Understanding the Required Return Under New Uncertainty

Emphasizing the equity risk premium.

James A. Abate, James L. Grant, and Chris Rowberry

Heightened uncertainty over the past five years—with bursting of the Nasdaq bubble, the recession of 2001, the September 11, 2001, attacks, accounting scandals, and the oil shocks of 2005—has brought new challenges for securities analysts and portfolio managers. This is particularly the case for fundamental equity managers using price-relative or discounted cash flow (DCF) models.

Portfolio managers must consider values of cash flow input to DCF models (dividends, free cash flow, economic earnings) but be especially aware of risk factors that impact the required return or discount rate and market valuation multiples. This discount rate concern is evident in the stock prices of several large-cap blue-chip companies (like Coca-Cola, General Electric, Pfizer, and Wal-Mart); their market performance in recent years has been flat, despite fluctuating interest rates over December 1999–March 2005 and rising profits and cash flows.

A better understanding of the equity discount rate and its components can be used to explain stock market conditions (valuations) and to provide insight on the possible future direction of stock prices. An economic profit approach to estimating the required return is useful to explain the sensitivity of a stock's intrinsic value to changes in the required return. The overall equity duration effect (including potentially offsetting interest rate and risk premium effects on stock price) could explain flat price performance during a period of falling interest rates, which impacts high-quality or growth stocks more than low-quality or low growth stocks.

We examine the pricing role of the discount rate using empirical inputs over December 1999–March 2005. We begin the empirical analysis with a look at pricing

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effects of the risk-free rate over the past five years. The period includes falling interest rates (measured by five-year Treasury yields) from December 1999 to June 2003 and rising interest rates from July 2003 to March 2005.

We also examine the pricing role of the equity risk premium over the tumultuous five years of December 1999 to March 2005, and how it has behaved relative to the risk-free rate over longer periods. This includes a pricing assessment of 1) the base (or non-diversifiable) equity risk premium to the highest-quality stocks in the U.S. equity market as reflected in the ACE50 portfolio, an "approximately earnings certain portfolio of 50 high earnings quality companies," (Gould [1997]), and 2) a company-specific risk premium, which in our equity risk buildup model is driven by incremental fundamental factors (size, leverage) and economic profit volatility considerations.

We conclude that an economic profit approach to securities analysis—with its three-faceted focus on the return on capital (operating condition), the required return (risk profile), and the capital growth rate (a reflection of future growth opportunities)—can provide portfolio managers insight in a world of heightened risk and uncertainty.

THE REQUIRED RETURN

There are several practical approaches to estimating the required return. These include the traditional capital asset pricing model, the Gordon growth model, arbitrage pricing theory, and the bond yield buildup approach.[1] We use a modified discount rate approach whose risk factors are based on traditional fundamental elements such as size and leverage as well as economic profit risk considerations. Our economic value added (EVA)-based, equity-risk buildup model has three components: 1) the risk-free rate of interest (five-year Treasury yield); 2) a base equity risk premium for an earnings-certainty portfolio (ACESO); and 3) a company-specific risk premium that is driven by fundamental factors including size, leverage, and economic profit volatility.[2]

Exhibit 1 provides a graph of how these opportunity costs join to produce an estimate of the discount rate in our equity risk buildup model. The specific points in the exhibit are required return on equity estimates as of April 1, 2005, for a universe of 500 to 600 large-capitalization non-financial companies that we generally track. At that time, the risk-free rate of interest (five-year Treasury yield) was 4.13%, and the base (non-diversifiable) equity risk premium was 4.96%. These two macroeconomic forces gave a 9.09% required return for the highest-quality stocks in the U.S. equity market as defined by the earnings-certainty portfolio.

We see that specific risk adds anywhere from 1 percentage point (for a company with a low specific risk score) to 5 percentage points (high company-specific risk score) to the required return on equity for large-cap companies. Discount rate changes have an impact on intrinsic value as shown next.

INTRINSIC VALUE AND THE DISCOUNT RATE

We first model the overall impact of discount rate changes on intrinsic value using a simple economic profit valuation model. Firm value, V, is determined by adding the present value of economic profit (or NPV) to invested capital:

$$V = C + PV \text{ of } EVA$$
$$= C + NPV$$

Exhibit 2 shows the sensitivity of firm value and net present value to changes in the required return, assuming constant management, assets, and capital structure.[3] We see some interesting practical implications.

First, Exhibit 2 shows that firm value and net present value are inversely related to changes in the discount rate. When the required return rises from 10% to 11%—because of higher interest rates or heightened business uncertainty—the firm's intrinsic value falls by 9% (actually 9.09%).

