CHAPTER 1

Understanding the Simplicity of Valuation

The constant growth equation is a simple model for valuing a stream of cash flows in perpetuity based on cost of capital and long-term growth. By using earnings as a proxy for cash flow, this simple model can estimate fair value of the stock market. Understanding how lower cost of capital and higher growth rates translate to higher price-to-earnings (P/E) ratios, thus higher valuation, and that even small changes make a big difference is one of the most important lessons from the Risk Premium Factor (RPF) Model. The Capital Asset Pricing Model (CAPM) is used to determine cost of equity capital where the equity risk premium (ERP) is a key component. Despite its importance in valuation, most methods for estimating the ERP have been unsatisfactory.

Understanding the drivers of value requires familiarity with a few basic financial concepts. The first is the *time value of money*. This term refers to the idea that money promised at some future date is less valuable than money in hand today. Would you rather have $100 today or in one year? Of course, you'd rather have the $100 today to spend, invest, or pay down debt. At a 5 percent annual interest rate, $100 invested today is worth $105 in a year. We call this the *future value* (FV).

Conversely, assuming the same rate of return, $105 in a year is worth $100 today. This is referred to as *discounted value*. Discounting a stream of cash flows over several periods is discounted cash flow (DCF) analysis. This discount rate is the amount by which we discount future payments or cash flow to find their equivalent value today. It is also called the *cost of capital*—a term that will be used throughout this book and abbreviated by "C."

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How much is the promise to pay \$100 in a year with C of 5 percent worth today? We call this the present value (PV). If you think it is \$95, you are close, but wrong. A simple test is to take the estimated PV and use the discount rate to get the FV. In this case, if you invested \$95 at 5 percent, you would have only \$99.75 at the end of a year. In order to calculate present value, you need to divide by the discount rate (C). The math is simple. The future value in one year equals the present value (our original amount) plus the present value times the interest rate. Think of it this way, if you deposit \$100 (PV) in the bank at 5 percent (C) at the end of one year, you have your initial \$100 plus \$100 times 5 percent.

$FV = PV + PV \times C$, which is usually simplified to:

$$FV = PV \times (1 + C)$$

In our first example, that would be:

$$\$105 = \$100 \times (1 + 0.05)$$

Therefore, we can just rearrange the equation to solve for PV:

$FV/(1 + C) = PV$, so to find the future value of \$100 at 5 percent:

$$\$100/(1 + 0.05) = \$95.24$$

In other words, \$95.24 invested for one year at 5 percent is \$100.

Next, let's look at values over longer periods. What is the value of \$100 at 5% in five years with interest paid at the end of each year and reinvested? At the end of year one, we have \$105. The \$105 is reinvested at 5 percent to return \$110.25 at the end of year 2. At the end of year 3, \$115.76. And at the end of year 5, \$127.63. This is simply taking the PV and multiplying by (1 + C) once for each year.

This can also be expressed as:

$$FV = PV \times (1 + C)^n \text{ where } n \text{ represents the number of years.}$$

In our example, that is:

$$\$127.63 = \$100 \times (1.05)^5$$

This is another way of saying we multiply by 1.05, five times. The formula for PV is:

$$PV = FV/(1 + C)^n$$

In words, we just divide by 1 + C once for each year.

RATES, COMPOUNDING, AND TIME VALUE

Interest rates have an obvious impact on time value. If instead of 5 percent you were able to invest at 10 percent per year, your annual return doubles. One hundred dollars at 10 percent is worth $110 in a year and $121 in two years. At the end of five years it is worth $161, compared to $127 at 5 percent. The calculation of reinvested interest plus principal over a number of years is called compounding. The compounding of interest results in ever growing returns over time with the impact of interest rates magnifying over time. While the difference between 5 percent and 10 percent for a year might not seem like much, over five years the initial investment would have grown just 27 percent at 5 percent, while growing 61 percent at a 10 percent annual rate. After 10 years at 5 percent the original $100 will have grown to just $163, while the investment of $100 at 10 percent will have grown to $259. Just as future value increases with the discount rate, present value decreases. The present value of $100 paid in five years at 5 percent is $78.35, while the present value at 10% is just $62.09. The higher the discount rate, the less that future dollar is worth.

