end spread of 4.23% into our updated regression model as of September 30, 2013 results in a one-year default rate forecast for September 30, 2014 of 2.41%.

Our second market-based method utilizes the distress ratio, a measure we developed in 1990 to assess that segment of the high-yield bond market that is most likely to default should either specific firms' conditions worsen and/or the real economy deteriorates and

¹¹ E. Altman and B. Kuehne, *Defaults and Returns in the High-Yield Bond and Distressed Debt Market: The Year 2012 in Review and Outlook*, Paulson & Co., February 06, 2013.

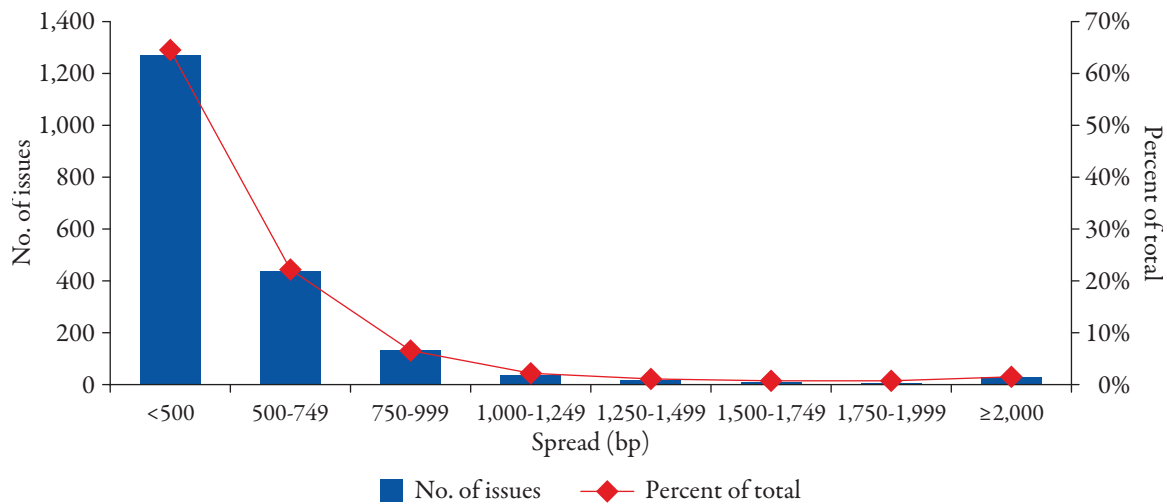


Figure 13: Distribution of High-Yield Bond Issues by OAS over Comparable Duration US Treasury Bonds, September 30, 2013.

Source: Bank of America Merrill Lynch. Data based on the population of distressed credits including only US domiciled companies.

default rates, in general, increase. We zero in on the proportion of the market selling at 1,000bp (10%) or higher than the risk-free benchmark – we utilized, in 1990, the 10-year US Treasury rate. The current market convention, and the one we now utilize in our analysis and in our default rate forecasts, is the average option-adjusted spread (OAS) between high-yield bond issues and the equivalent, comparable duration US Treasury bond. This spread differential, if greater than 1,000bp, qualifies the bond as a distressed security.

When observing the distribution of yield spreads amongst high-yield bonds as of the end of the third-quarter 2013 (Fig. 13), the proportion of bonds selling between 1,000bp and 1,500bp was higher (3.81%), as expected, compared to those selling between 1,500bp and 2,000bp (1.12%), and above 2,000bp (1.52%). Their default likelihood is lower than those which were already over 1,000bp and are now greater than, say, 1,500bp. Still, there were 52 issues (out of a total of 1,971 in the Bank of America Merrill Lynch US High Yield II Master Index) trading above 1,500bp, with 30 of those issues selling at 2,000bp and over.

Inserting the distress ratio of 6.28% as of September 30, 2013 into our regression model (Fig. 14) reveals an expected 1.82% default rate for the end of the third-quarter 2014 (Tab. 9).

14 Conclusions

Considering the various forecasting methods, we observe that the one-year forecast as of September 30, 2014 is in a range between 1.82% (distress ratio) and 3.73% (mortality rate). There is no obvious way to reach a consensus from the different techniques, so we simply took the average of the three to obtain our forecast of 2.65% (Tab. 9). Inputting this estimate into our recovery regression (see Annual Report), we estimate that the corresponding high-yield bond recovery rate, as of September 30, 2014, will be about 41.8%, based on our log-linear model.

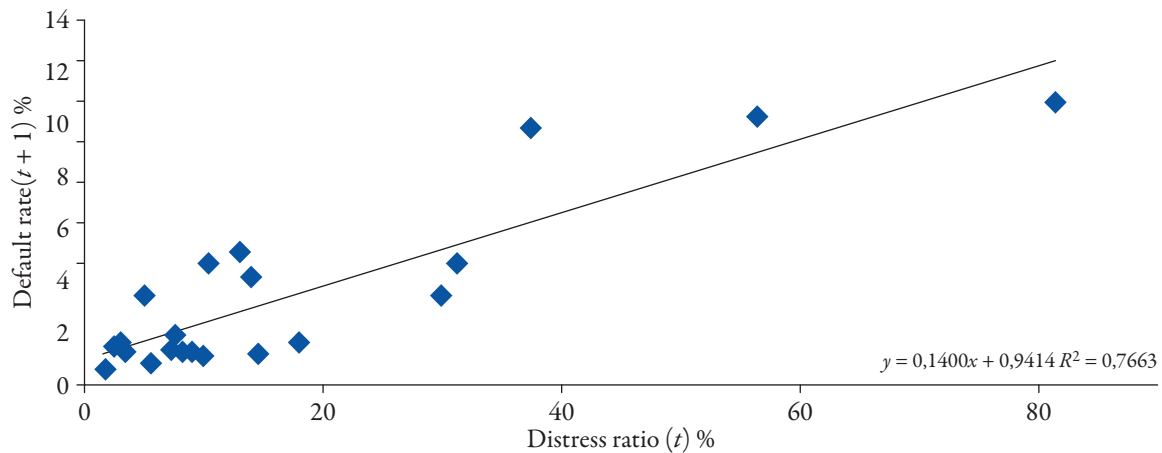


Figure 14: Market-Based Annual Default Rate Forecast: Annual Default Rate ($t + 1$) vs. Annual Distressed Ratio (t), 1990-2011.

Source: Bank of America Merrill Lynch & NYU Salomon Center.

Table 9: 2013 and One-Year Default and Recovery Forecasts: Summary of Forecast Models (%)

Model	2013	Sep. 2014
	Default Rate Forecast as of 12/31/2012	Default Rate Forecast as of 09/30/2013
Mortality Rate	3.73	3.73
Recession Scenarios	n/r	n/r
Yield-Spread	3.32 ^b	2.41 ^d
Distressed Ratio	2.65 ^c	1.82 ^d
Average of Models	3.23	2.65
Recovery Rates ^a	39.7	41.8

Note: ^a Based on the log-linear regression, see our Annual Report, February 06, 2013. ^b Based on 12/31/2012 Yield-Spread of 505.8bp. ^c Based on 12/31/2012 Distress Ratio of 9.88%. ^d Based on 9/30/2013 Yield-Spread of 423.3bp. ^e Based on 9/30/2013 Distress Ratio of 6.28%.

Source: NYU Salomon Center, Citi Yieldbook and Bank of America Merrill Lynch.

If, and when, the US economy does fall into a recession, default rates will, of course, escalate. Note that we do not utilize a recession scenario technique since many economists have estimated that the one-year probability of a renewed recession is now less than 10%.

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