EXHIBIT 1
Required Return on Equity—
U.S. Large-Cap Industrials (April 1, 2005)

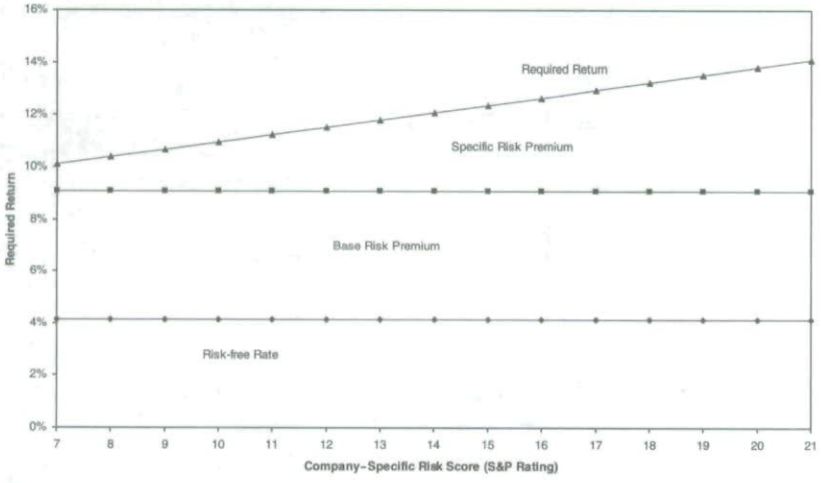


EXHIBIT 2

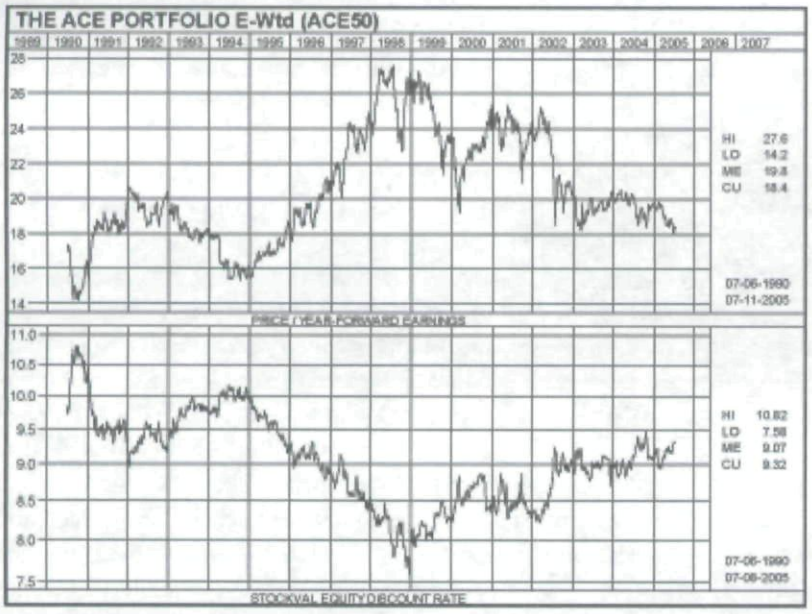
Firm Value and the Discount Rate

Discount Rate %	NOPAT	Capital Charge	EVA	Firm Value*	Book Capital	NPV**	% Change in Firm Value
1	20	1	19	2000	100	1900	900
5	20	5	15	400	100	300	100
6	20	6	14	333	100	233	67
7	20	7	13	286	100	186	43
8	20	8	12	250	100	150	25
9	20	9	11	222	100	122	11
10	*20*	*10*	*10*	*200*	*100*	*100*	*0*
11	20	11	9	182	100	82	-9
12	20	12	8	167	100	67	-17
13	20	13	7	154	100	54	-23
14	20	14	6	143	100	43	-29
15	20	15	5	133	100	33	-33
20	20	20	0	100	100	0	-50

**Valuation assumptions:*
$V = NOPAT/k$
$= [k \times C + EVA]/k$
$= C + EVA/k$
$= C + NPV$
$^{**}NPV = EVA/k.$

EXHIBIT 3

Forward PE versus Equity Discount Rate



Conversely, if the discount rate falls by 100 basis points—from 10% to 9%—the firm's value rises by 11% (or double that percentage to 22% for NPV).

Wealth effects are greater if the required return changes by a larger amount. For example, if the discount rate declines by 200 basis points, the firm's intrinsic value would rise some 25%. Exhibit 2 shows that if the required return falls from 10% to 6%, firm value would rise by 67%; for a comparative basis point rise in the discount rate and cash flow assumption, the firm's intrinsic value would decline by 29%.

Second, the inverse pricing relationship suggested in Exhibit 2 is stronger for high-equity duration (discount rate sensitive) stocks than cyclical stocks. That is, companies with high or fairly consistent earnings growth are more sensitive to discount rates. Cyclical companies with higher mean estimate errors related to earnings are priced mostly by earnings anticipation (profit change) rather than discount rate change. Consequently, cyclical stocks are less sensitive to discount rates.

