

## **A Note on Credit Market Bubbles\***

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**and**

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### **Abstract**

**Bubble theories and concerns are becoming quite common these days for several asset classes, prompting discussions and warnings, including those from regulators. We now come to some key questions -- are we in the midst of an inflating credit bubble and, if so, when is it likely that the bubble will burst? Contrarily, are we experiencing an extended period of opportunistic debt financing - - a theory made popular amongst corporate finance theorists going back to at least the 1960s and 1970s. The evidence we have compiled leads us to conclude that, indeed, a bubble is building, but it is not likely to explode dramatically, with a significant increase in corporate bond and loan defaults, until at least late 2016 or more likely in 2017-2018. Fear, however, of a potential crisis in credit and equity markets, or major dislocations in important industries or countries, may contribute to periods of negative price movements and increased volatility in these, and other, asset classes before the bubble actually bursts.**

### **(1) Forward**

Bubble theories and concerns are becoming quite common these days for several asset classes, prompting discussions and warnings, including those from regulators, e.g., “Central bankers issue strong warning on asset bubbles,” NY Times.com, July 7, 2014. We now come to some key questions -- are we in the midst of an inflating credit bubble and, if so, when is it likely that the bubble will burst? Contrarily, are we experiencing an extended period of opportunistic debt financing - - a theory made popular amongst corporate finance theorists going back to at least the 1960s and 1970s by such luminaries as Ezra Solomon (1963) and Steward Myers (1984). The evidence we have compiled leads us to conclude that, indeed, a bubble is building, but it is not likely to explode dramatically, with a significant increase in defaults, until at least late 2016 or more likely in 2017-2018. Fear, however, of a potential crisis in credit and equity markets may contribute to periods of negative price movements in these, and other, asset classes before the bubble actually bursts. This is consistent with our continued expectation of a below-average default rate for the next twelve months (Altman & Kuehne, 2015). However, we are becoming

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quite concerned about the period thereafter, when the current benign credit cycle will reach six or seven years in length, the latter tying a record in modern high-yield bond history.

The second section of this paper discusses benign and distressed cycles and how long they typically last. We then explore, in section 3, the information content in yield spreads and the risk tolerance of risky debt investors, followed by an analysis of recent trends in new issuance and its association with credit quality. In section 5 we analyze the trend in LBO statistics, and in the final section we present concluding remarks.

## **(2) Benign and Distressed Cycles: How Long Do They Last**

In our opinion, to use a baseball metaphor, the credit market is at the start of the 8th inning of its current cycle, but the score is tied and the likelihood of extra innings is fairly high. Whether or not the game will be extended beyond the normal end-point is based on the FED's interest and ability to continue to provide significant liquidity to the markets. Here are some instructive historical perspectives on credit cycles.

From Figures 1 and 2, we can observe that the benign credit-cycles of the recent past, of well-below-average default rate periods (and high recovery rates after default), have lasted four years (2004-2007) and seven years (1992-1998), with the current cycle now in its sixth year (2010-2015 [6/30]). If we had included the two relatively low default cycles in the 1970s and 1980s, when the average annual dollar-denominated default rate was much lower than the current 1971-2014 rate of 3.5% per year, then the four benign credit cycles since 1971 would have averaged about six years. If we only include the last two cycles, the average is about 5.5 years. As noted, since the current cycle has run 5.5 years, if the latest benign cycle continues through 2015, as is likely, it will have lasted for six years. Note also that once a benign cycle ends, the subsequent spike in default rates has reached at least 10% for one or two years (1990/1991, 2001/2002, and 2009). With the market's size now significantly larger than in prior default peaks, the amount of defaulted high-yield bonds likely to occur in stressed cycles will be between \$150-200 billion in each 10% default year.

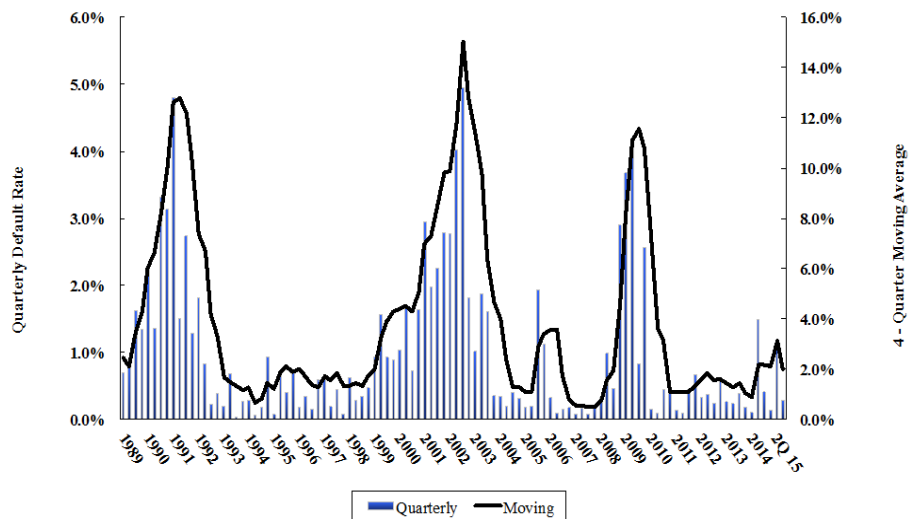
**Figure 1. Historical Default Rates – Straight High-Yield Bonds Only, Not Including Defaulted Issues In Par Value Outstanding, 1971-2Q 2015 (Dollars in Millions)**

