

Credit markets and bubbles: is the benign credit cycle over?¹

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Abstract: Bubble theories are becoming quite common these days for several asset classes, and in important growth areas of the world, like China, India and the U.S. 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? 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. We believe that if not for the enormous credit stimuli by all of the major Central Banks of the world, the most recent benign credit cycle, one of over six years now, would be over, and a new stressed cycle would be starting. That is, the match (cycle) is now in “extra-time.”

Keywords: credit bubbles, benign credit cycles, default rates, recovery rates, Z-Scores.

JEL codes: G01, G17, G21, G23, G31, G33.

Introduction

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, “A King Deposed by Debt: Face of Indian Excess”, **NY Times**, April 30, 2016, and from regulatory shadow committees, e.g. Litan, esp. Chapter 3 [2011]. We now come to some key questions – are we in the midst of

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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 Stewart 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 expectation of an above average high-yield bond default rate in the U.S. for the next twelve months [Altman and Kuehne 2016b], for the first time since 2009.

The objective of this paper is to assess the current (early 2016) state of the leveraged-finance market, primarily in the U.S., as to whether the benign credit cycle is near its end, or even over, and what metrics can be evaluated as to the likelihood that a new phase of stress will start soon. We first (in Section 1) examine what are the major ingredients of a credit cycle. Then, we observe the amount of new issuance and its credit quality in recent years, particularly the CCC segment; in Section 3, we consider LBO financing and its credit quality, and in Section 4, the comparative corporate risk levels between 2007 and 2014, in order to predict the next cycle. Our conclusion is in the final section.

1. What is a benign credit cycle?

In our opinion, benign credit cycles are periods when at least four aspects of the market are providing incentives to major growth in the supply and demand for credit. These are (1) low and below average default rates, (2) high and above average recovery rates on whatever defaults do occur, (3) low and below average yields and spreads that investors are requiring from issuers, and (4) highly liquid markets, whereby even the most risky credits are able to issue debt at reasonably low interest rates, in considerable amounts. With the exception of the 2015 default rate in the high-yield bond market, all of the other criteria are now pointing strongly to the end of the benign credit cycle, and our forecast is that the high-yield bond default rate will rise to significantly above the historic average (3.4%, see Table 1) in 2016. If we are correct, then indeed, the benign cycle is essentially over, although some may wish to wait for confirmation from near-term default rates in both high-yield bonds and leveraged loans.

We can observe that the benign credit cycles of the recent past, of well below average default rates (Figure 1), high recovery rates, low interest rate spreads, and high liquidity, have lasted between four years (2004–2007) and seven years (1992–1998). The current cycle of 2010–2016 (first-quarter) has now lasted more than six years. Going back to the beginning of the modern high-yield

bond market in the late 1970's, the average benign cycle has averaged about six years, and the last three cycles a bit less at 5.5 years. We also note that once a benign cycle ends, the subsequent spike in default rates and fall in recovery rates on corporate bond defaults have been dramatic, with default rates reaching at least 10% for one or two years, and recovery rates dropping below 40%, and sometimes below 30%, e.g. in 1990/1991, 2001/2002 and 2009. The recovery rate in 2015 already dropped to about 34%, and through the first quarter of 2016, this rate (based on prices just after default) was just 14%!

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. 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 2. 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 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

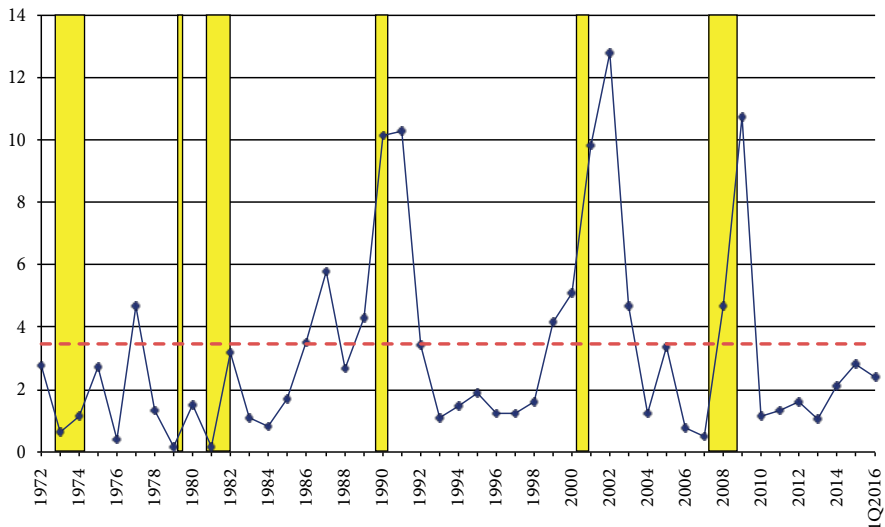


Figure 1. Historical default rates and recession periods^a in the U.S.: high-yield bond market, 1972–1Q 2016 (in percent)