Exhibit 3 illustrates the actual sensitivity of stock price to discount rate change for high-quality companies as measured by the ACE portfolio. The inverse relationship is clearly evident starting in 1995 when the overall equity discount rate started to decline and changed by over 200 basis points. This resulted in valuation expansion as measured by the forward P/E multiple. The P/E multiple expanded from 1995 to the end of 1998 from 16 to almost 28. Since 1998, the equity discount rate has increased over 100 basis points despite the historically low risk-free rate. This rate change resulted in a contraction in the P/E multiple from 28 to 18.

Third, while major changes in the required return on a scale of 400 to 500 basis points might seem unlikely for the U.S. economy, it is interesting to note that a readily available component of the discount rate, the risk-free rate, did decline by this amount from December 1999 to June 2003. A relevant question then is why the U.S. stock market did not enjoy a significant wealth increase from this substantial decline in interest rates.

A FIXED-INCOME ANALOGY

Exhibit 4 graphs the simulated values shown in Exhibit 2. These firm value and wealth effects are interesting from a fixed-income or interest rate perspective.

EXHIBIT 4

NPV and the Discount Rate

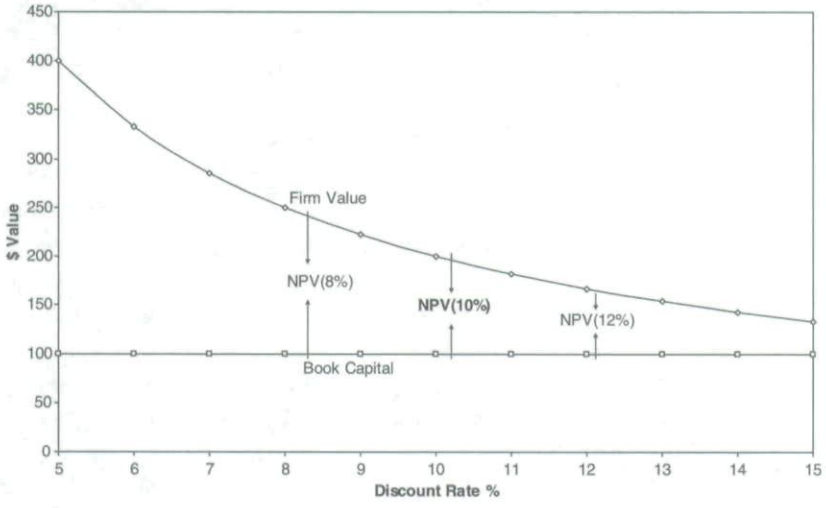
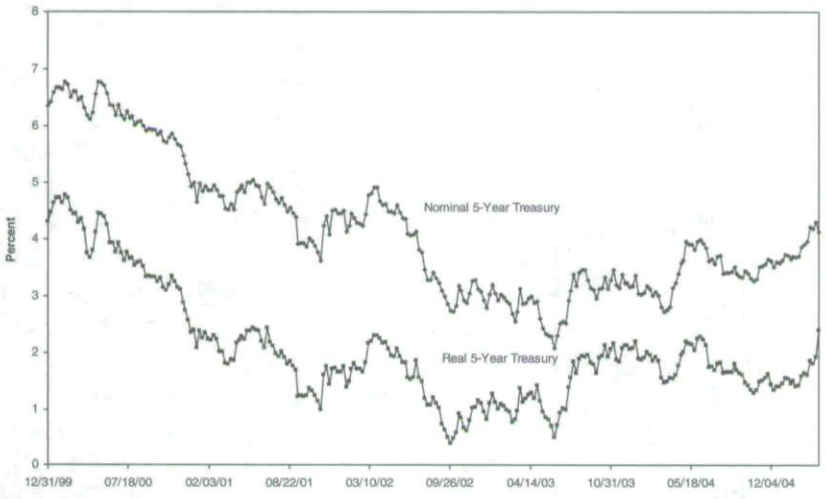


EXHIBIT 5

Nominal and Real Rates (5-Year Treasury)—December 31, 1999–April 1, 2005



That is, the behavior of the firm value (and NPV) function shown is similar to the duration and convexity properties of plain vanilla bonds. As interest rates rise—whether because of an unanticipated rise in inflation or an increase in credit risk spreads—bond prices go down across the board. Conversely, when interest rates fall, bond prices go up by an even greater percentage than the percentage decline that occurs when rates go up, assuming no change in the firm's credit quality. This of course is due to convexity in the price-yield relationship.

By analogy, the firm's value (and stock price) should display the same kind of interest rate sensitivity as is evident in the pricing of fixed-income securities. Taking this one step farther, credit risk associated with the bond is not so different from the company-specific risk premium tied to the equity.[4]

While pricing relations between interest rates and bond prices and the required return and stock prices might seem analogous, there are important differences. For theoretical and empirical reasons, investors must be careful not to confuse a change in bond yield (or interest rate) with a change in the required return. In principle, sometimes offsetting bond and equity risk premium changes can leave the discount rate unchanged. That is, in order for the required return on equity to rise in the presence of, say, a rise in interest rates, we must presume there is no offsetting reduction in the equity risk premium.