We can see this in the equations. Since $FV = PV \times (1 + C)^n$, the larger the discount rate (C) and the longer it is invested in years (n), the more it grows. The opposite holds true for PV, since the equation for $PV = FV/(1 + C)^n$, as C or n gets larger, the PV gets smaller. I am spending a lot of time on this point because, as we will see, the cost of capital (C) has a big influence on stock price.

WHY TIME VALUE MATTERS FOR THE STOCK MARKET

When you buy stock in a company, you are buying ownership. Just as an owner of 100 percent of a business owns 100 percent of the future cash flow, an owner of 0.01 percent of a company, owns 0.01 percent of its future cash flow. It is that cash flow that accounts for the value. If you own 100 percent of a business, you decide how that cash flow is invested—pay dividends or reinvest. If you own only a small part of the business—like a typical shareholder—you are entrusting management to decide how to dispose of its cash flow. They can pay dividends, reinvest, buy back shares, or acquire another business.

If we forecast future cash flows of a business, projecting out all revenue, expenses, and investment, the value of the business is equal to the present value of those cash flows. Valuation of companies reflects current earnings

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and future earnings—growth; but the more distant the earnings, the less value today.

How far in the future do we discount the earnings? In perpetuity—in other words, forever. Of course, the company could be sold in the next few years, but since the sale price is based on projected cash flow, the valuation at time of sale will still be based on perpetuity cash flows. As you will see, projecting future earnings into perpetuity does not require a spreadsheet with an infinite number of columns.

VALUING A PERPETUITY

If I promise to pay you \$5 per year forever, what is that worth today? If we assume C is still 5 percent, then the payment at the end of the first year is worth $\$5/(1 + 0.05)$ and the second $\$5/(1 + 0.05)^2$ and so on. Table 1.1 shows the discount factors and present value for select future years. The PV in any year is the payment divided by the discount factor. The PV of the perpetuity is the sum of the PVs for each year out to infinity.

The good news is that in order to calculate a perpetuity, you don't need to forecast cash flows forever. Assuming a constant discount rate and cash flow the value of a perpetuity is simply:

$$PV = E/C,$$

where E is the annual cash flow in each year. Notice that since E is divided by C, PV gets larger as C gets smaller—lower interest rates make values go up. Since in evaluating a company, E is not a constant we need to account for its growth.

TABLE 1.1 PV of \$5 at 5 Percent

Year	Discount Factor	PV
1	1.050	\$4.76
2	1.103	\$4.54
3	1.158	\$4.32
4	1.216	\$4.11
5	1.276	\$3.92
10	1.629	\$3.07
100	131.501	\$0.04

CONSTANT GROWTH EQUATION: THE KEY TO UNDERSTANDING THE STOCK MARKET

Transforming the perpetuity equation to account for growth only requires subtracting the long-term growth rate (G) from C in the perpetuity formula, so PV = E/C becomes:

$$PV = E/(C - G)$$

Notice again that since you are dividing E by C – G, as G increases, so does PV. This makes intuitive sense. If you are starting with the same cash flow (E) and discount rate (C), then obviously PV gets bigger when E grows faster—companies that grow earnings faster are worth more.

The constant growth equation is a derivative of the Discounted Cash Flow Model that determines the net present value of a perpetual cash flow assuming a constant rate of growth. Instead of assuming different levels of earnings in each period, it assumes a constant growth rate off the base year and a constant cost of capital. If you are so inclined, you can wade through the derivation of the constant growth formula in the next two equations, but it is really not necessary. The discounted cash flow model, where E is cash flow and C is cost of capital:

$$PV = \sum E_1/(1 + C)^1 + E_2/(1 + C)^2 + \cdots + E_n/(1 + C)^n$$

If you assume that E grows at a constant rate (G),

$$PV = \sum (E_0 \times (1 + G)^1)/(1 + C)^1 + (E_0 \times (1 + G)^2)/(1 + C)^2 + \cdots + (E_0 \times (1 + G)^n)/(1 + C)^n$$

the result then simplifies to:

$$PV = E/(C - G)$$

Note that if G is zero then we are back to the perpetuity formula, PV = E/C. This equation is not a theory; it is a proven mathematical concept found in most corporate finance textbooks.