^a 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

Source: Data from Table 1 and the National Bureau of Economic Research 2010, www.nber.org/cycles.html

Table 1. Historical default rates — straight bonds only, not including defaulted issues in par value outstanding, 1971–2016 (4/30) (dollars in millions)

| Year | Par Value | | Default Rates (%) |
|-------------|-------------------------------|---------------|-------------------|
| | Outstanding ^a (\$) | Defaults (\$) | |
| 2016 (4/30) | 1,600,227 | 27,457 | 1.716 |
| 2015 | 1,595,839 | 45,122 | 2.827 |
| 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 |

cont. Table 1

| Year | Par Value | | Default Rates (%) |
|--|-------------------------------|---------------|-------------------|
| | Outstanding ^a (\$) | Defaults (\$) | |
| 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 |
| Arithmetic Average Default Rate | | 1971 to 2015 | 3.111 |
| | | 1978 to 2015 | 3.327 |
| | | 1985 to 2015 | 3.810 |
| Weighted Average Default Rate ^b | | 1971 to 2015 | 3.441 |
| | | 1978 to 2015 | 3.445 |
| | | 1985 to 2015 | 3.460 |
| Median Annual Default Rate | | 1971 to 2015 | 1.708 |

^a As of midyear.

^b Weighted by par value of amount outstanding for each year.

Source: NYU Salomon Center.

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 a 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). Indeed, the very recent spike in yield-spreads and negative and volatile returns in January, 2016, seems to have been associated with concerns about China and continued low oil prices, not to mention the now clear high correlation with the stock market.

2. New issuance and credit quality

The corporate high-yield (HY) and investment grade (IG) sectors have been refinancing and increasing their debt financing continuously since the current benign cycle started in 2010. Indeed, 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. The third quarter of 2015 witnessed a slow-down in new issuance, with only \$31.7 billion issued during the quarter, the lowest quarterly issuance since the fourth-quarter 2011. New issuance in 2015 ended the year at a respectable \$215.8 billion, but the second-half of the year experienced a noticeable slowdown (see Figure 2). The growth of new HY issuance in Europe has been even more impressive of late, reaching €92 billion in 2013 and €119 billion in 2014. Similar to the U.S., 2015 new issuance slowed to about €68. In a nutshell, market acceptance of newly issued high-yield bonds has been remarkable, with record amounts issued at relatively low-interest rates. This reinforces the observation that a seemingly insatiable appetite exists for higher yields in this low-interest rate environment. 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 amount of new issuance was \$528 billion in 2014 and \$421 in 2015.

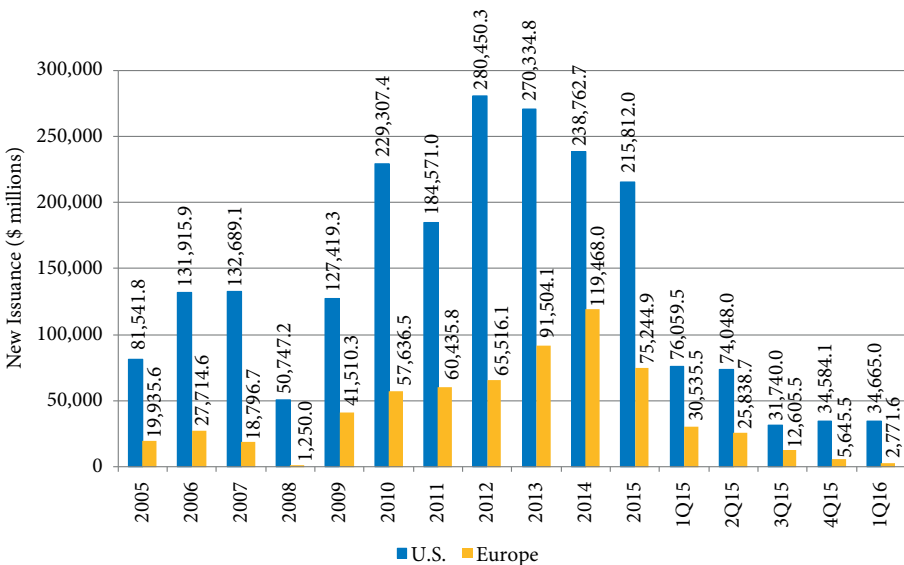


Figure 2. U.S. and European high-yield bond markets: new issuance, 2005–1Q 2016 (in dollars)