Year	Par Value		Default Rates (%)
	Outstanding <sup>a</sup> (\$)	Defaults (\$)	
2015 (2Q)	1,540,308	22,173	1.440
2014	1,496,814	31,589	2.110
2013	1,392,212	14,539	1.044
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
			<b>Standard</b>
			<b>Deviation (%)</b>
Arithmetic Average	1971 to 2014	3.117	3.097
Default Rate	1978 to 2014	3.340	3.273
	1985 to 2014	3.843	3.416
Weighted Average	1971 to 2014	3.491	
Default Rate <sup>b</sup>	1978 to 2014	3.496	
	1985 to 2014	3.513	
Median Annual Default Rate	1971 to 2014	1.664	

<sup>a</sup> As of midyear. <sup>b</sup> Weighted by par value of amount outstanding for each year.

Source: Altman & Kuehne (August, 2015).

**Figure 2. Quarterly High-Yield Bond Default Rate and the Four-Quarter Moving Average Default Rate, 1989-2Q 2015**



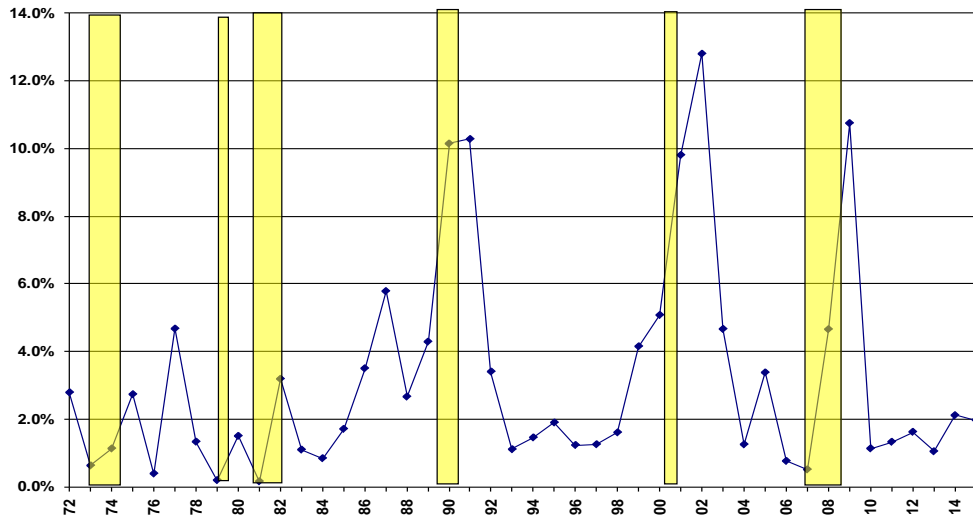
Source: Altman & Kuehne (August, 2015).

In terms of our estimate for how long the next stressed default cycle will last, we observe that above average default rates have lasted three years in the 1989-1991 period, four years, or so, in the 2000-2003 period and just two years in the 2008-2009 cycle, averaging about three years.<sup>1</sup> Note that some of these above average default cycles include one or two years with default rates in the 4-5% range, just barely above average.

It should be noted that the three recent spikes in default rates to levels of 10% or more were accompanied by economic recessions, as shown in Figure 3. Forecasting the timing of economic recessions is challenging, at best, and to estimate the confluence of a stressed credit cycle with recession is a “perfect storm” that has indeed occurred a number of times in the recent past and is likely to occur again - - the timing is the difficult issue. Related to all of these scenarios is the speculation of what could be the catalyst. However, it is clear that if, and when, we do have another economic downturn, default rates will increase to significantly high levels and defaults to very high dollar amounts, ending a drought for distressed investors. While the catalyst to credit market crisis is very difficult to identify, it could be as simple as a major market correction in the stock market or a significant decrease in economic growth in a systemically important country (e.g. U.S. or China) or region (e.g. Asia).

<sup>1</sup> M. Fridson in his study “Next Default Upsurge will Likely Total \$1.5 Trillion”, S&P Capital IQ LCD, November 12, 2013, assumes a four-year above average distressed cycle in his scenario analysis.

**Figure 3. Historical Default Rates and Recession Periods<sup>a</sup> in the U.S.: High-Yield Bond Market, 1972-2Q 2015<sup>b</sup>**