Also, from a cost of capital perspective, one must recognize that the discount rate may be impacted by the firm's decision to finance a company with debt versus equity. This too can have a concomitant impact on the discount rate and possibly the value of the firm and its outstanding shares.[5]

INTRINSIC VALUE AND THE RISK-FREE RATE

The two macroeconomic variables that comprise the required return are the risk-free rate of interest and the base (non-diversifiable) equity risk premium associated with an earnings-certainty portfolio (like ACESO). We simulate their pricing effects using real-world data over December 31, 1999–April 1, 2005. We then look at how company-specific risk factors, such as size, leverage, and economic profit volatility, cause the overall discount rate (required return on equity) to differ from a rate that results from simply summing the observed macroeconomic rates.

Exhibit 5 shows the time series behavior of the risk-free rate (nominal and real) over December 1999–March 2005. The risk-free rate declined some 400 basis points as five-year eg. Treasury yields declined from 6.36% at year-end 1999 to a low of 2.80% on June 13, 2003. It rose

EXHIBIT 6

Intrinsic Value and Changes in Risk-Free Rate—December 31, 1999–April 1, 2005

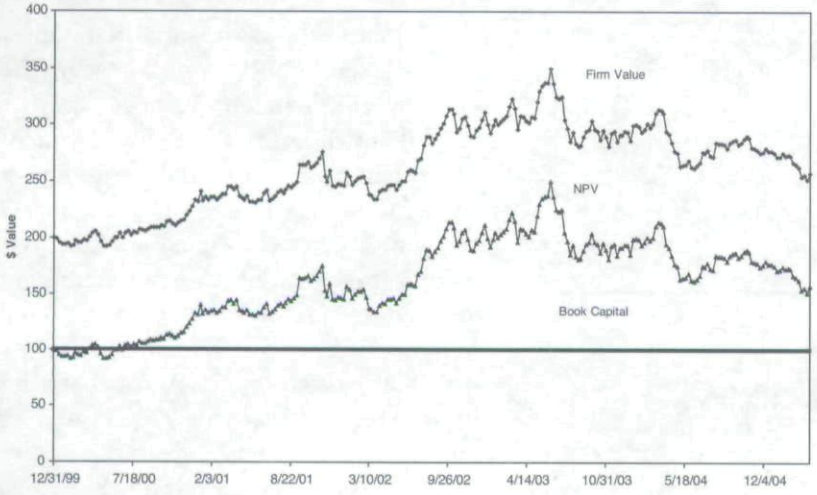
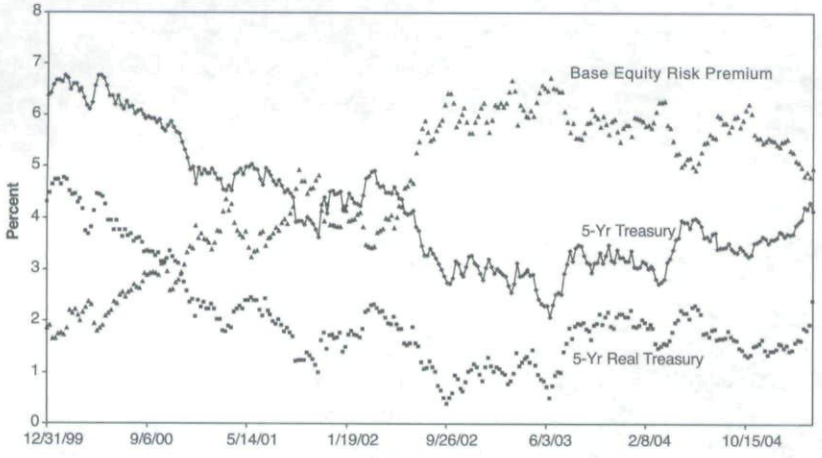


EXHIBIT 7

Base Equity Risk Premium, 5-Year Treasury, and 5-Year Real Rate—12/31/99–4/1/05



by some 200 basis points when five-year Treasury yields rose from a low in June 2003 to a weekly high of 4.30% on March 25, 2005, then settling at 4.13% on April 1, 2005.

All else the same, the large fluctuations, from sharply falling to rising interest rates, would suggest this macroeconomic factor has a rather large and varying impact on stock prices.

Exhibit 6 shows the sensitivity of intrinsic value using data on the risk-free rate over the five years, December 31, 1999–April 1, 2005. Not surprisingly, we see that firm value rises by a high percentage, reflecting a gain of some 75% on its initial value of 200 from year-end 1999 to June 13, 2003. Since the initial NPV equals 100, this simulated rise in value can also be interpreted as a 150% gain in wealth created by the actual decline in the risk-free rate over the three and a half-year observation period. The exhibit also shows a decline in firm value and NPV due to the upward trend in the risk-free rate from July 2003 to March 2005. Simulated firm value declines from a high of 349.65 on June 13, 2003, to an intrinsic value of 257.40 on April 1, 2005. NPV peaks at 249.65 on June 13, 2003, and then declines to 157.40 by April 1, 2005.

Taken together, the simulated findings in Exhibit 6 from actual fluctuations in the risk-free rate show that firm value rises by about 28% from December 31, 1999, to April 1, 2005, while intrinsic NPV rises by 57%. Although this is important, we must explain that fluctuations in the risk-free rate alone cannot explain the actual behavior of stock prices over this tumultuous five-year period.

INTRINSIC VALUE AND THE BASE EQUITY RISK PREMIUM

While Fed model proponents often emphasize the link between monetary policy and interest rates and stock prices, in actuality the relation between stock prices and the discount rate is more complex, especially in recent years. This is because the required return is also a reflection of the equity risk premium, which reflects compensation that investors require for holding risky securities.[6]

On a risk scale, one can argue that the past five years have been a tumultuous period for equity investors. Reasons include the bursting of the Nasdaq bubble, the recession of 2001, terrorism, accounting scandals, and the oil shocks of 2005. Such an event-driven period would imply a relatively high equity risk premium, although not necessarily higher than that observed during the 1970s, which saw negative events such as oil shocks, Watergate, and a dollar crisis. At the very least, we would expect that the base equity risk premium has changed.

To examine this, we show in Exhibit 7 the time series behavior of the equity risk premium on the

EXHIBIT 8

Intrinsic Value and Changes in Base ERP—December 31, 1999–April 1, 2005

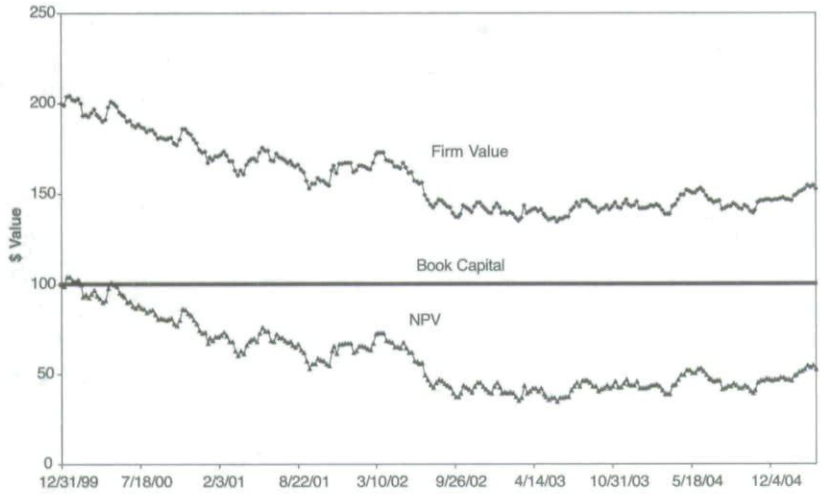
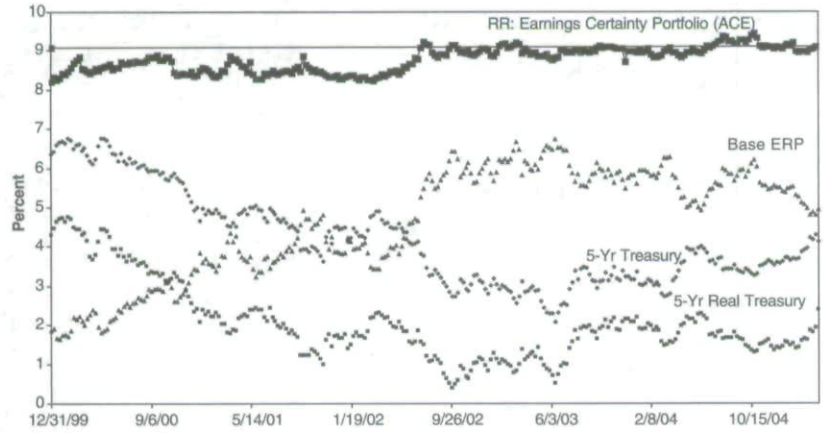


EXHIBIT 9

Required Return on Earnings-Certainty Portfolio, Base Equity Risk Premium, 5-Year Treasury, and 5-Year Real Rate—12/31/99–4/1/05



earnings-certainty portfolio (ACE) over December 1999–March 2005. We also show an overlay of the prospective equity risk premium on the nominal (and real) five-year Treasury rates for the five-year period.

We see that the risk premium to the earnings-certainty portfolio was only 1.86% as of December 31, 1999. This is consistent with bull market commentary that investors no longer required much of a premium to hold risky stocks over bonds. Indeed, Exhibit 7 shows from year-end 1999 to June 2003 a rather dramatic rise in the base risk premium, from a low of 1.86% in December 1999 to a high of 6.73% on June 13, 2003—all during a period of heightened uncertainty.

Exhibit 8 shows the simulated impact on firm value and NPV from changes in the base equity risk premium. Firm value declines from 200 at the outset to a low point of 134.50. This represents a simulated decline in firm value of 32.75% over December 31, 1999–June 2003. Meanwhile, NPV falls from 100 to a low point of 34.5, representing a simulated decline of 65.5% over the three and a half-year period.

Taking together the simulated pricing variation of the risk-free rate shown in Exhibit 6 and the pricing effects of the base equity risk premium in Exhibit 8, we see that overall simulated changes have a somewhat neutral impact on firm value and net present value. For example, the simulated rise in firm value of 28.7%—due to falling interest rates from December 1999 to June 2003 and then rising rates from July 2003 to March 2005—is largely offset by the overall 23.66% decline in firm value associated with fluctuations in the base equity risk premium. Similarly, the overall simulated wealth accumulation (NPV) of 57.4% over the tumultuous five years is largely offset by NPV decline of 47.33% due to variations in the (base) risk premium that investors require for holding an earnings-certainty portfolio.

Exhibit 9 reveals why there are offsetting pricing effects. The top plot represents the required return on the earnings-certainty portfolio (ACE) as the sum of the risk-free rate of interest and the base (non-diversifiable) equity risk premium. From a statistical perspective, the recent five-year correlation (December 1999 to March 2005) between five-year Treasury yields and the base equity risk premium is strongly negative, at 0.99, while the *long-term correlation* (July 1975 to March 2005) between the Treasury yields and the non-diversifiable risk premium is somewhat lower (in absolute value terms), at –0.81.

In effect, the offsetting changes in the risk-free rate and the base equity risk premium have resulted in a relatively stable required return series for the earnings-certainty portfolio over the five-year observation period. Consider

EXHIBIT 10

Long-Term Experience—Equity Risk Premium, 5-Year Treasury Yields, and Equity Discount Rate

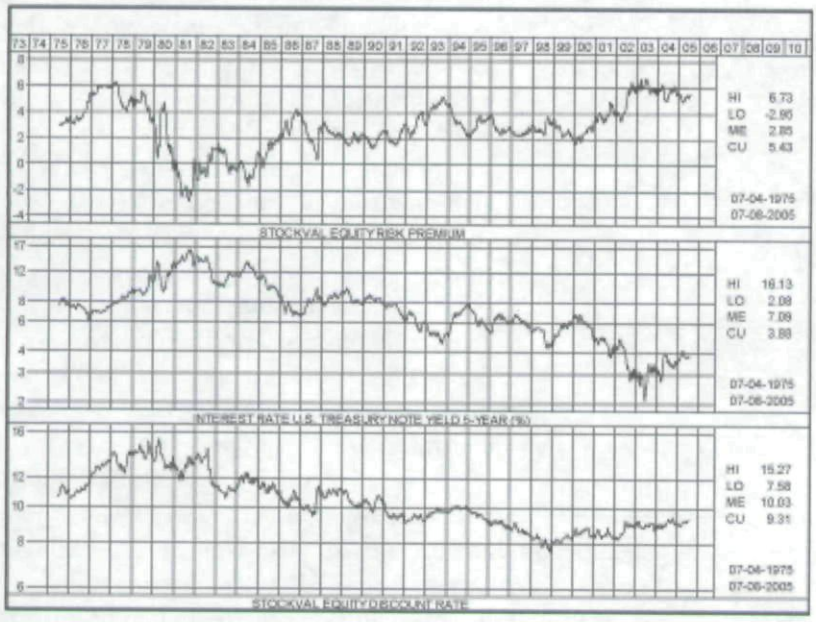


EXHIBIT 11

5-Year Averages—Risk-Free Rate, Base Equity Risk Premium, and Discount Rate on ACE

Median

	5-Year Treasury	Equity Risk Premium	Equity Discount Rate
1975-1979	7.68	4.65	12.65
1980-1984	12.44	-0.15	12.43
1985-1989	8.40	2.30	10.79
1990-1994	6.74	2.90	9.77
1995-1999	5.91	2.71	8.67
2000-Current	3.91	5.15	8.89

that the average risk-free rate over December 31, 1999–April 1, 2005, was 4.17% with a standard deviation of 1.18%, while the average base equity risk premium was 4.62% with a standard deviation of 1.39%. The average required return to the earnings-certainty portfolio (ACE) was 8.79% during the five years with a standard deviation of *only* 0.30%.

Thus, the relatively flat required return series on the earnings-certainty portfolio over December 1999–March 2005 could explain in part why U.S. stock market performance has been so uninspiring over the past five years, especially when the time series behavior of the risk-free rate—from a sharp fall in interest rates to a less dramatic rise—would have suggested otherwise.[7] In reality, the beneficial impact of falling interest rates on the required return to ACE was largely offset by companion rises in the non-diversifiable component of the equity risk premium.

EARNINGS-CERTAINTY PORTFOLIO: A LONG-TERM PERSPECTIVE

Exhibit 10 shows that long-term (30-year) averages have been 2.85% for the base equity risk premium, 7.09% for the risk-free rate, and 10.03% for the required return to ACE. The latter average is higher than the discount rate observed on ACE in recent years. We know that the last half of the 1990s experienced a beneficial 200 basis point decline in the required return to the earnings-certainty portfolio. In fact, since the market discount rate low of 7.58% occurred in December 1998, the rate has increased and has remained steady in the 9% range since mid-2002.

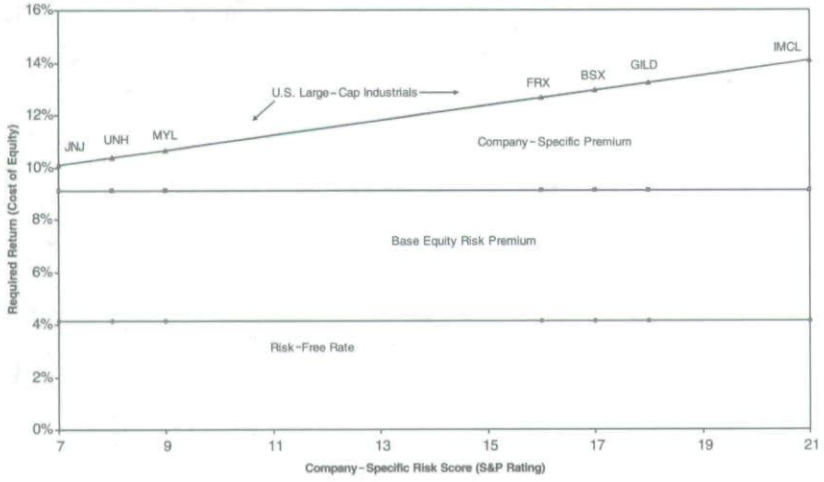
Exhibit 11 shows for five-year segments the medians for the risk-free rate, the base equity risk premium, and the discount rate for the earnings-certainty portfolio. Note that when interest rates are unusually high, the equity risk premium is at the low end and sometimes negative—the two subperiods 1980-1984 and 1985-1989, for example. During the most recent period, 2000-current, interest rates are very low, resulting in an unusually high base equity risk premium.

Compared to the long-term 30-year median equity discount rate of 10.03%, the current and recent discount rate to ACE justifies higher valuations, even with the currently high base equity risk premium. That being said, it's interesting to note that the base equity risk premium in late 2002 to mid-2003, near 6%, is similar to the high risk premium observed on ACE in 1977.

The behavior of the base equity risk premium is an important and timely element if we are trying to explain or discern the possible future direction of stock prices. In practice, it is common to apply a fixed equity risk premium, as is implied in Fed model calculations, to equity valuation models. Yet over the last five years this assumption would

EXHIBIT 12

Required Return on Equity—Selected Health Care Companies in Large-Cap Universe—April 1, 2005



have resulted in an artificial reduction in the discount rate, which, as we illustrated in Exhibit 9, would have sent incorrect signals of undervaluation.

If we assume, say, a 4% risk premium (about midpoint between low and high for the past five years) and apply the variable risk-free rate for the current period, the equity discount rate would have declined from 10.36% to 8.30%, a decline of over 200 basis points. This implies that the application of a fixed equity risk premium in recent years would have produced faulty intrinsic value calculations. It most surely would not have explained the relatively flat U.S. stock market performance, particularly on large-capitalization stocks.

Hence, the simulated pricing results using the two macroeconomic components of the discount rate, the risk-free rate and the base equity risk premium, suggest that estimating the discount rate in a world of heightened uncertainty is both important and complex.

ROLE OF COMPANY-SPECIFIC RISK

We argue that in recent years top-down or macroeconomic forces—such as the risk-free rate of interest and the base equity risk premium (a non-diversifiable component of the risk premium)—have had largely offsetting effects on the equity discount rate. This finding during a period of increased stock market risk highlights the importance of estimating the company-specific risk component of the equity discount rate.

Exhibit 12 provides another look at the equity risk buildup model introduced in Exhibit 1. The exhibit provides required return on equity estimates on April 1, 2005, for large industrial companies in nine S&P classified sectors of the economy. The vertical scale shows the required return on equity in terms of the two macroeconomic variables and a specific equity risk premium for companies in the S&P sectors. The nine S&P sectors include consumer discretionary, consumer staples, energy, health care, industrials, information technology, materials, telecommunications, and utilities. The horizontal scale shows the specific risk score for each company tracked in the large-cap universe, again based on traditional fundamentals and EVA volatility.