Source: [Khoda 2016]

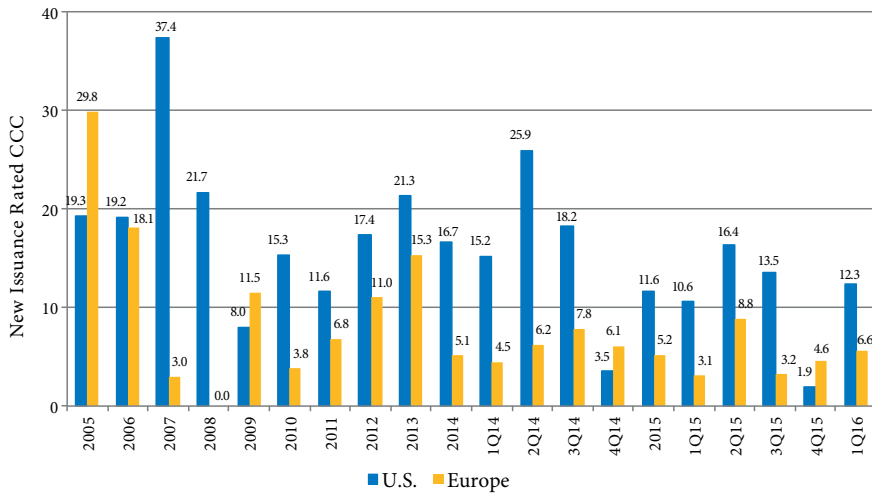


Figure 3. U.S. and European high-yield bond markets: CCC issuance, 2005–1Q 2016 (in percent)

Source: [Khoda 2016]

In terms of the bond ratings ascribed to new issues, recent trends also indicate a deterioration in credit quality, notably the proportion of newly issued bonds rated “CCC” compared to total HY new issuance, from 2005 through first-quarter 2016 (Figure 3).

The 2014 second quarter’s CCC proportion jumped to 25.9%, second only to the 2007 record 37.4%, when a company of just about any credit quality could find new bond financing. Issuance of CCC rated bonds fell in both the fourth quarter of 2014 and first quarter of 2015, regained acceptance in 2Q, fell again in 3Q 2015 and almost disappeared in 4Q 2015. We believe the drop at the end of last year was due to the flight to quality in the markets during that period, and that companies were simply not able to bring such low-rated debt to market. 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 (Table 2), based on our actuarial default model developed in 1989 [Altman 1989], show that the average three-year cumulative mortality (default rate) for “CCC” new issuance is about 34% and, by the fifth year, it reaches 47.4%! We need to keep our eye on the results of this low-rated cohort over the next few years, as well as to consider the amount of new financing of the even more plentiful, and also risky, “B” rating category.

Note that the incidence of CCC level ratings in Europe is considerably less than in the U.S. in recent years, indicating a more conservative risk profile (Figure 4). Perhaps that is one factor, along with lower government bond interest rates, that has resulted in a European high-yield bond rate considerably lower than rates in the U.S., for the first time ever, starting in 2015.

Table 2. Mortality rates by original rating — all rated corporate bonds^a (1971–2015, in percent)

| | Years after issuance | | | | | | | | | | |
|-----|----------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| AAA | Marginal | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Cumulative | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| AA | Marginal | 0.00 | 0.00 | 0.21 | 0.07 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| | Cumulative | 0.00 | 0.00 | 0.21 | 0.28 | 0.30 | 0.32 | 0.33 | 0.35 | 0.36 | 0.36 |
| A | Marginal | 0.01 | 0.03 | 0.12 | 0.13 | 0.10 | 0.02 | 0.25 | 0.08 | 0.05 | 0.05 |
| | Cumulative | 0.01 | 0.04 | 0.16 | 0.29 | 0.39 | 0.47 | 0.72 | 0.80 | 0.85 | 0.85 |
| BBB | Marginal | 0.33 | 2.36 | 1.26 | 1.00 | 0.50 | 0.26 | 0.15 | 0.15 | 0.34 | 0.34 |
| | Cumulative | 0.33 | 2.68 | 3.91 | 4.87 | 5.34 | 5.80 | 5.94 | 6.08 | 6.40 | 6.40 |
| BB | Marginal | 0.94 | 2.02 | 3.88 | 1.97 | 2.34 | 1.45 | 1.12 | 1.43 | 3.13 | 3.13 |
| | Cumulative | 0.94 | 2.94 | 6.71 | 8.54 | 10.68 | 13.31 | 14.28 | 15.51 | 18.15 | 18.15 |
| B | Marginal | 2.85 | 7.72 | 7.85 | 7.80 | 5.70 | 3.58 | 2.08 | 1.76 | 0.77 | 0.77 |
| | Cumulative | 2.85 | 10.35 | 17.39 | 23.83 | 28.17 | 33.85 | 35.22 | 36.36 | 36.85 | 36.85 |
| CCC | Marginal | 8.13 | 12.43 | 17.89 | 16.32 | 4.85 | 5.44 | 4.84 | 0.66 | 4.28 | 4.28 |
| | Cumulative | 8.13 | 19.55 | 33.94 | 44.72 | 47.40 | 56.06 | 58.19 | 58.46 | 60.24 | 60.24 |

^a Rated by S&P at issuance based on 2,903 defaulting issues.

Source: [Altman and Kuehne 2016a]. Original mortality rate concept developed in: [Altman 1989].

3. LBO financing trends

With respect to highly leveraged LBO financing, we can observe that the purchase-price multiple increased to an extremely high 10.9 times in 2015, and even higher in the first-quarter 2016, the highest price to cash flow in recent memory (see Figure 4)! Again, this is reminiscent of, in fact exceeding, the frothy 2007 multiple. Also, the average Debt/EBIDA of LBO deals has risen to dangerous levels in the United States, the highest since 2007. Skeptics might argue that these high-risk levels of almost six times are acceptable in this low interest rate environment. However, this can change quickly, especially if the economy falters and the Federal Reserve takes its foot off the accelerator.

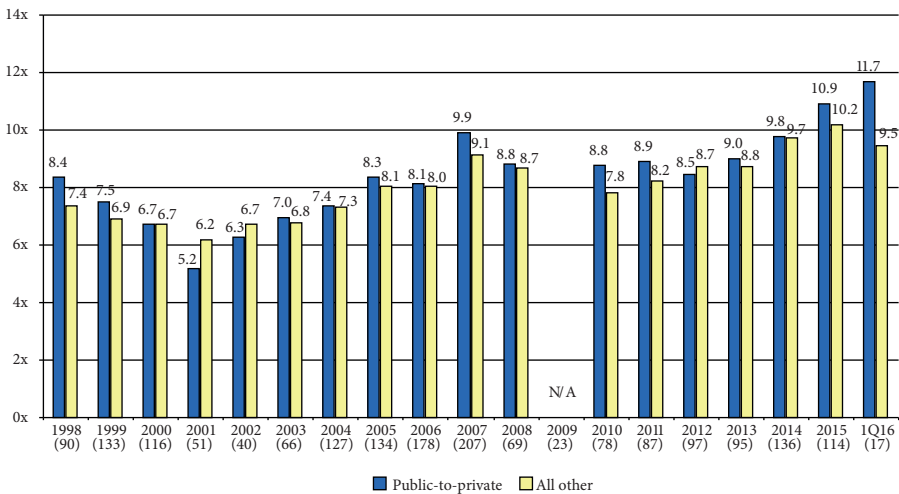


Figure 4. Purchase price multiples excluding fees for LBO transactions, 1998–1Q 2016

Source: [S&P 2016]

4. Comparative corporate risk levels

Comparing the holistic risk profile of high-yield issues in 2007 with those in 2014, we can conclude that probabilities of default are about the same and not significantly different from each other. We utilize the original Z-Score model [Altman 1968], and that of the next generation model for non-manufacturing as well as manufacturing industrials (Z”-Score) [Altman and Hotchkiss 2006], to form the basis for this comparison (Table 3). The results show slightly higher Z-Scores and about the same median Z and Z”-Scores between the classes of 2007 and 2014. Is that good news, or not? We think that the increased corporate leverage has neutralized any increase in corporate liquidity and profitabil-

Table 3. 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) ^a | Median Z-Score/(BRE) ^a | Average Z ^{''} -Score/(BRE) ^a | Median Z ^{''} -Score/(BRE) ^a |
|------|------------------------------------|-----------------------------------|---|--|
| 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 |

^a Bond Rating Equivalent.

Source: [Altman and Kuehne 2013], data from [Altman and Hotchkiss 2006].

ity and, with these factors deteriorating in 2015–2016, we expect increased defaults and distress in the leveraged finance markets. Remember also, that 2007 was the period just before the credit bubble did burst the last time.

5. Concluding comments

Whether the current tolerant, highly liquid market sentiment persists in the future, and the Federal Reserve continues its strong growth posture, are topics continuing to warrant prominent analysis, especially as it concerns a building bubble in credit markets. As we have shown, we find convincing evidence that the leveraged finance markets have become increasingly risky, that the current benign cycle is essentially over, and the bubble is now quite inflated. Indeed, if it were not for the concurrent increase in liquidity poured into credit markets in February 2016 by the four most important Central Banks of the world, and the fortuitous increase in oil prices, we believe that there would be little hesita-

tion on the part of most analysts to declare that the benign credit cycle is over. We appear to be in “extra-time,” or extra innings, of the current benign cycle.

While we have not examined specifically the enormous build-up in debt elsewhere in the world, we cannot ignore entirely the troubling increase (excesses?) in key countries, like Brazil, India, and especially China. Combined with the current penchant of the world’s major Central Banks to stimulate their economies using credit-market stimuli, we are increasingly concerned with the possibility of a global credit bubble and the implications of a burst in that bubble by some catalyst that we can provide, e.g. oil prices, or ones we cannot.

References

- Altman, E., 1968, *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, Journal of Finance, September: 599–609.
- Altman, E., 1989, *Measuring Corporate Bond Mortality & Performance*, Journal of Finance, September: 909–922.
- Altman, E., Hotchkiss, E., 2006, *Corporate Financial Distress and Bankruptcy*, John Wiley & Sons.
- Altman, E. Kuehne, B., 2013, *Are High-Yield Firm Balance Sheets Stronger Today*, NYU Salomon Center, 16 May.
- Altman, E., Kuehne, B., 2014, *Special Commentary: A Note on Credit Market Bubbles*, International Journal of Banking, Accounting and Finance, vol. 5, no. 4.
- Altman, E., Kuehne, B., 2016a, *Defaults and Returns in the High-Yield Bond and Distressed Debt Market: The Year 2015 in Review and Outlook*, NYU Salomon Center Special Report, 2 February.
- Altman, E., Kuehne, B., 2016b, *Defaults and Returns in the High-Yield Bond and Distressed Debt Market: First Quarter 2016 Review*, NYU Salomon Center Special Report, 2 May.
- Barro, R.J., 1990, *Government Spending in a Simple Model of Endogenous Growth*, Journal of Political Economy, October, vol. 98: 103–125.
- Grossman, G.M., Helpman, E., 1990, *Hysteresis in the Trade Pattern*, NBER Working Papers 3526, National Bureau of Economic Research, Inc.
- Grossman, G.M., Helpman, E., 1991, *Endogenous Product cycles*, Economic Journal, vol. 101: 1214–1229.
- Khoda, N., 2016, *High Yield Strategy: High Yield Credit Chartbook*, Bank of America Merrill Lynch Global Research, 1 April.
- Litan, R. (ed.), 2011, *The World in Crisis: Insights from Six Shadow Financial Regulatory Committees from Around the World*, Wharton Financial Institution Center, University of Pennsylvania, Philadelphia.
- Lucas, R.E., 1988, *On the Mechanics of Economics Development*, Journal of Monetary Economics, vol. 22: 3–42.
- Meyers, S., 1984, *The Capital Structure Puzzle*, Journal of Finance, 39, July: 581–592.
- Rebelo, S., 1991, *Long-Run Policy Analysis and Long-Run Growth*, Journal of Political Economy, vol. 99: 500–521.

Romer, P.M., 1986, *Increasing Returns and Long-Run Growth*, *Journal of Political Economy*, vol. 94: 1002–1037.

Romer, P.M., 1987, *Growth Based on Increasing Returns Due to Specialization*, *American Economic Review*, American Economic Association, vol. 77(2): 56–62.

Romer, P.M., 1990, *Endogenous Technical Change*, *Journal of Political Economy*, vol. 98: 71–102.

S&P Capital IQ LCD, 2014, www.lcdcomps/lcd/r/research.html.

S&P Capital IQ LCD, 2016, *Leveraged Buyout Review – 1Q16*, April.

Solomon, E., 1963, *The Theory of Financial Management*, Columbia University Press.

The National Bureau of Economic Research 2010, www.nber.org/cycles.html.