We can easily apply this equation to valuing companies or valuing the entire Standard & Poor's (S&P) 500 Index by substituting operating earnings for E as a proxy for cash flow. I apply it to market valuation by substituting S&P operating earnings for cash flow and since we are talking about the

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price of an index, for clarity, we will use P instead of PV. The formula becomes:

$$P = E/(C - G)$$

where:

P = Price (value of S&P 500 Index).
E = Earnings (reported operating earnings for the prior four quarters as reported by S&P) as a proxy for cash flow.
G = Expected long-term growth rate.
C = Cost of capital (we will derive C in a later chapter).

This formula can also be restated to predict P/E ratio as:

$$P/E = 1/(C - G)$$

These are the two most important equations in this book. Together, these equations are useful in understanding valuation for an individual company or the market overall and, as will be discussed, with the right assumptions offer a powerful explanation for overall market levels.

NOT THE FIRST TO TRY THIS

I am not the first to try applying a constant growth equation to the stock market, but I may be the first to have done it successfully. The key is in the underlying assumptions used as inputs for E, C, and G. Some suggest that cash flow should be used and earnings are the wrong measure. While cash flow would technically be better, it is useful in a perpetuity formula only after normalizing so that it represents ongoing future cash flow. Because annual operating cash flow includes capital expenditures and other investments along with changes in working capital, cash taxes, and other balance sheet items, it is almost never a good representation of expected long-term future cash flow in a single year. While we could adjust cash flow to account for these, and we should when looking at a single company, it is impractical to do so for an entire index like the S&P 500.

I argue that when looking at the S&P 500 as a whole, these things net out. Depreciation for the S&P 500 is a good proxy for capital expenditures, so that operating earnings, which exclude nonrecurring items, is good proxy for cash flow. In short, operating earnings for the S&P 500 contain enough adjustments to be a good proxy for long-term cash flow, and that makes it a good basis for evaluating current market value. It also has the

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advantage of being reported frequently and has a history going back at least 50 years.

Others suggest equity should be valued as the present value of dividend payments, not earnings or cash flow. They use a version of the constant growth model called the Gordon Growth Model or Dividend Growth Model by using dividends in place of earnings. They argue that the value of equity should relate to actual cash flow received by shareholders. Some advocate a modified approach that uses dividends, plus share repurchases. One well-known advocate of this approach is Nobel Laureate Paul Krugman, who said:

> *Now earnings are not the same as dividends, by a long shot; and what a stock is worth is the present discounted value of the dividends on that stock—period, end of story.*[1]

Krugman is adamant that the only things that you should count are dividends and share repurchases. I disagree, and so do some of his fellow Nobel Prize winners. First, as posited by Franco Modigliani and Merton Miller in their famous article on the "irrelevance" of dividend policy, it is the underlying expected earnings power of companies, not their dividend payouts that determine corporate market values. Dividend policy does not impact valuation.[2] Dividend policy is a matter of capital structure in that companies use dividends to repatriate cash to shareholders or choose not to pay dividends in order to reinvest in their business.

Shareholders can mimic the result of dividend or share repurchases by choosing to sell shares and therefore determine the time at which they receive cash. In other words, if they want their earnings distributed in cash, they can sell shares. Why would it matter who is repurchasing the shares? Consider the examples in Table 1.2 of a company that has earnings per share (EPS) of $2, growing at 8 percent per year. We assume it trades at a P/E ratio of 20 throughout the period, so starting with earnings of $2 per share and a P/E of 20, it trades for $40 per share. Two investors each hold 1,000 shares. Investor 1 holds all his shares throughout the period.