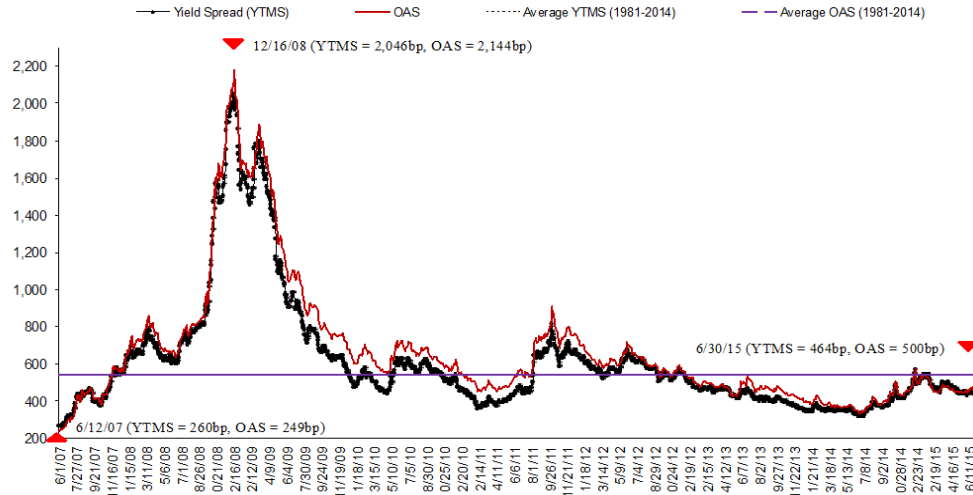


<sup>a</sup> Periods of Recession: 11/73 - 3/75, 1/80 - 7/80, 7/81 - 11/82, 7/90 - 3/91, 3/01 - 11/01, 12/07 - 6/09.<sup>b</sup> All rates annual, except 2Q 2015 which is LTM.  
Sources: Data from Figure 1 of this commentary and the National Bureau of Economic Research 2010, <[www.nber.org/cycles.html](http://www.nber.org/cycles.html)>.

### (3) Yield Spreads and Risk Tolerance

Figure 4 shows the non-investment grade yield spreads since the record low point in June 2007, when the YTM spread was only 2.60% and the option adjusted spread was just 2.49. We are now, as of June 30, 2015, at 4.64%, 204bp above the all-time low point, but 55bp below the long-term historical average. Clearly, the market is expecting the benign cycle to last for at least a while longer. What's more, the current yield on high-yield bonds is near its all-time low, at 6.98%, also as of June 30th. While this reflects the extremely low interest rate environment we are currently experiencing, it is also a testament to the low required yields demanded by investors. This begs the question as to whether the credit-default profile of corporate bonds issuers in general, and high-yield issuers in particular, are stronger today (or more recently) than they were in 2007, just before the default rate started to rise significantly during the great financial crisis of 2008 and 2009. Were investors requiring an absurdly low rate of return in 2007, given issuer risk profiles, and are they doing the same thing of late?

**Figure 4. YTM and Option-Adjusted Spreads Between High-Yield Bonds and U.S. Treasury Notes, 1 Jun 07–30 Jun 15**



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

To answer this question, we draw upon an earlier study that looked at the average/median Z-Score of HY issuers in 2007 vs. 2012 (Altman & Kuehne, May 2013), as well as a recent update through June 2014. We can see from Figure 5 that, indeed, the 2012 crop of HY issuers actually have a lower average Z-Score (1.66) in 2012 vs. 1.89 in 2007, both with a B average bond-rating-equivalent. The difference in Z-Scores was significant at the .05 level, as shown in the figure. Median Z-Scores show essentially the same difference, 1.81 in 2007 vs. 1.59 in 2012. Average and median Z"-Scores were essentially the same in both periods. An update using second-quarter 2014 data reveals that the average Z and Z"-Scores of firms have improved over the last two years, and now exceed 2007 levels. However, the median scores are still slightly below the 2007 levels; in fact, the median Z"-Score fell between 2012 (4.60) and 2014 (4.56). Therefore, we can conclude, perhaps surprisingly to some, that the average American HY bond issuer was as risky, and in some cases riskier, in recent years than it was in 2007, just prior to the market's meltdown. The main culprit for lower median Z"-Scores and only slightly higher Z-Scores is the considerably higher leverage levels of high-yield firms over the last several years. It should be noted that a number of additional factors can explain credit spreads and risk tolerance, including the duration of the issue, its size, and other liquidity indicators, e.g. bid-ask spread, tax considerations, the risk-free or benchmark rate, option features (e.g. call option), etc. All of these factors were quite similar between 2007 and 2012/14, except the benchmark rate which is lower, of late, than it was in 2007.

**Figure 5. Comparing Financial Strength of High-Yield Bond Issuers in 2007 and 2012/2014**

Number of Firms		
	Z-Score	Z"-Score
2007	277	383
2012	404	488
2014	558	760

Year	Average Z-Score/(BRE) <sup>a</sup>	Median Z-Score/(BRE) <sup>a</sup>	Average Z"-Score/(BRE) <sup>a</sup>	Median Z"-Score/(BRE) <sup>a</sup>
2007	1.89 (B)	1.81 (B)	4.58 (B+)	4.61 (B+)
2012	1.66 (B)	1.59 (B)	4.60 (B+)	4.60 (B+)
2014	2.03 (B+)	1.80 (B)	4.67 (B+)	4.56 (B+)

Difference in Means Test (2007 versus 2012/2014)					
Model	Average Difference (2012/2014)	Standard Deviation (2007/2012/2014)	t-test (2012/2014)	Significance Level	Significant at .05? (2012/2014)
Z-Score	-0.23/+0.14	1.29/1.15/1.78	-2.38	0.88%/9.70%	Yes/No
Z"-Score	+0.02/+0.09	2.50/2.07/2.65	+0.13	44.68%/28.78%	No/No

<sup>a</sup> Bond Rating Equivalent

Source: Altman & Kuehne (May, 2013), data from Altman and Hotchkiss (2006) and S&P Capital IQ.

#### (4) New Issuance and Credit Quality

The corporate HY and Investment Grade (IG) sectors have been refinancing and increasing their debt financing fairly continuously since the current benign cycle started in 2010. Indeed, according to Bank of America Merrill's statistics, as shown in Figure 6, new HY issuance topped \$200 billion for the first time in 2010, reached a peak of \$280 billion in 2012, almost matched that in 2013, and ran at a slightly lower amount, but still at a substantial pace, for 2014, at \$239 billion. With \$150 billion issued in the first half of 2015, it does not appear that increased amounts of high-yield issuance will be slowing down anytime soon.<sup>2</sup> Incidentally, the pace and growth of new issuance in Europe has been even more impressive of late, surpassing the \$92 billion reached in 2013, with new issuance in 2014 of \$119 billion -Figure 7. In a nutshell, market acceptance of newly issued high-yield junk bonds has been remarkable, with record amounts issued at relatively low interest rates, reinforcing the seemingly insatiable appetite for higher yields in this low-interest rate environment.

<sup>2</sup> Credit Suisse new issuance statistics indicate even higher amounts of high-yield bond issuance.

**Figure 6. New Issuance: U.S. High-Yield Bond Market, 2005-2Q 2015 (Dollars in Millions)**

Annual	Total	Ratings				
		BB	B	CCC	(% H.Y.)	NR
2005	83,373.6	19,415.0	47,132.5	16,235.9	(19.5%)	590.2
2006	126,130.1	36,761.2	64,943.8	22,966.8	(18.2%)	1,458.2
2007	131,008.9	23,713.2	54,490.1	49,288.1	(37.6%)	3,517.5
2008	44,243.3	12,393.0	22,151.9	7,243.8	(16.4%)	2,454.6
2009	133,078.3	40,757.8	81,587.1	10,113.4	(7.6%)	620.0
2010	227,505.5	54,859.0	133,389.7	36,086.8	(15.9%)	3,170.0
2011 (1Q)	70,627.4	8,766.0	43,821.5	15,193.0	(21.5%)	2,846.8
(2Q)	64,737.5	16,803.5	34,149.0	13,285.0	(20.5%)	500.0
(3Q)	22,739.9	10,535.3	8,018.9	4,010.0	(17.6%)	175.0
(4Q)	31,215.2	18,070.2	10,610.0	2,535.0	(8.1%)	0.0
<b>2011 Totals</b>	<b>189,319.2</b>	<b>54,175.0</b>	<b>96,599.4</b>	<b>35,023.0</b>	<b>(18.5%)</b>	<b>3,521.8</b>
2012 (1Q)	75,462.0	26,071.1	36,003.0	11,362.9	(15.1%)	2,025.0
(2Q)	40,748.9	9,589.2	21,724.5	6,583.1	(16.2%)	2,852.0
(3Q)	86,806.5	23,529.1	46,640.0	16,092.4	(18.5%)	545.0
(4Q)	77,432.9	12,662.7	49,243.5	14,651.7	(18.9%)	875.0
<b>2012 Totals</b>	<b>280,450.3</b>	<b>71,852.1</b>	<b>153,611.1</b>	<b>48,690.2</b>	<b>(17.4%)</b>	<b>6,297.0</b>
2013 (1Q)	73,492.3	31,953.1	29,534.2	11,480.0	(15.6%)	525.0
(2Q)	62,135.0	24,380.0	23,665.0	13,790.0	(22.2%)	300.0
(3Q)	73,770.8	22,964.2	32,610.0	18,196.6	(24.7%)	0.0
(4Q)	60,936.8	24,050.0	22,686.8	14,175.0	(23.3%)	25.0
<b>2013 Totals</b>	<b>270,334.8</b>	<b>103,347.3</b>	<b>108,495.9</b>	<b>57,641.6</b>	<b>(21.3%)</b>	<b>850.0</b>
2014 (1Q)	51,634.7	17,585.0	25,792.2	7,842.5	(15.2%)	415.0
(2Q)	74,629.6	23,893.7	30,852.3	19,363.6	(25.9%)	520.0
(3Q)	59,777.3	25,537.3	22,550.0	10,875.0	(18.2%)	815.0
(4Q)	52,721.1	21,975.0	28,906.1	1,840.0	(3.5%)	0.0
<b>2014 Totals</b>	<b>238,762.7</b>	<b>88,991.0</b>	<b>108,100.6</b>	<b>39,921.1</b>	<b>(16.7%)</b>	<b>1,750.0</b>
2015 (1Q)	76,059.5	23,184.2	44,785.3	8,090.0	(10.6%)	0.0
(2Q)	74,048.0	21,219.0	40,656.8	12,052.1	(16.3%)	120.0
<b>Ytd Totals</b>	<b>150,107.5</b>	<b>44,403.3</b>	<b>85,442.1</b>	<b>20,142.1</b>	<b>(13.4%)</b>	<b>120.0</b>

Source: N. Khoda (July, 2015).



**Figure 7. New Issuance: European High-Yield Bond Market, 2005-2Q 2015 (Dollars in Millions)**

Annual	Total	Ratings						
		BB	B	CCC	NR	USD	EUR	GBP
2005	20,900.2	1,463.3	13,296.0	4,961.6	1,179.3	5,023.7	13,882.2	1,668.3
2006	31,736.0	5,696.2	18,136.1	7,197.8	705.9	11,592.8	19,919.9	223.3
2007	19,176.2	6,097.8	10,806.0	1,351.5	920.9	5,835.5	10,172.2	3,168.5
2008	7,306.9	1,250.0	2,266.3	3,790.6		7,306.9		
2009	37,300.3	12,856.3	18,120.5	4,771.3	1,552.2	11,180.0	25,622.0	498.3
2010	58,903.9	19,314.3	33,338.3	2,945.7	3,305.6	13,945.0	43,245.2	1,403.3
2011 (1Q)	24,813.1	10,283.1	12,884.8	1,645.3		7,925.0	13,127.5	3,191.3
(2Q)	24,924.0	7,170.6	13,957.9	2,704.0	1,091.5	5,795.0	13,183.6	5,651.1
(3Q)	4,325.9	3,533.4	792.5			400.0	3,925.9	
(4Q)	3,088.0	1,855.0	750.0	395.9	87.0	1,550.0	1,286.1	
2011 Totals	57,151.0	22,842.1	28,385.2	4,745.2	1,178.6	15,670.0	31,523.1	8,842.4
2012 (1Q)	21,788.3	8,904.1	11,003.0	1,734.6	146.6	8,945.0	10,783.0	1,108.2
(2Q)	9,075.8	2,086.4	6,296.0	693.4		4,080.0	4,179.3	816.5
(3Q)	17,733.2	9,138.4	4,122.4	2,652.5	1,820.0	6,350.0	10,399.2	241.2
(4Q)	16,918.8	6,872.9	7,591.7	2,106.2	348.0	8,823.0	6,908.8	763.5
2012 Totals	65,516.1	27,001.7	29,013.0	7,186.7	2,314.6	28,198.0	32,270.4	2,929.3
2013 (1Q)	27,954.5	6,738.8	15,008.4	5,160.6	1,001.7	10,050.0	12,380.7	4,837.4
(2Q)	30,335.3	6,860.2	19,295.1	3,724.1	455.9	9,913.0	14,149.9	6,074.0
(3Q)	16,558.4	3,375.3	9,609.6	2,721.8	851.7	5,310.0	8,644.0	2,604.4
(4Q)	16,655.9	2,588.0	10,657.6	2,366.4	1,043.9	5,210.0	9,086.5	2,359.4
2013 Totals	91,504.1	19,607.3	54,570.7	13,972.9	3,353.2	30,483.0	44,261.0	15,875.3
2014 (1Q)	27,169.2	12,565.7	11,685.2	1,230.0	1,688.3	7,315.0	16,352.8	3,501.4
(2Q)	65,671.4	13,730.1	45,808.3	4,111.1	2,021.9	23,150.0	36,009.0	6,096.7
(3Q)	15,980.5	3,586.3	10,593.2	1,241.3	559.7	2,750.0	8,216.2	4,744.6
(4Q)	10,646.9	3,893.7	4,288.8	654.5	1,810.0	6,305.0	4,341.9	
2014 Totals	119,468.0	33,775.8	72,375.4	7,236.9	6,080.0	39,520.0	64,919.9	14,342.7
2015 (1Q)	30,535.5	15,387.8	10,054.6	938.7	4,154.3	10,225.0	17,149.0	2,622.0
(2Q)	25,838.7	11,282.6	11,633.7	2,334.6	587.8	12,465.0	11,124.8	1,782.2
Ytd Totals	56,374.2	26,670.5	21,688.3	3,273.3	4,742.1	22,690.0	28,273.8	4,404.2

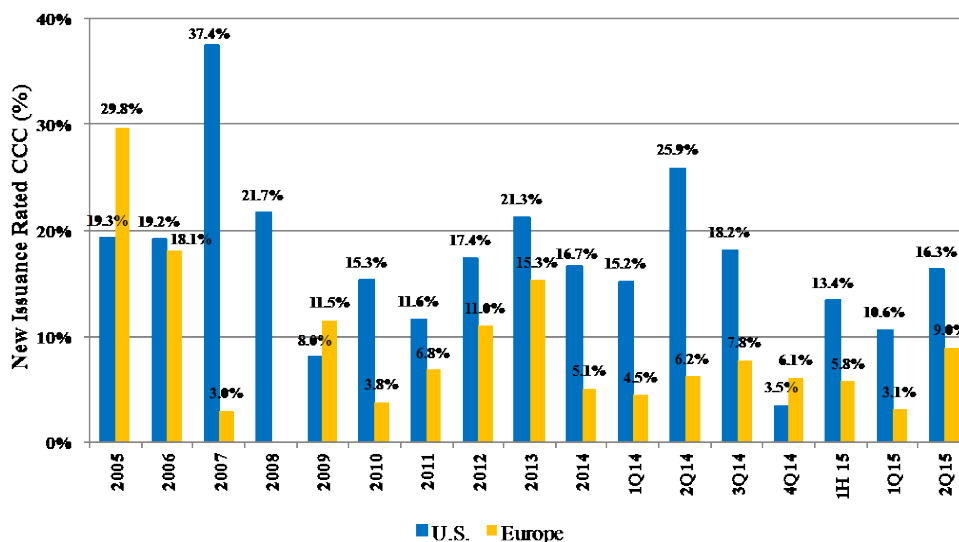
Source: N. Khoda (July, 2015).

New issuance of leveraged loans has also grown dramatically of late, from just \$77 billion in 2009 to a record \$607 billion in 2013. The latter amount surpassed the previous record of \$535 billion in 2007 (*S&P LCD Statistics*). In 2014, the amount of new issuance was approximately \$529 billion, lower than total issuance in 2013, but close to the previous record indicated above. For the first half of 2015, the amount of new issuance was approximately \$229 billion, substantially lower than issuance during the same period last year (\$328 billion). Incidentally, about \$237 billion of the 2014's total issuance (45%) was considered covenant-lite, a loan type that gives creditors less influence over the debtor and, should the debtor default, will likely result in a lower recovery rate, as history has shown, than that received by creditors holding loans with

normal covenant features. In the first half of 2015, approximately 39% of new leveraged loan issuance was covenant-lite (about \$89 billion).

What of the credit quality of these record new issuances? We have already shown that the average HY bond in recent years has a slightly higher, or similar, default risk, based on its Z-Score values, than those outstanding in 2007. In terms of the bond ratings ascribed to new issues, recent trends from 2012 to late 2014 also indicated deterioration in credit quality. This trend has receded since the fourth quarter of 2014, likely due to the oil price scare and disruption, but appears to have resumed in the second-quarter 2015. Figure 8 shows the proportion of newly issued bonds rated CCC (bonds are almost never rated lower than CCC at issuance) compared to total HY new issuance, from 2005 through the first-half 2015.

Figure 8. U.S. and European High-Yield Bond Markets: CCC Issuance, 2005-2Q 2015 (In Percent)



Source: Data from Figures 6 and 7 of this commentary.

Note that the second-quarter 2014's CCC proportion jumped to 25.9%, second only to the record year's incredible 37.4% in 2007, when just about any credit quality company could find new bond financing. Though issuance of CCC rated bonds fell a great deal in the fourth quarter of 2014 to a proportion of just 3.5%, resulting in 16.7% of new issuance being rated CCC for all of 2014, it rose to a still relatively low proportion in the second-quarter 2015 of 16.3%, resulting in 13.4% for the first half of the year. We believe the drop at the end of last year was due to the flight to quality resultant of the volatility in the markets during that period, and that companies were simply not able to bring such low-rated debt to market. Thus, we still believe that the amount of low-rated debt issued within the past three years is an ominous indication of significant defaults down the road, and not in the too distant future. Our mortality rate statistics (Figure 9) show that the average three-year cumulative mortality (default rate for CCC new issuance) is about 34% and by the fifth year, it reaches almost 50% (47.4%). So, for example, out of the \$57.6 billion of CCC new issuance in 2013 alone, we might expect about \$20 billion in new defaults in the 2014-2016 period and as much as \$27 billion by 2018. This is just from one year's CCC issuance! Therefore, we need to keep our eye on the results over the next few years

of this low-rating cohort, as well as to keep in mind the even more plentiful “B” rating categories.

**Figure 9. Mortality Rates by Original Rating – All Rated Corporate Bonds<sup>a</sup> (1971–2014)**

		Years After Issuance									
		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.04%	0.04%	0.04%	0.04%
AA	Marginal	0.00%	0.00%	0.22%	0.08%	0.02%	0.01%	0.01%	0.01%	0.02%	0.01%
	Cumulative	0.00%	0.00%	0.22%	0.30%	0.32%	0.33%	0.34%	0.35%	0.37%	0.38%
A	Marginal	0.01%	0.03%	0.13%	0.14%	0.11%	0.07%	0.02%	0.26%	0.08%	0.05%
	Cumulative	0.01%	0.04%	0.17%	0.31%	0.42%	0.49%	0.51%	0.77%	0.85%	0.90%
BBB	Marginal	0.34%	2.38%	1.28%	1.01%	0.51%	0.23%	0.27%	0.15%	0.15%	0.35%
	Cumulative	0.34%	2.71%	3.96%	4.93%	5.41%	5.63%	5.88%	6.03%	6.17%	6.50%
BB	Marginal	0.95%	2.03%	3.90%	1.97%	2.35%	1.53%	1.47%	1.13%	1.45%	3.15%
	Cumulative	0.95%	2.96%	6.75%	8.58%	10.73%	12.10%	13.39%	14.37%	15.61%	18.27%
B	Marginal	2.86%	7.74%	7.86%	7.81%	5.71%	4.46%	3.56%	2.09%	1.77%	0.76%
	Cumulative	2.86%	10.38%	17.42%	23.87%	<b>28.22%</b>	31.42%	33.86%	35.24%	36.39%	36.87%
CCC	Marginal	8.15%	12.44%	17.92%	16.35%	4.68%	11.53%	5.45%	4.86%	0.69%	4.30%
	Cumulative	8.15%	19.58%	33.99%	44.78%	<b>47.37%</b>	53.43%	55.97%	58.11%	58.40%	60.19%

<sup>a</sup> Rated by S&P at issuance based on 2,847 defaulting issues.

Sources: S&P and Altman & Kuehne (January, 2015). Original mortality rate concept developed in Altman (1989).

Finally, we can assess the CCC new issuance so far in 2015 and the stated purpose of the new financing. Figure 10 shows that of the \$20.1 billion new CCCs issued through the first-half 2015, 43.2% were for refinancing, a credit positive purpose, but most of the balance, including M&A (31.9%), LBOs (21.3%), and Recap/Dividends (3.6%) were likely to be credit negative purposes, i.e. resulting in lower ratings and increased default risk.

**Figure 10. CCC New Issuance by Purpose, 2Q 2015 (In Percent)**

Refinancing	43.15
M&A	31.91
LBO	21.30
Recap/Dividends	3.64
Project Financing	0.00
Corporate Purpose	0.00
<b>Total</b>	<b>100%</b>

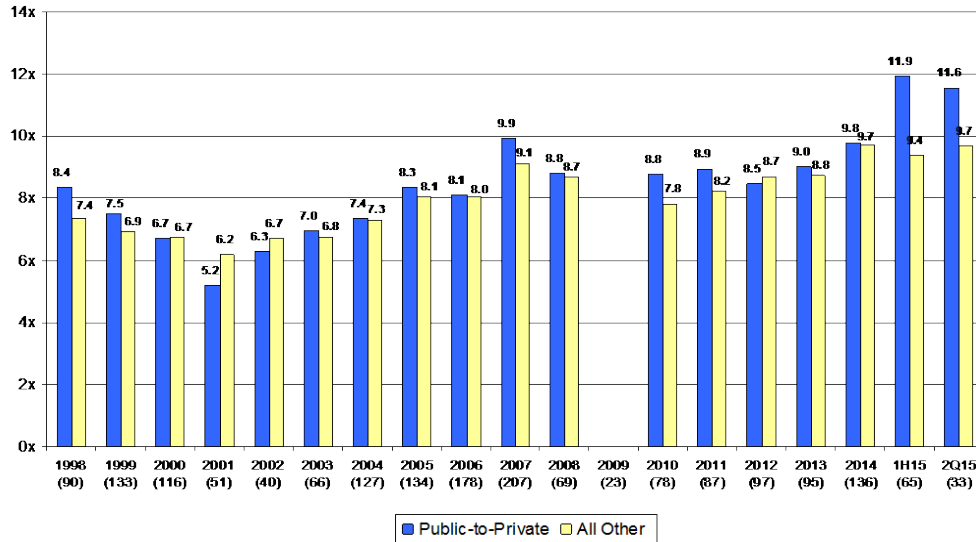
Sources S&P *Capital IQ LCD 2015*, <[www.lcdcomps/lcd/r/research.html](http://www.lcdcomps/lcd/r/research.html)>.

## (5) LBO Statistics and Trends

With respect to highly leveraged LBO financing, we can observe in Figure 11 that the purchase price multiple median increased to its historically highest level of 11.9x for public-private transactions, and remained quite high at 9.4x for “all other” transactions, in the first half of 2015 (65 cases). The latter was slightly lower than the 9.7 times observed for all of 2014, but is still strongly reminiscent of the frothy 2007 period. Most of these deals were sales of a company from one sponsor to another. The average total debt/EBITDA in the U.S. fell from its level of 5.8 at the end of 2014 to an average of 5.7 in the first half of 2015, but again, the highest levels since 2007 (Figure 12). Skeptics will argue that these high-risk levels are acceptable in this low interest rate environment. Indeed, comparing 2007 with 2014, a number of metrics look

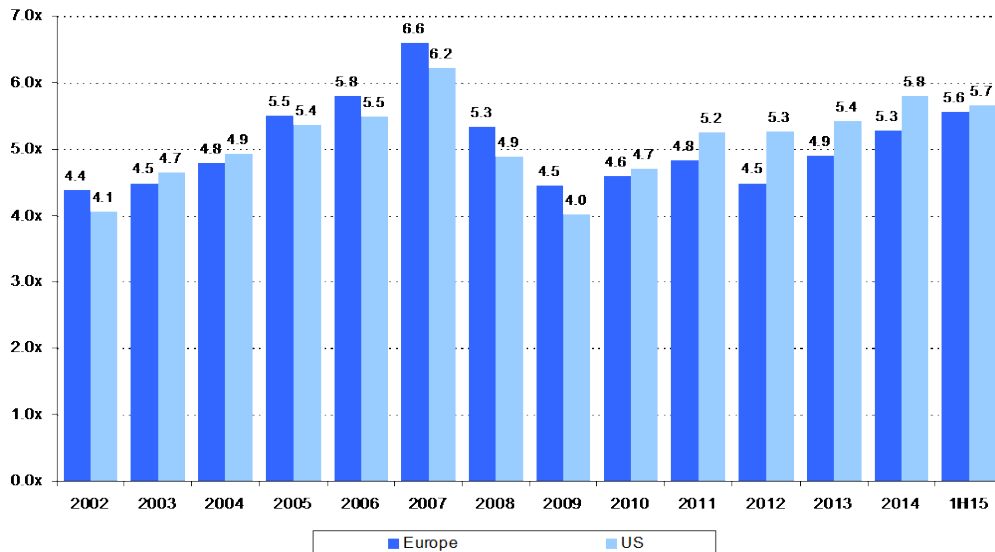
somewhat less risky, although the trend in many of these risk factors are all pointing toward higher risk levels.

**Figure 11. Purchase Price Multiples Excluding Fees for LBO Transactions, 1998 - 2Q 2015**



Source: S&P Capital IQ LCD, "Leveraged Buyout Review - 2Q15", July, 2015.

**Figure 12. Average Total Debt Leverage Ratio for LBOs: Europe and U.S. with EBITDA of €/\$50M or More, 1999 - 2Q 2015**



Source: S&P Capital IQ LCD, "LCD Global Review - US/Europe", July, 2015.

Figure 13 shows a comparison of risk factors between 2007 and 2014, with an update for the first-half 2015, that may calm analysts, like us, who are increasingly concerned about the private-equity sponsored LBO environment in the U.S. today. For one thing, the percentage of

total high-yield loan financing allocated to M&A/LBO purposes was considerably lower in 2014 at about 47% (compared to 62% in 2007), but has risen slightly of late to 48% in the first-half 2015. If you add in the Recap/Dividend purposes (8% in the first-half 2015), the percentage of new high-yield financing that is for credit-negative purposes is quite high, although not as high as in 2007.

While the Debt/EBITDA ratio in neither 2014 (6.0x), nor the first-half 2015 (5.8x), was as high as the average in 2007 (6.2x), it is still at a dangerous level of late. The current interest rate level does favorably impact the EBITDA/cash interest ratio, which averaged only 2.1x in 2007, and in 2014 and first-half 2015 was a safer 3.3x and 2.8x, respectively, and the equity contribution on LBOs was somewhat higher at 40% in the first-half 2015 (38% in 2014) than it was in 2007 (31%). So, all-in-all, a somewhat more favorable risk-metric profile for PE-sponsored LBOs existed in 2014 and into the first six months of 2015. Still, recall that 2007 was an extremely risky year, and some of the positive current conditions, like interest-rate levels, can change fairly quickly, and the economy, which is going very well of late, may falter in a year or two. It should be noted, however, that preliminary findings on our own research show that private equity sponsored LBOs display greater resiliency and lower default rates than comparably rated corporate debt financings.

**Figure 13. LBO Statistics and Ratios: 2007 versus 2014 (update 1H 15)**

	2007	2014	1H 15
<b>M&amp;A/LBO as a % of Total Issuance</b>	62%	47%	48%
<b>Purchase Multiple</b>	9.1-9.9x	9.7-9.8x	9.4-11.9x
<b>Debt to EBITDA @ Inception</b>	6.2x	6.0x	5.8x
<b>EBITDA to Cash Interest</b>	2.1x	3.3x	2.8x
<b>Equity Contribution</b>	31%	38%	40%

Source: Guggenheim Investments and S&P Capital IQ.

## (6) Concluding Results

Will this tolerant, highly liquid market sentiment persist and will the FED continue its strong growth posture? These are the questions we feel continue to be most prominent to analyze as we may watch the bubble inflate to even larger dimensions.

## References

- E. Altman, “Measuring Corporate Bond Mortality & Performance”, Journal of Finance, September, 1989, 909-922.
- E. Altman and E. Hotchkiss, **Corporate Financial Distress and Bankruptcy**, John Wiley & Sons, 2006.
- E. Altman and B. Kuehne, “Are High-Yield Firm Balance Sheets Stronger Today”, *Paulson & Co.*, May 16, 2013 and the NYU Salomon Center, May 16, 2013.
- E. Altman and B. Kuehne, “Defaults and Returns in the High-Yield Bond and Distressed Debt Market: The Year 2014 in Review and Outlook”, *Paulson & Co.*, January 30, 2015 and the NYU Salomon Center Special Report, January 30, 2015.
- E. Altman and B. Kuehne, “Defaults and Returns in the High-Yield Bond Market: First -Half 2015 Review”, *Paulson & Co.*, August 4, 2015 and the NYU Salomon Center Special Report, August 4, 2015.
- E. Altman and B. Kuehne, “Special Commentary: A Note on Credit Market Bubbles”, International Journal of Banking, Accounting and Finance, vol. 5, No. 4, 2014.
- M. Fridson, “Next Default Upsurge will Likely Total \$1.5 Trillion”, S&P Capital IQ LCD, November 12, 2013.
- N. Khoda, “High Yield Strategy: High Yield Credit Chartbook”, Bank of America Merrill Lynch Global Research, July 2, 2015.
- S. Meyers, “The Capital Structure Puzzle”, Journal of Finance, 39, July 1984, 581-592.
- National Bureau of Economic Research 2010, <[www.nber.org/cycles.html](http://www.nber.org/cycles.html)>.
- E. Solomon, **The Theory of Financial Management**, Columbia University Press, 1963.
- S&P Capital IQ LCD, “Leveraged Buyout Review – 2Q15”, July, 2015.
- S&P Capital IQ LCD, “LCD Global Review – US/Europe”, July, 2015.
- S&P Capital IQ LCD 2015, <[www.lcdcomps/lcd/r/research.html](http://www.lcdcomps/lcd/r/research.html)>.