The evidence in Exhibit 12 is interesting in several respects. First, it shows that macroeconomic forces make up a significant component of the discount rate (required return). In fact, the risk-free rate and the base equity risk premium constitute 73% of the required return on equity estimates as of April 1, 2005, for U.S. industrial companies. At that time, the risk-free rate was 4.13%, while the base equity risk premium was 4.96%, implying a required return of 9.09% for the earnings-certainty portfolio (ACE).

Second, specific risk *does* matter for individual companies as evidenced by both the upward-sloping required return line for the 500 to 600 industrial companies as well as the actual health care companies whose ticker symbols are shown for illustration.

On average, it appears that specific risk accounts for some 27% of the overall required return. The specific risk premiums range from about 1% for a company with a low-risk profile to 5% for a company with a high-risk profile. The specific risk premium for Johnson & Johnson (JNJ), for example, is 1.0% (low specific risk profile) compared to about 3.5% for Forest Laboratories (FRX) (moderate-to-above average risk profile) and 4.0% for ImClone Systems (IMCL) (high risk profile).

Firm-specific risk can also be implied by current market pricing. By equating the intrinsic value (using a variety of valuation models) to the current price and solving for the specific risk premium, we can estimate the market-implied discount rate adjustment. According to the G-Model, an earnings/dividend discount model, (Kitselman [2004]), the market-implied risk premiums for the sample pharmaceutical companies are: Johnson &

Johnson −15 bp, Forest Laboratories 170 bp, and ImClone Systems 60 bp. From this comparative analysis, one could assume that the market does not give ImClone a high-enough firm-specific risk adjustment.

Exhibit 12 in its decomposition of required return on equity (or the equity discount rate) into meaningful macroeconomic and microeconomic risk forces shows how important it is for today's equity managers to have a clear understanding of how these various components of the required return relate to each other, especially given the inverse relationship between discount rate components and intrinsic value, and ultimately market prices.

CONCLUSION

We find that the equity discount rate over the past five years has been largely stable despite widely varying interest rate environments, from sharply falling rates to moderately rising rates. The constancy of the required return on equity over the past five years has resulted from the strongly negative relationship between the risk-free rate of interest (measured by five-year Treasury yields) and the equity risk premium to the earnings-certainty portfolio.

Given the largely flat stock market performance of many large-cap U.S. companies, this finding supports our belief that a rigorous evaluation of stock market conditions requires a keen understanding of the interaction between the two macroeconomic components of the overall equity discount rate, namely, interest rates and the non-diversifiable portion of the equity risk premium.

Going forward, we believe that the required return on equity is one of three key factors that drive stock prices. In our view, it is a primary driver of stock returns and volatility in the short run (see also Abate [2006] and Grant and Abate [2001]).

In a nutshell, our fundamental selection process for distinguishing better companies is based on 1) the return on capital (operating condition); 2) the required return (equity risk profile); and 3) the growth rate of invested capital, which points to favorable economic value added growth when the return on capital is greater than the cost of capital. Like Abate, Grant, and Stewart [2004], we also evaluate the stock selection implications of market-implied EVA growth embedded in share price relative to the actual growth expectations that we think a company can realistically deliver.

Finally, a disciplined economic profit approach to company and security analysis, where the equity discount rate incorporates a prospective risk premium and is fully recognized as one of three key drivers of stock price, is especially important in a world of heightened risk and uncertainty.

ENDNOTES

The authors thank for helpful comments J. Clifford, Jeffrey McMains, Tony Rouzzo, and Scott Stewart.

[1]The required return on equity is also known as the cost of equity. See Grant [2003] or Grant and Abate [2001] for a discussion of traditional and EVA-based approaches to estimating the required return. Our findings should not be interpreted to mean that our risk buildup approach to estimating the required return is better than alternative methods such as the CAPM, the Gordon growth model, or APT.

[2]EVA® is a registered trademark of Stern Stewart & Co.

The term ACE refers to *approximate certainty equivalent*, a statistical value term. ACESO is a portfolio of high earnings quality companies used to derive an "earnings certain" equity risk premium. See Gould [1997], "The G-Model and Equity Pricing Theory" [2000], and Rowberry [2002] for application of an innovative approach to estimating the non-diversifiable component of the equity risk premium.

[3]We assume a direct correspondence between changes in the required return on equity and the cost of capital (or weighted average cost of capital).

[4]Credit risk can be interpreted as the equity risk premium that is derived from company-specific risk factors.

[5]See Grant [2003] for an EVA-based discussion of capital structure and valuation.

[6]That the link between Fed policy and interest rates and the stock market is a tenuous one in recent years is examined by Conover et al. [2005]. We model the equity risk premium in the form of a non-diversifiable risk premium to the highest-quality stocks in the U.S. equity market (also referred to as the base or prospective equity risk premium) and a company-specific risk premium.

[7]As of April 30, 2005, the five-year annualized return on the S&P 500 was −2.94%.

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