Investor 2 makes his own dividend policy by selling shares equal to earnings—effectively mimicking a 100 percent dividend payout ratio. In the first year, he held 1,000 shares. Since the company earned $2 per share, he needed to sell $2,000 worth of shares ($2 × 1,000 shares) to create his "dividend," so he sells 50 shares ($40/share × 50 shares) to reduce his holdings to 950 shares worth $38,000.

Since we are assuming that earnings grow at 8 percent and the P/E is a constant, the share price also grows at 8 percent. If we assume that Investor 2 reinvests his distribution, also at an 8 percent return, the line FV of

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TABLE 1.2 Equivalence of Selling Shares Instead of Dividends

	Year 1	Year 2	Year 3	Year 4	Year 5
EPS	2.00	2.16	2.33	2.52	2.72
P/E	20	20	20	20	20
Share Price	$40.00	$43.20	$46.66	$50.39	$54.42
Investor 1—No Distributions					
Shares	1,000	1,000	1,000	1,000	1,000
Value	$40,000	$43,200	$46,656	$50,388	$54,420
Investor 2—Distribute Earnings					
Beginning Shares	1,000	950	903	857	815
EPS on Shares Owned/Distribution	2,000	2,052	2,105	2,160	2,216
Shares to Sell	50	48	45	43	41
Ending Shares	950	903	857	815	774
Ending Value	$38,000	$38,988	$40,002	$41,042	$42,109
FV of Distributions @ 8%	$2,721	$2,585	$2,456	$2,333	$2,216
Total Distributions					$12,311
Shares + FV Distributions					$54,420

Distributions in Table 1.2 shows their value in year 5. It's not a coincidence that the ending value of shares for Investor 1 and shares plus the future value of distributions in the final year for Investor 2 are both $54,420. Since the distributions earn the same rate of return as shares, they have to be equal. Differences arise only if either shares or reinvested distributions outperform one another. Earnings are as good as a distribution!

If earnings growth is greater than the reinvestment rate, then Investor 1's results would outperform Investor 2's results. For example, if the company grew earnings at a 20 percent rate during the period, then stock price would increase at 20 percent per year, so investors would be better off maintaining their investment in the company rather than selling shares. Likewise, if the company paid a dividend, then those shareholders who reinvested the dividend in the company would outperform those who took the cash. You see, it does not matter whether the company pays out cash through dividends or share repurchases—the results are the same; since public markets provide liquidity, shareholders determine whether they will reinvest profits or not.

Furthermore, earnings are a better approximation for cash flow than dividends, which are often maintained long after earnings have declined or

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not paid at all by high-growth companies. Finally, information on current business condition is much stronger in earnings than in dividends, even including potential signaling with a cut or increase in dividends, and thus provide a much better gauge of future growth prospects. These contribute to making earnings a good measure.

P = E/(C – G) is the key to understanding the stock market. If you understand this formula, you can understand changes in the market. We've discussed E, and in subsequent chapters we will learn how to calculate C and determine estimates for G.

WHY GROWTH RATE AND COST OF CAPITAL MATTER

The constant growth equation is helpful in understanding what drives value. Assume you have an asset (which could be a business or the entire market) with a cost of capital of 12 percent, a growth rate of 2 percent and cash flow of $100, then: P = $100/(12 percent – 2 percent) = $1,000.

The equation tells us with constant 2 percent growth in cash flow your asset is worth $1,000. This is called *intrinsic value*. We can also apply this to a share of stock to determine its intrinsic value. Instead of cash flow, we use EPS of $2 and the same cost of capital and growth rate, so the result P is now share price: P = $2/(12 percent – 2 percent) = $20. Since EPS is $2 and price is $20, the P/E is $20/$2, or a P/E of 10. While the market may value it differently, if these assumptions are true, this formula tell us its intrinsic value—its actual worth.

P/E is often used to gauge whether share price is expensive or cheap; a P/E of 8 is considered very low, but when Google had a P/E of 60 or more, some thought it was very high. Is a company with a P/E of 10 a bargain compared to a company with a P/E of 20? We can explore this question using the constant growth equation. Take the same company and now assume that its cost of capital drops from 10 percent to 8 percent and its growth rate increases from 2 percent to 3 percent and earnings stay the same. These might seem like small differences, but the impact is dramatic. P = $2/(8 percent – 3 percent) = $40, with the P/E rising to 20. The same company with a lower cost of capital and better growth doubles in value. If growth increased to 5 percent (in line with nominal long-term gross domestic product (GDP) growth) the share price rises to $66, a P/E of 33. Table 1.3 provides additional examples of how P/E varies based on growth for a company with an 8 percent cost of capital:

The formula P = E/(C – G) shows that earnings relate directly to price. What many managers fail to realize is that investors don't look at earnings

TABLE 1.3 Growth Drives P/E

Growth	P/E
0%	12.6
2%	16.7
4%	25
6%	50

Note: Assumes 8% cost of capital.

in a vacuum; they parse the information in earnings in order to estimate growth. So the reporting of earnings often causes the P/E to change.

P/E RATIO EXPANSION AND CONTRACTION

P/E ratios for a company and the entire market change over time. One important use for the constant growth equation is in illustrating the probable causes of these changes:

P/E expansion. If the P/E ratio increases, it means that either earnings are expected to grow at a faster rate or cost of capital has decreased.

P/E contraction. If the P/E ratio decreases it means that either earnings are expected to grow more slowly or the cost of capital has increased.

These can be illustrated with a few simple examples. If a company has a stock price of $40 and consensus or expected earnings of $4, then it trades at a forward P/E of 10. If the company positively surprises the market by reporting earnings of $4.40, and the P/E stayed at 10, then stock price would increase to $44 (10 × $4.40). Since this was also a positive surprise, the market may also increase its growth expectations for the company which causes the P/E multiple to increase as well. If the P/E increases to 11, then the stock price increases to $48 ($4.40 × 11). Later in the book, we will revisit the topic and calculate expected growth.

If the company surprises on the other end with lower-than-expected earnings, then the opposite result ensues. Suppose they report $3.60, 10 percent below expected; then, if the P/E stays at 10, price drops to $36, but may drop more if P/E shrinks because of reduced growth expectations. Growth expectations are the reason that a stock may drop significantly when the company misses earnings by just a penny or two.

You have probably noticed that I am cautious in my language by saying "may increase" or "may decrease." This is because earnings are just part of the story. Investors will try to understand the entire story by, among other things, looking at the quality and sustainability of earnings, revenues, margins, product mix and investment. If a company reports earnings growth, they want to understand if those earnings really are representative of the future and if the company can keep growing. This will be discussed in more detail later.

CAPM, RISK PREMIUM, AND VALUATION

The Capital Asset Pricing Model (CAPM) can be used to determine the cost of equity for an individual firm or the market overall.

$$\text{Cost of Equity} = R_f + \beta \times (\text{ERP})$$

where

R_f = Risk-free rate (10-year or 30-year Treasury yields are used as a proxy).

β = Beta, the sensitivity to market risk (by definition for the entire market, it is 1.0).

ERP = Equity risk premium (this will be the main subject and the most innovative part of this discussion).

Simplifying this equation, cost of equity for the market as a whole, $C = R_f + \text{ERP}$.

The model was introduced by Jack Treynor (1961, 1962), William Sharpe (1964), John Lintner (1965), and Jan Mossin (1966) independently, building on the earlier work of Harry Markowitz. Sharpe received the Nobel Memorial Prize in Economics in 1990 (jointly with Markowitz and Merton Miller) for this contribution to the field of financial economics. While the risk-free rate is easily determined, the risk premium is not. In fact, there is no consensus. The next section will discuss some classic approaches. