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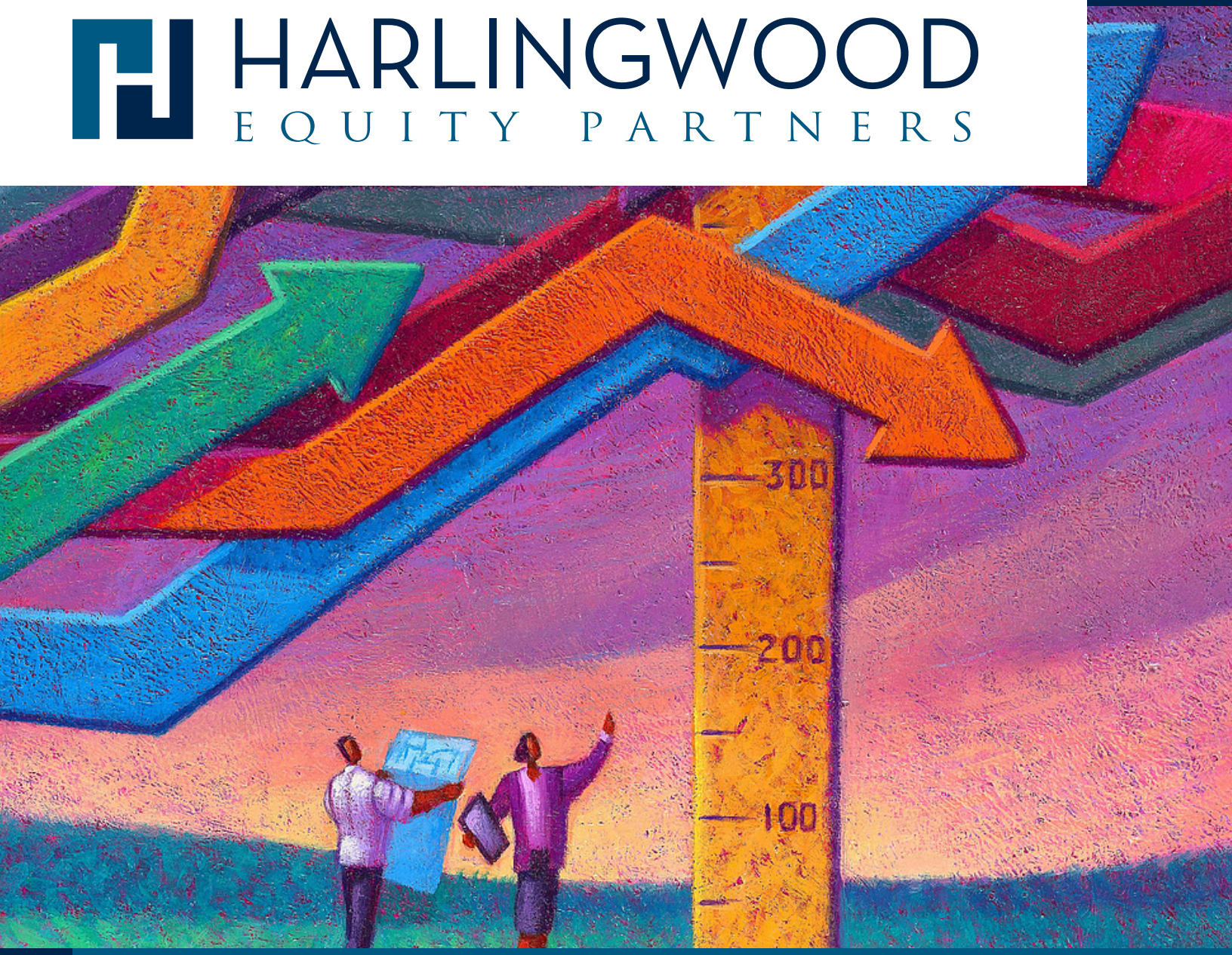

The Harlingwood Cost of Capital

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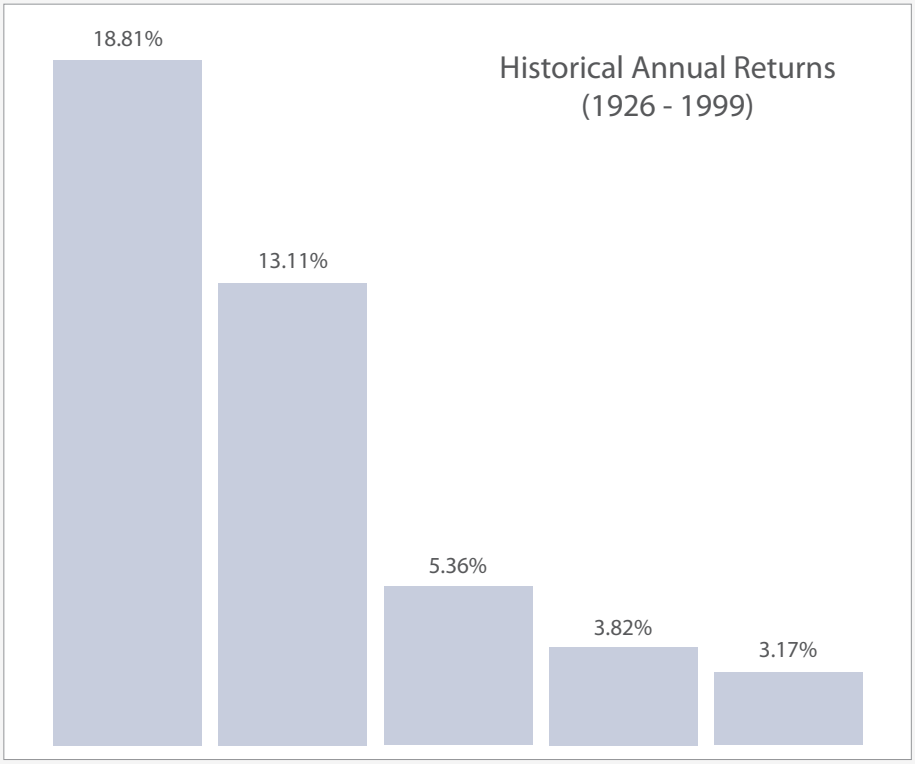
Finance literature has devoted considerable attention to measuring a company's cost of capital, generally employing the following Weighted Average Cost of Capital ("WACC") calculation:

$$WACC = w_d k_d (1-t) + w_e k_e$$

k_d = *cost of debt; interest rate on bonds*
k_e = *cost of equity; minimum rate of return the market demands on equity*
t = *corporate tax rate*
w_d = *weight of debt in capital structure*
w_e = *weight of equity in capital structure*

The foundation for a discussion of the WACC formula can be found in the Capital Asset Pricing Model (CAPM), Ibbotson Associates' modified CAPM, and Fama and French's Three-Factor model. Each calculation method demonstrates that the market demands a higher return or "size premium" on the equity of smaller capitalized companies. This size premium is the compensation that investors require for the risk of buying smaller assets. Smaller companies are more sensitive to a variety of risk factors and are less capable of absorbing negative financial events. As a result, underperforming companies often underestimate their cost of capital and, correspondingly, the market-implied required rate of return to guide future capital allocation decisions.



Source:
Stocks, Bonds, Bills and Inflation
2002 Yearbook, 2002 Ibbotson Associates

I. Cost of Equity

The Cost of Equity ("COE") is the required rate of return that the market demands on equity. Traditionally, it has been calculated using the Capital Asset Pricing Model (CAPM). The CAPM uses a single factor, β ("Beta"), to derive COE. β is a measure of the covariance of a stock's returns with that of the overall market.

Capital Asset Pricing Model:

$$k_e = r_f + \beta(r_m - r_f)$$

k_e = cost of equity capital
r_f = risk-free rate appropriate for a given time horizon
β = covariance of individual stock returns with that of the overall market
$r_m - r_f$ = market risk premium, or the amount by which historical market returns have exceeded risk-free returns

Thus, in the CAPM, a company's cost of equity depends solely on its exposure to systematic risk (i.e. non-diversifiable risk). Companies that have more volatile returns have higher betas and are considered riskier investments. In turn, a higher β drives a higher cost of equity. Under the CAPM, all company specific risk is captured in β.

Recent finance literature has questioned the CAPM's reliance on β as the single risk factor that impacts expected returns. Fama and French state that, "CAPM… offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor – poor enough to invalidate the way it is used in applications."[1] The authors find that adding factors for size and valuation enhances the explanation of expected stock returns provided by β. Accordingly, a three-factor model provides better explanatory power for average stock returns than the CAPM.

Fama-French Three-Factor Model:

$$k_e = r_f + \beta_a(r_m - r_f) + s_a(SMB) + h_a(HML)$$

SMB = Small Minus Big, a measure of the "size premium"
HML = High Minus Low, a measure of the "value premium"

[1] Fama, E. and French, K. "The Capital Asset Pricing Model: Theory and Evidence." *J Econ Pers*, 18.3 (2004): 25-46.

The Fama-French Three Factor model adds two factors, SMB and HML. We are focusing on the SMB (Small Minus Big) factor, as it relates specifically to small companies versus large companies. The SMB monthly factor is computed as the average return for the smallest 30% of stocks minus the average return of the largest 30% of stocks in that month. The historical average from July 1926 to July 2002 of the annual SMB factor is approximately 3.3%. This additional return is referred to as the "size premium."

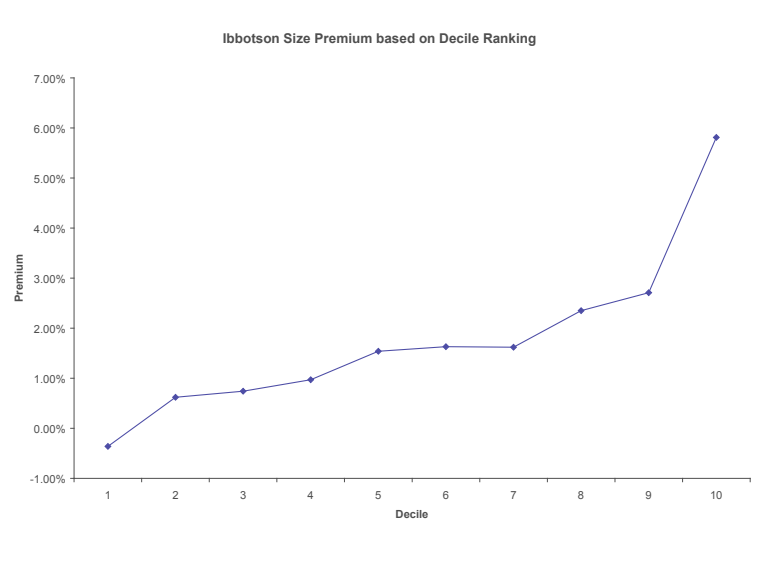
Ibbotson Associates uses a third method for calculating cost of equity. Ibbotson begins with the CAPM then adds a second risk factor to account for the size premium ("SP").

Ibbotson Associates Modified CAPM:

$$k_e = r_f + \beta(r_m - r_f) + SP$$

In Ibbotson's words: "The size premium is the return of small company stocks in excess of that predicted by the CAPM. It is the additional return that cannot be explained by the betas of small companies."[2] This change to the CAPM formula results in a higher COE for small stocks due to both higher β and a size premium that increases as the company gets smaller.

Ibbotson divides the stock market into deciles based on market capitalization.[3] The largest size premium is assigned to the highest decile (i.e. smallest companies).



Source:
Ibbotson SBBI 2009 Valuation Yearbook

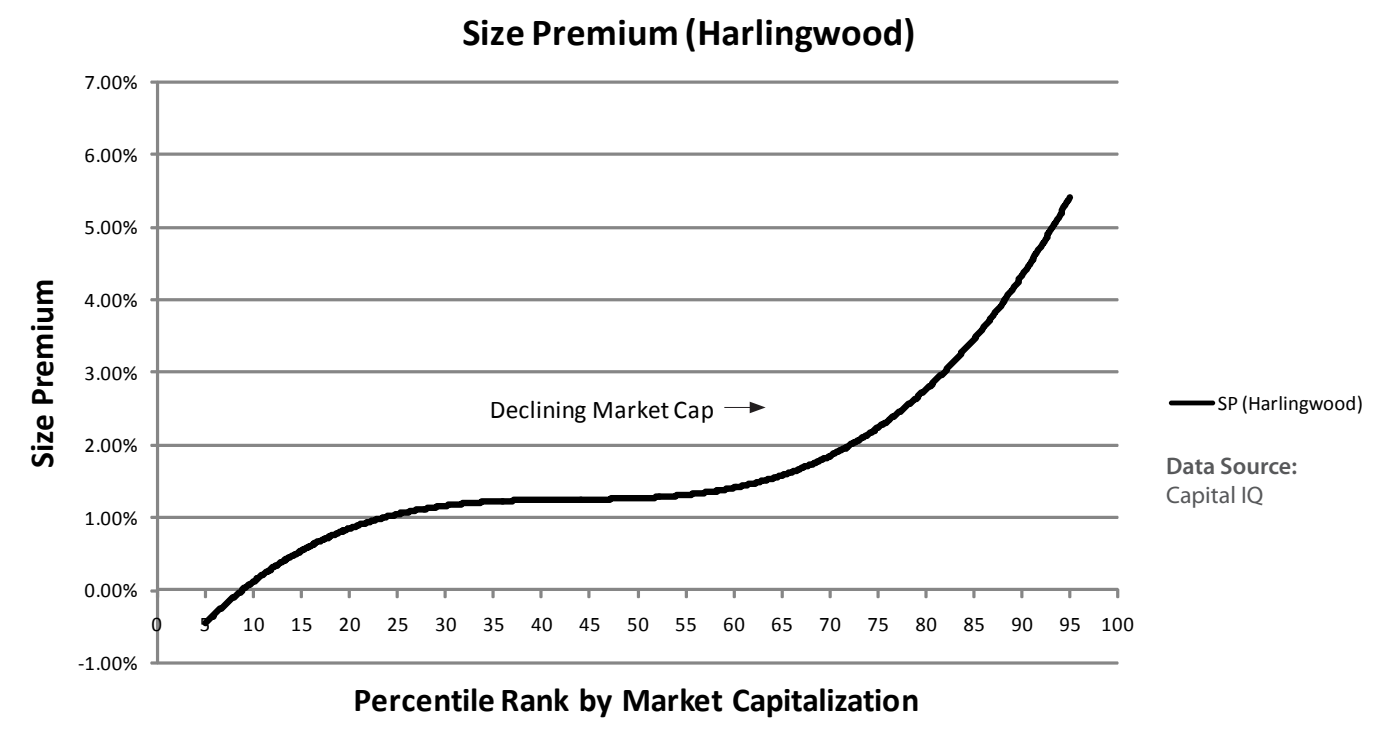
Ibboston Size Premiums as of 12/31/2008

Size (in millions)			
Decile	**Smallest**	**Largest**	**Premium**
1	18,627.54	456,651.94	-0.36%
2	7,434.81	18,503.47	0.62%
3	4,229.32	7,360.27	0.74%
4	2,785.70	4,225.15	0.97%
5	1,849.95	2,785.54	1.54%
6	1,198.01	1,848.96	1.63%
7	753.68	1,197.13	1.62%
8	453.40	753.45	2.35%
9	218.74	453.25	2.71%
10	1.58	218.53	5.81%

Source:
Ibbotson SBBI 2009 Valuation Yearbook

[2] Barad, Michael. "Ibbotson Risk Premia: Under the Microscope." Ibbotson Associates, ASA/CICBV 5th Joint Business Valuation Conference, Oct 2002.
[3] Ibbotson SBBI 2009 Valuation Yearbook. Morningstar, Inc., 2009.

While Ibbotson's method for determining size premium is more rigorous than that of Fama and French, it does not account for variations within the deciles. Companies that fall within a given decile will be assigned the same size premium, even though the decile represents a wide capitalization range. We addressed this shortcoming by fitting a curve to the observed data.



The curve is derived from a polynomial function that correlates tightly with the observed data.[4] As indicated, the value of the size premium rises continuously as market cap decreases. Using this function and current market data, a company's size premium can be determined solely from its market cap.[5]

The magnitude of the size premium changes most rapidly in the bottom two deciles of the capitalization range.

[4] y = 3E-07x3 - 4E-05x2 + 0.001x - 0.012; R2 = 0.96 The independent variable "x" is the company's percentile ranking by market cap; the dependent variable "y" is the calculated size premium.

[5] Using current data obtained from CapitalIQ, the percentile ranking for any U.S. public company can be determined from its market cap by comparing its market cap to the Russell 3000 universe.

The table below shows Harlingwood's calculated size premium (SP_{HW}) for a sample of public companies with declining market caps. Using decile rankings, Ames National Corporation (ATLO) and Benihana Inc. (BNHA) would both be assigned a size premium of 2.71%. However, Harlingwood's function shows that Benihana's smaller market cap results in a greater size premium of 4.13%.

Company	Ticker	Market Cap	Market Cap Percentile	SP Ibbotson	SP Harlingwood
Concur Technologies, Inc.	CNQR	297.7	77	2.35%	2.42%
Ames National Corporation	ATLO	252.5	80	2.71%	2.76%
Celadon Group Inc.	CLDN	217.7	83	2.71%	3.15%
Concurrent Computer Corporation	CCUR	179.8	86	2.71%	3.61%
Benihana Inc.	BNHN.A	148.6	89	2.71%	4.13%
American Independence Corp.	AMIC	123.3	92	5.81%	4.73%
GenVec Inc.	GNVC	90.6	95	5.81%	5.41%
Allied Motion Technologies Inc.	AMOT	43.7	98	5.81%	6.17%

Source:
Capital IQ

As indicated, a company experiences rapid increases in its size premium as its market cap declines, driving the cost of equity higher. This result is important both for investors in smaller capitalized companies, and firms that have recently experienced declines in their stock price. It is imperative that an underperforming company understands the market-derived hurdle rate it faces as a result of its weak performance. The appropriate cost of equity to be used in a WACC calculation can be determined using Harlingwood's modified CAPM formula.

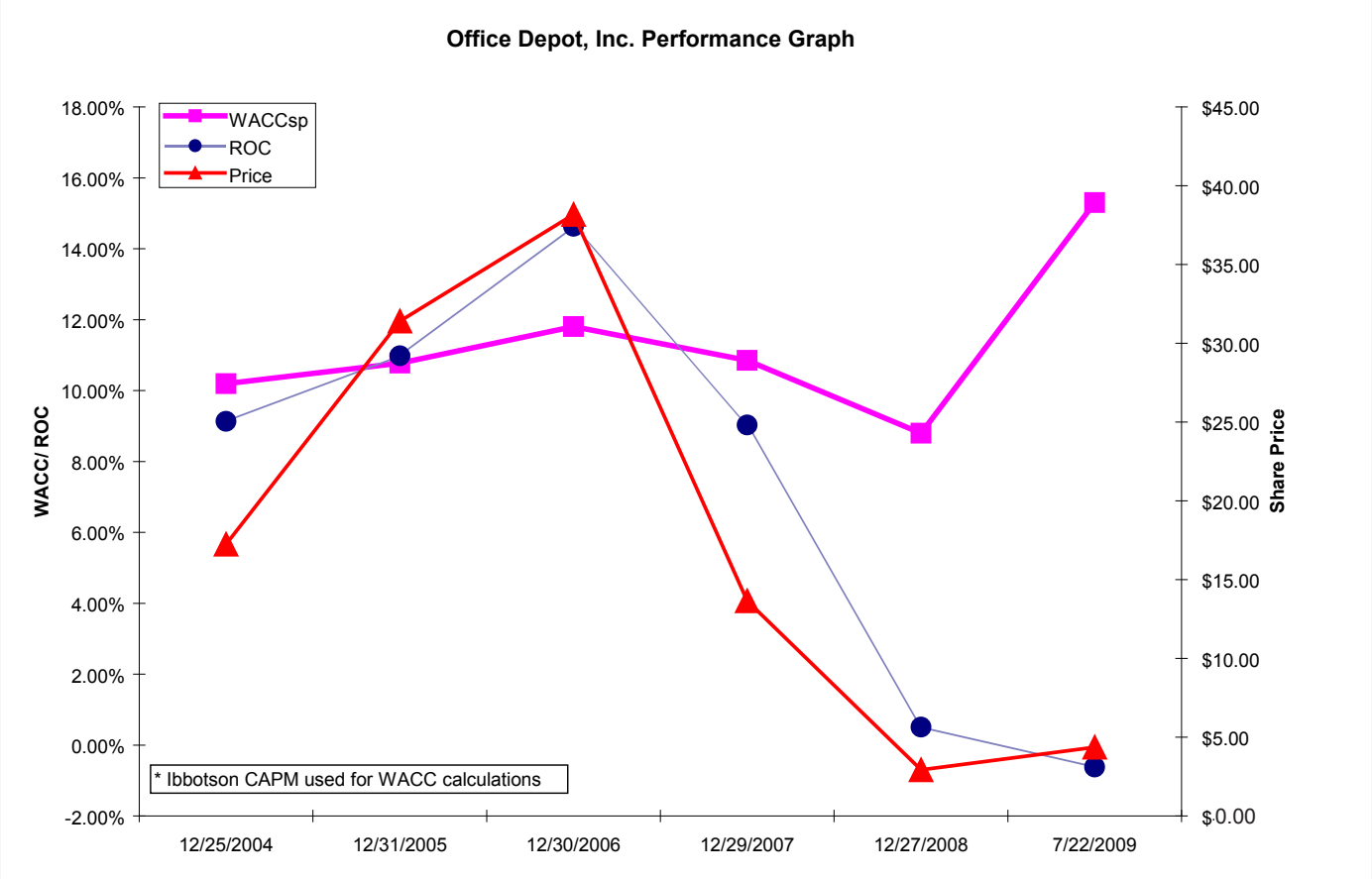
Harlingwood Cost of Equity:

$$k_e = r_f + \beta(r_m - r_f) + SP_{HW}$$

SP_{HW} = Harlingwood calculated size premium

II. Case Studies

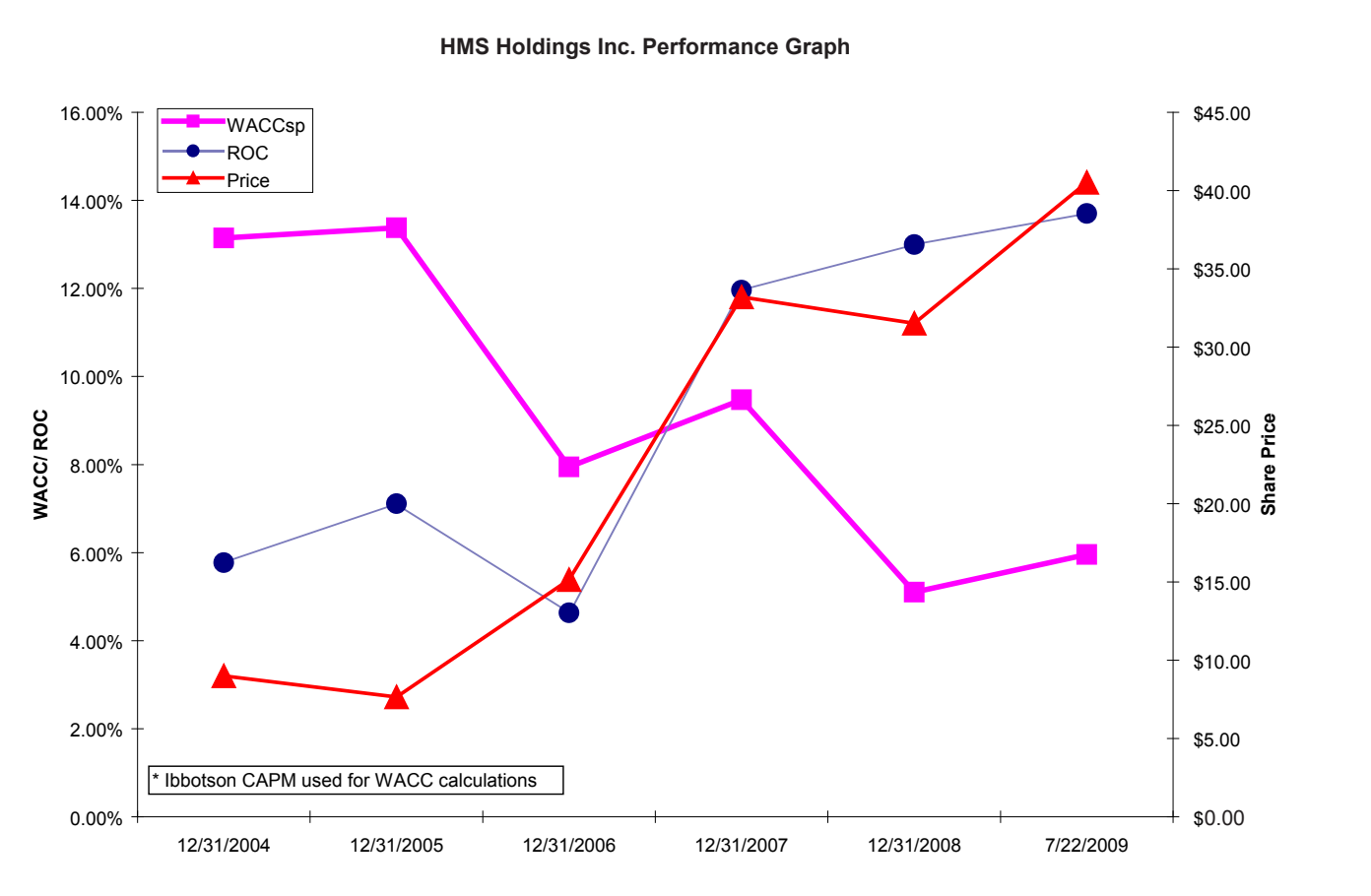
Office Depot, Inc. and HMS Holdings Corp. are two examples of public companies that have experienced changes in their respective cost of capital as a result of capital allocation decisions. As is evident below, both the share prices and cost of capital of these companies have exhibited dramatically different performance over the past five years.



Data Source:
Capital IQ

Office Depot's stock price has plummeted while its WACC has increased and return on capital has dramatically decreased, demonstrating the tight correlation between shrinking market capitalization and cost of capital. The company grew its store base by approximately 30% from the beginning of 2005 to the end of 2008, spent nearly $400 million in acquisitions, and bought back over $2 billion in stock (the bulk at the higher ranges of its 5 year valuation- 2005/2006). All of this capital was deployed in the face of declining returns, fierce competition, an overheated economy, and an over-stored retail environment. Office Depot's market cap has shrunk from $5.3 billion to $1.2 billion, and recently offered a 10% yield to attract a private placement of convertible preferred stock in order to pay down debt.

On the other hand, HMS shareholders have seen their investment quadruple over the past five years while returns on capital have more than doubled and cost of capital has decreased. On June 22, 2006, the company acquired the Benefits Solutions Practice Area from Public Consulting Group, Inc. for $115.24 million. Prior to the announcement, HMS' market capitalization was approximately $200 million. By the end of the year HMS' market valuation was $350 million. Today, HMS has a market capitalization in excess of $1 billion. This transformative acquisition combined with efficient management has rewarded shareholders and driven a significant increase in returns on capital.



Data Source:
Capital IQ

III. Debt Portion of the WACC

The value of an optimal capital structure is well documented in finance literature. The standard method for generating a company's WACC curve relies on use of the CAPM-based cost of equity, the cost of debt, the tax rate, and the ratio of debt to equity. [6] Using this approach, the minimum WACC, and optimal capital structure, occurs at the point when gains from the tax shield on debt are offset by the costs of financial distress.

A company whose equity has recently underperformed may underestimate the appropriate cost of debt to be used in a WACC calculation. The cost of debt clearly increases with higher levels of firm leverage. [7] Additionally, the cost of debt increases with declining firm size. [8] Thus, size factors must be considered not only when calculating the cost of equity, but also the cost of debt.

A sample of twenty public companies that issued public debt since the beginning of 2009 demonstrates this trend of higher coupon rate on newly issued debt. The sample includes ten highly leveraged companies (debt-to-equity ratios greater than 3.0 or debt-to-EBITDA greater than 3.0) and ten moderately levered companies (debt-to-equity ratios less than 1.0). The data shows that the increase of the coupon rate on newly issued debt securities over the company's calculated cost of pre-tax debt is in excess of 60% for the highly levered companies, and approximately 33% for the moderately levered firms. It is to be expected that newly issued debt securities, which in this sample were often additive to debt levels, would be at higher rates than the overall blended cost of pre-tax debt, however, the cost increase for highly levered firms is dramatically higher than that of moderately levered companies. Thus, as a company underperforms and EBITDA declines, its true cost of debt also increases.

The data at right confirms this point about the increasing cost of debt for companies with high debt-to-equity and debt-to-EBITDA ratios. The higher these ratios are on average for all public non-convertible debt issues over the past twelve months, the higher the coupon rate.

Coverage Ratio	Average Coupon Rate %	
	Debt to Equity	Debt to EBITDA
Less than 1.0	6.37%	6.15%
Between 1.0 and 2.0	7.75%	6.48%
Greater than 2.0	8.37%	8.09%

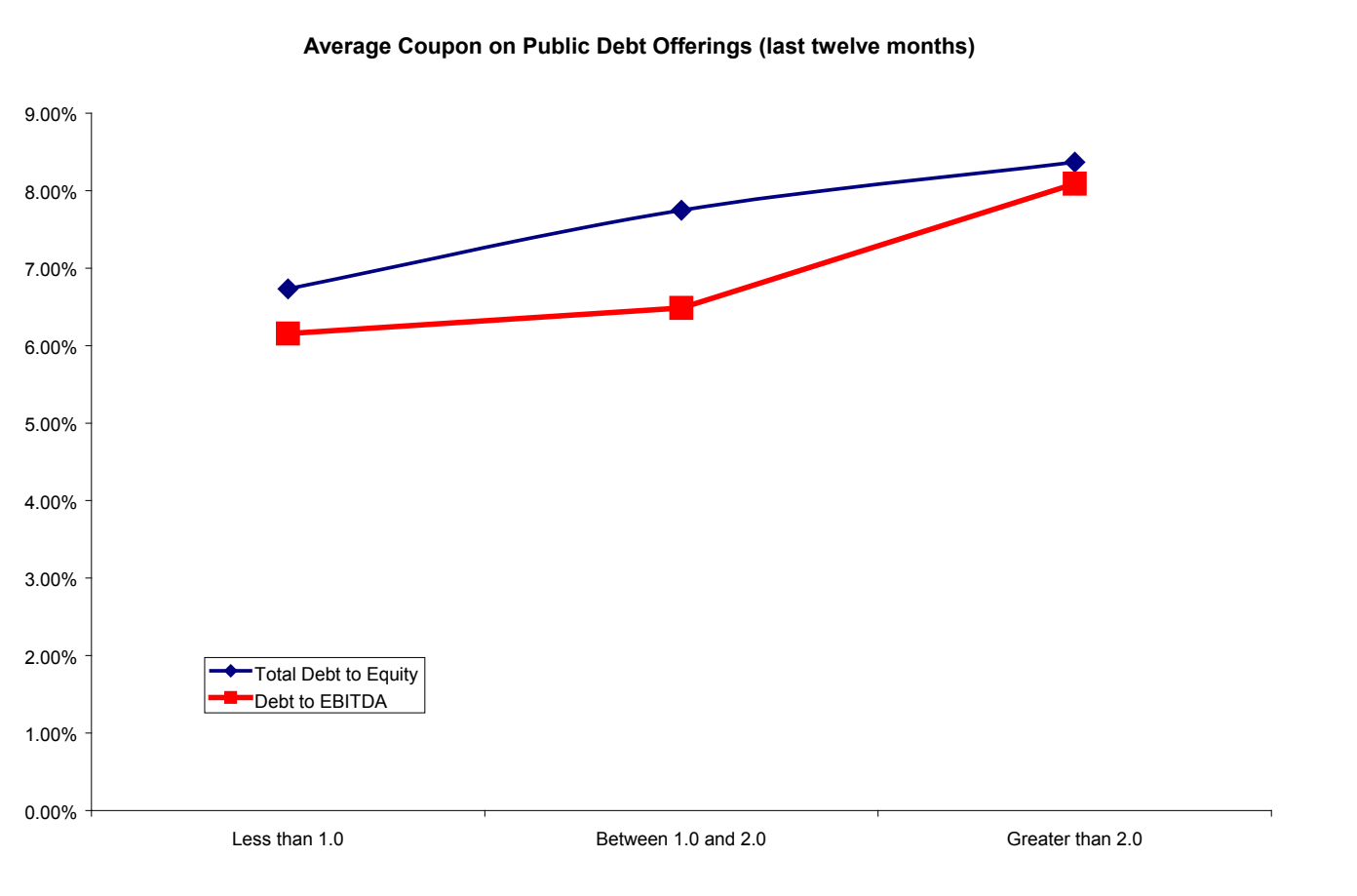
Source:
Capital IQ

[6] Cohen, Ruben. "An Analytical Process for Generating the WACC Curve and Locating the Optimal Capital Structure." Corporate Finance – Citigroup Centre (2002). www.wilmott.com

[7] Titman, S. and Wessels, R. "The Determinants of Capital Structure Choice." *J Finance*, 43.1, (1988): 1-19.

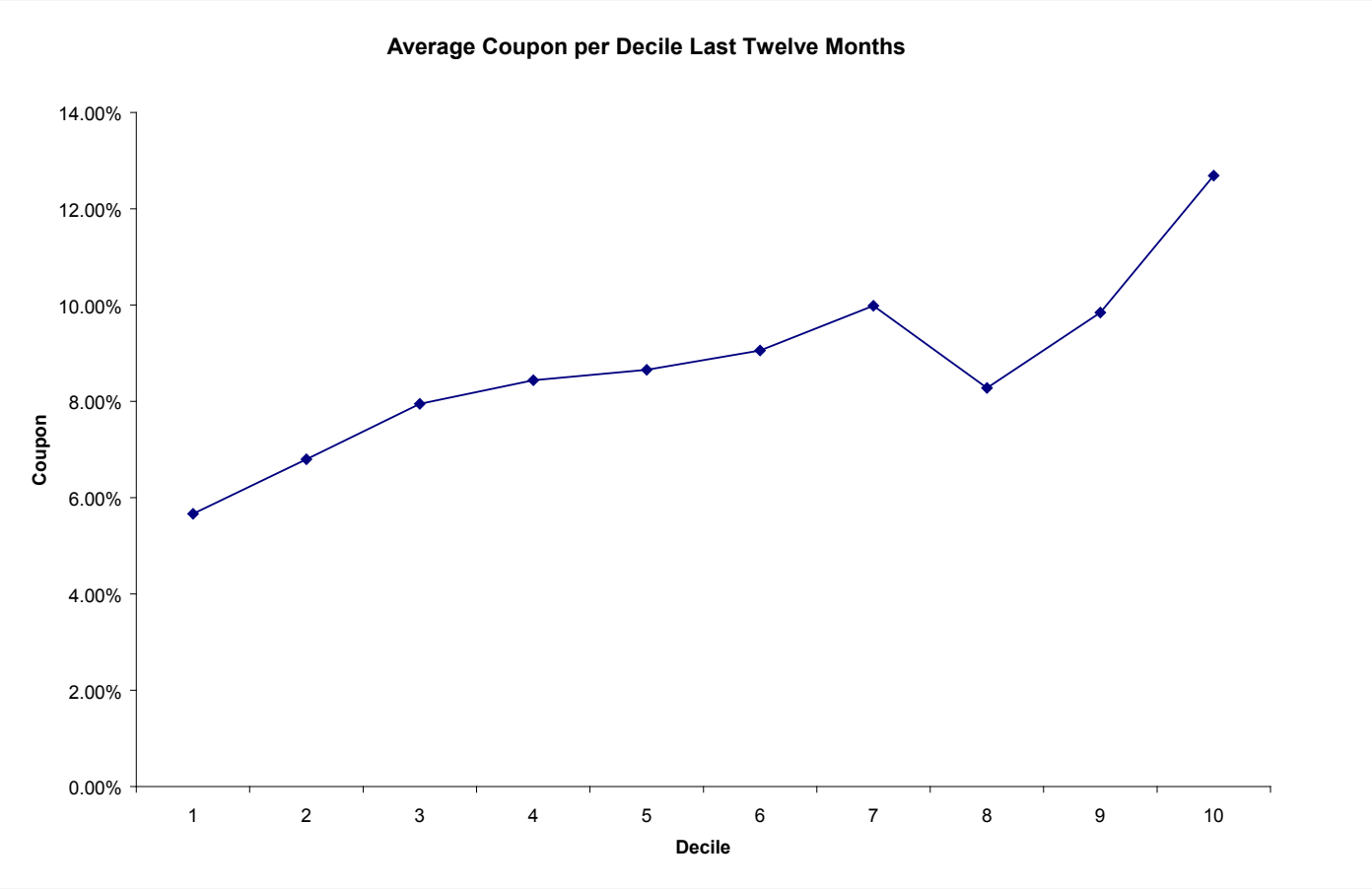
[8] Heaton, H. "On the Use of Size Premiums, Arithmetic of Geometric Average Returns, and Liquidity Premiums in Determining Discount Rates." *J Prop Tax Assessment & Administration*, 4.4. 5-12.

The notion that levered firms have higher cost debt than their unlevered counter parts is not a surprise. However, this effect is particularly pronounced for companies in the smaller deciles of market capitalization. Over the same period of time, organizing all issuers by their Ibbotson decile rankings proves that smaller companies are forced to issue higher cost debt.



Data Source:
Capital IQ

These results explain why companies cannot lower their cost of capital simply by increasing their level of leverage. Traditionally in the WACC calculation, the effect of a higher cost of equity is off-set by debt becoming a larger portion of the cap structure. This leads to a false conclusion that a company with a declining market value can actually lower its overall cost of capital by possessing or issuing leverage/ debt. In reality, the true cost of debt for underperforming companies would be the cost of issuing (re-pricing) debt.



Data Source:
Capital IQ, Ibbotson

IV. Conclusion

An accurate estimation of a company's true WACC is critical to capital allocation decisions. Underperforming companies with shrinking market capitalizations often underestimate their true cost of equity and debt. As managers develop capital allocation strategies, a proper analysis of how changes in market valuation impact cost of capital is critically important. There are many ways to evaluate proper benchmarking of capital allocation alternatives, yet none of these methods are effective without an accurate measurement of cost of capital.