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Adjusting Cost of Capital for Prevailing Market Conditions

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Revenue Ruling 59-60 requires that fair market value reflect general economic conditions, be they "normal," "boom," or "depression." However, this requirement cannot be met using *Ibbotson* and *Duff & Phelps* cost of capital estimates without adjusting for current market conditions. Unless such adjustments are made, conventional cost of capital estimates are usually inconsistent with market conditions as of the valuation date. Using the market conditions adjustment factor described below allows the business appraiser to objectively consider the fair market value effects of highly volatile markets as of any valuation date.

The market floats up; the market floats down. But the generally accepted methods for calculating cost of capital do not fluctuate much because they are based on averaging the annual costs of equity capital over long periods of time. The 2011 Ibbotson SBBI Valuation Yearbook provides the following justification for using long-term averages:

> [U]sing a longer historical period provides a more stable estimate of the equity risk premium. The reason is that any unique period will not be weighted heavily in an average covering a longer historical period. It better represents the probability of these unique events occurring over a long period of time.[1]

The result is an essentially flat quantification of the cost of equity capital from year-to-year that is generally unresponsive to current market conditions. This result occurs because as more-and-more time passes, it becomes harder-and-harder for the current year's equity costs to significantly influence the cumulative average of many historical years' equity costs. This fact is demonstrated by the following graph of the cumulative annual mean average returns reported by *Ibbotson*:[2]

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[1] 2011 Ibbotson SBBI Valuation Yearbook, page 59.

[2] Duff & Phelps Risk Premium Report 2011 also uses cumulative averages in its cost of equity analyses: "In the 2011 Risk Premium Report, risk premia and other useful statistics are developed using historical equity returns (from CRSP), and fundamental accounting data (from *Compustat*) over the period 1963 through 2010." (Risk Premium Report 2011 at page 10)

Graph 1 demonstrates that although annual returns fluctuate, the cumulative average eventually falls into an ever-narrower range of fluctuations.

Graph 1
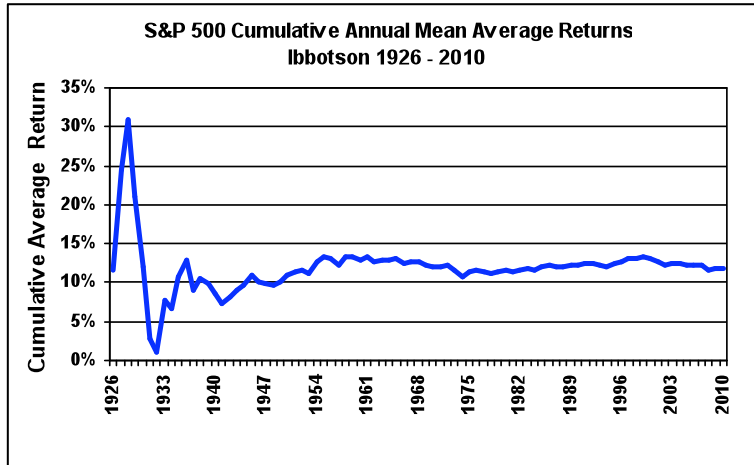
In contrast, the market values of publically traded companies fluctuate widely with prevailing market conditions. The following graph demonstrates the value fluctuations of the S&P 500 companies by comparing the price-to-earnings (P/E) ratio of the S&P index over time:

Graph 2
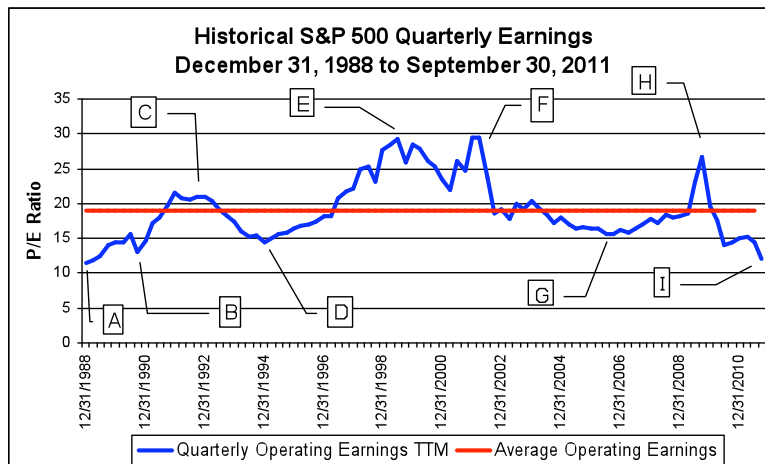
Graph 2 compares the P/E ratios of the S&P 500 index to its historical average from 1988 to 2011. The graph shows periods of time when the market floated above and below the historical average. The periods labeled "A" through "I" correspond to the market events described below:

A- The stock market crash of October 19, 1987, was the largest one day percentage drop in the S&P 500 index of about 20%.[3] The index took the next seven quarters to recover the price lost from the market crash.[4]

B- The Savings and Loan Crisis in 1989[5] and Iraq's invasion of Kuwait that resulted in the jump in oil prices,[6] combined with the drop in consumer confidence,[7] forced the U.S. into a recession that began in July 1990, and ended in March 1991.[8]

C- The Cold War ended in 1991 and the market entered a postwar recovery. Beginning the second quarter of 1991, real GDP grew for six consecutive quarters.[9]

D- In 1993, GDP and employment growth were much slower than typical postwar recoveries.[10] In 1994, the bond market crashed and bond yields were at historically low levels.[11]

E- The U.S. was nurturing and sustaining the longest peacetime expansion on record.[12] The rise of the internet industry was building into the "dot-com" bubble.[13] This period

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[3] "A Brief History of the 1987 Stock Market Crash with a Discussion of the Federal Reserve Response" by Mark Calson. *Finance and Economics Discussion Series*. Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C., page 2. http://www.federalreserve.gov/pubs/feds/2007/200713/200713pap.pdf

[4] S&P 500 quarterly closing price were gathered from the Standard and Poor's S&P 500 Earnings and Estimate Report. http://www2.standardandpoors.com/spf/xls/index/SP500EPSEST.XLS

[5] http://www.nydailynews.com/money/useconomytimeline/index.html

[6] "A Brief Review of the Recession of 1990-1991" by Rob H. Kamery. *Proceedings of the Academy of Legal, Ethical and Regulatory Issues*, Volume 8, Number 2, page 61. http://www.sbaer.uca.edu/Research/allied/2004_maui/legal_ethical_regulatory_issues/14.pdf

[7] Id.

[8] Economic Report of the President 1993, page 42.

[9] Economic Report of the President 1993, page 40 and 41.

[10] Economic Report of the President 1994, page 56.

[11] http://money.cnn.com/magazines/fortune/fortune_archive/1994/10/17/79850/index.htm and http://www.gfmag.com/archives/80-80-october-2003/2147-corporate-finance-bond-markets-sell-off-may-not-be-over-yet.html#axzz1XTp2r9Ao

[12] Economic Report of the President 2000, page 21.

[13] http://www.nydailynews.com/money/useconomytimeline/index.html

ended with the burst of the dot-com bubble in March 2000, which was compounded by rising energy prices and increases in interest rates associated with monetary tightening by the Federal Reserve.[14]

F- The economy entered 2001 growing slowly, but started decelerating during the year. The terrorist attacks on September 11 tipped the economy into recession for the first time in 10 years.[15]

G- The subprime mortgage crisis started in late 2006.[16] A recession started in December 2007.[17] In 2008, the economy encountered major shocks in the financial sector that it could not shake off, including the collapse of Lehman Brothers in September 2008,[18] that caused it to enter the most severe recession since the Great Depression.[19] Over a million jobs were lost in 2008.[20]

H- A short-lived "recovery" after the 2007/2008 recession began in June 2009[21] and continued into the first half of 2010.[22]

I- In July and August 2011, stock prices fell sharply with the signing of a bill increasing the U.S. debt ceiling by $2.4 trillion, a decrease in spending by American consumers, disappointing growth in GDP, very weak labor markets, high unemployment, and ongoing concerns regarding the European credit markets.[23]

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[14] Economic Report of the President 2001, page 59.

[15] Economic Report of the President 2002, page 15.

[16] http://articles.cnn.com/2007-03-29/us/subprime.congress_1_subprime-center-for-responsible-lending-adjustable-rate-mortgages?_s=PM:US

[17] http://www.nber.org/cycles/dec2008.pdf

[18] Economic Report of the President 2009, page 19.

[19] Economic Report of the President 2011, page 29.

[20] http://www.nydailynews.com/money/useconomytimeline/index.html

[21] http://blogs.wsj.com/economics/2010/09/20/nber-recession-ended-in-june-2009/

[22] Id. This "recovery" is due to a steep reduction of public company earnings and not due to an increase of index values.

[23] http://abcnews.go.com/blogs/politics/2011/08/debt-ceiling-raised-but-markets-still-depressed/, http://money.cnn.com/2011/07/29/markets/markets_newyork/index.htm,   and http://perspectives.wrightinvestorsservice.com/2011/07/18/debt-debate-might-be-going-to-

4

The Broad Market Greatly Affects Fair Market Value

According to many stock commentators, a majority of the price movement of an individual stock is attributable to the movement and trend of the overall market, as well as the performance of the sector or industry of the stock.[24] The performance of the individual company accounts for only about 10% to 30% of the company's stock price movement.[25] But sector, industry, and company specific circumstances are not what is measured by the cumulative arithmetic[26] mean analyses of *Ibbotson* and *Duff & Phelps*. Instead their analyses measure the returns of the broad market. Narrower considerations are best addressed separately by factors such as *Ibbotson's* industry adjustments and specific company risk factors such as leverage deviations from a guideline group of companies.

Because the systematic costs of capital are determined from performance of the broad stock market, it is appropriate to consider the extent to which an individual stock affects the market and vice versa. The S&P 500 index tracks the market capitalization of 500 widely held stocks, and is often used as a proxy for the stock market.[27] The index weights the individual companies comprising it according to their market capitalization, so that more valuable companies affect the index value more than less valuable companies.[28]

The S&P 500 had a total market capitalization of $11.2 trillion as of October 25, 2011.[29] On that date, Exxon Mobil Corporation ("Exxon"), the largest constituent of the S&P 500, had a market capitalization of $386.3 billion,[30] representing just 3.45% of the total S&P 500 index

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penalty-kicks/, and http://www.nydailynews.com/news/national%20/2011/09/02/2011-09-02_august_2011_jobs_report_unemployment_rate_dropsticks_up_to_xx_xx_jobs_added_in_a.html

[24] http://www.fxstreet.com/education/related-markets/lesson-from-the-pros-stocks/2011/09/07/, http://www.peopleandpicks.com/blog/mightymo/3412054/, http://www.finweb.com/investing/understanding-a-stocks-beta.html, and http://tuckerreport.com/articles/etf-advantages/

[25] Id.

[26] According to the 2011 Ibbotson SBBI Valuation Yearbook at page 56, the arithmetic mean is more appropriate than the geometric mean for the average risk premia. "For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return."

[27] http://www.morningstar.com/Help/Data.html

[28] http://www.investopedia.com/terms/c/capitalizationweightedindex.asp#axzz1btyiQ9J9

[29] http://www.standardandpoors.com/indices/sp-500/en/us/?indexId=spusa-500-usduf--p-us-l--

[30] http://finance.yahoo.com/q?s=XOM&ql=1

5

value. If Exxon's value were to increase by 20%, the S&P 500 index would only increase by 0.69%. Exxon's value would have to increase by 290% to increase the value of the index by 10%.

It is much harder for smaller companies to move the market, even as a group. The average S&P 500 company had a market capitalization on October 25, 2011, of $22.4 billion,[31] which represents 0.20% of the total S&P 500. If the value of a constituent company worth $22.4 billion increased by 20%, the S&P 500 index would only increase by 0.04%. The value of such a company would have to increase by 5,000% to increase the S&P 500 index by 10%.

The price movement of an individual stock therefore has minimal effect on the overall market, but the overall market can have a great effect on the price of a given stock on a particular day. When the market for publically traded stocks floats above or below the historical average, it is much more likely to be attributable to broad investor sentiment regarding the economy than it is to be attributable to the much more discrete considerations applicable to individual companies. Inasmuch as fair market value is date-specific, failing to adjust the *Ibbotson* and *Duff & Phelps* measures of cost of capital for current market conditions will almost always result in erroneous conclusions regarding the cost of equity capital.
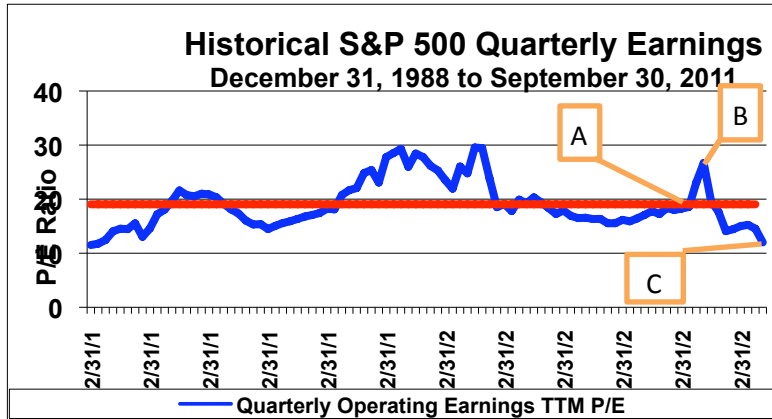
The cumulative arithmetic means calculated by *Ibbotson* and *Duff & Phelps* crush the sentiment-based stock movements associated with current market conditions. Therefore, an adjustment to the cost of equity determined by the buildup method is needed to reflect the market as of the day fair market value is to be determined.

Cost of Capital with Market Conditions as of the Valuation Date

Comparing the arithmetic mean returns estimated using the *Ibbotson* and *Duff & Phelps* buildup methods over time discloses a lack of fluctuation in cost of capital despite the dramatically different market conditions that can and do exist. Sometimes, what little fluctuation occurs with these buildup methods is contrary to the movement of the market. For example, as of March 31, 2009, September 30, 2009, and September 30, 2011, the *Ibbotson* buildup method estimates arithmetic mean equity costs of capital for a Decile 1 company of 9.34%, 9.75%, and 8.38%, respectively. Yet Graph 3, which provides a historical perspective of the P/E ratio of the S&P 500, suggests that the market would have valued a dollar of earnings much differently on each of these dates.

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[31] $11,198,612,020,000 total S&P 500 capitalization / 500 companies = $22,397,224,040 average capitalization for S&P 500 companies.

Graph 3

Historical S&P 500 Quarterly Earnings
December 31, 1988 to September 30, 2011

Legend: —— Quarterly Operating Earnings TTM P/E

Based on the trailing twelve months ("TTM") of operating earnings, the long-term average P/E ratio of the S&P 500 index from December 31, 1988, to September 30, 2011, was 19:1,[32] implying a marketable capitalization rate of 5.26% and an average expected growth rate of 3.12% for the overall market based on *Ibbotson's* long horizon Decile 1 cost of capital of 8.38%. But looking at September 30, 2011, on a discrete TTM basis, the P/E ratio of the S&P 500 was 12:1. This implies a marketable capitalization rate of 8.33%, and a *negative* 0.05% growth rate expectation for the overall market based cost of capital of 8.38%.

Graph 4 compares the change in cost of equity of a hypothetical Decile 1 company at three points in time, and compares the changes to the contemporaneous changes of the S&P 500 TTM P/E ratio. March 31, 2009 (point A on Graph 3) serves as the baseline of the graph and the related discussion.

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[32] Duff & Phelps uses historical averages going back to 1963 (Duff & Phelps Risk Premium Report 2011, at page 10). *Ibbotson* uses historical averages going back to 1926 (2011 Ibbotson SBBI Valuation Yearbook, page 121). Using P/E ratios of the S&P 500 index going back to 1963 and 1926, if available, might yield a different historical average.

Graph 4
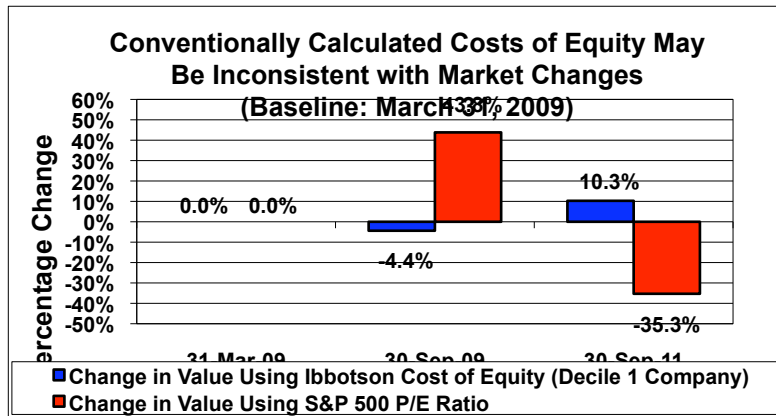
On September 30, 2009 (point B on Graph 3), using the *Ibbotson* buildup method, the arithmetic mean cost of equity estimated for a Decile 1 company was 9.75%, or 4.4% higher than the 9.34% cost as of March 31, 2009 (point A on Graph 1). Assuming all other things to be equal, the equity value of a hypothetical Decile 1 company on September 30, 2009, should have been 4.4% lower relative to the earlier date. However, on March 31, 2009, the market was at about parity with the historical long-term average P/E (18.555 P/E versus 19.045 P/E) while at September 30, 2009 (point B on Graph 3), the P/E ratio of the market was much higher than on the earlier date (26.687 P/E versus 18.555 P/E). Therefore, the market was placing a much higher value on each dollar of operating earnings on September 30, 2009, than on March 31, 2009 – about 43.8% more value.

Similarly, with an *Ibbotson* cost of equity capital of 8.38% on September 30, 2011, the value of a dollar of operating earnings for the same hypothetical company should have been worth 10.3% more than on March 31, 2009, all other things assumed to be equal. But on September 30, 2011 (point C on Graph 3), the P/E of the market was well *below* the P/E as of March 31, 2009 (12.003 P/E versus 18.555 P/E). Therefore, the market considered a dollar of operating earnings to be much *less* valuable on September 30, 2011, than it was on March 31, 2009 – about 35.3% less valuable. These contradictions demonstrate the need for a market conditions adjustment of the cost of equity estimated using cumulative arithmetic mean methodologies.

Although methods to adjust for prevailing market conditions are imperfect, one objective way to deal with disparate prevailing market conditions is to create an adjustment factor to apply, by multiplication, to the arithmetic means determined using the *Ibbotson* and *Duff & Phelps* build up methods. Using the S&P 500, practitioners can construct such a factor by dividing the TTM historical average P/E ratio by the TTM P/E ratio as of the valuation date. For example, if the historical P/E ratio through a valuation date is 19x and the recent P/E ratio is 13x then the factor to multiply times the arithmetic mean cost of capital is 1.38. If the conventional Ibbotson or Duff &

8

Phelps buildup of cost of capital is an arithmetic mean of 10% then adjusting for the described P/E shift in market conditions results in an adjusted mean of 13.8%. This, of course, would drive the market value of the valuation subject down, which is the result that one would expect if P/E ratios have contracted. Conversely, application of the method results in higher values during periods of time when the market is rewarding earnings more than it has historically.

The described approach for adjusting cost of capital is consistent with valuation theory because the inverse of a P/E ratio is a market capitalization rate. As we all know, changes in capitalization rates cause ratable changes in valuation. And capitalization rates are reconcilable to discounts rates, so practitioners can use the method in discounted cash flow models. The method also preserves the underlying usefulness of *Ibbotson* and *Duff & Phelps* cost of capital calculations as the baseline from which to adjust cost of capital for current market conditions. Using twelve trailing months provides some smoothing of dramatic single quarter S&P index and earnings per share anomalies, while being consistent with the way many investors analyze historical results of operations.[33]

The proposed cost of capital adjustment works mechanically as follows. When the market is at parity with its historical average P/E, the adjustment factor would be 1:1, resulting in no net effect on the discount rate. But when market P/Es are high relative to the historical average (i.e., a "good" market that is rewarding earnings), the adjustment factor would be less than 1:1—the numerator (historical P/E) would be less than the denominator (current P/E)—resulting in a reduced cost of capital and a higher appraised value. But when market P/Es are low relative to the historical average (i.e., a "bad" market that is not rewarding earnings), the adjustment factor would be greater than 1:1—the numerator (historical P/E) would be greater than the denominator (current P/E)—resulting in increased cost of capital. The resulting adjusted costs of capital and valuations would better correspond with the public market as of the particular valuation date.

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[33] Variations on the TTM idea might include annualizing the most recent quarter, weighting the trailing quarters in some manner, or attempting to use expected earnings. Each of these would seem to be more arbitrary than simply using a straight TTM approach. Additionally, using expected S&P 500 quarterly or annual earnings is impractical because of questions such as "Whose expectation?" and the difficulty of constructing a benchmark of long-term average expectations.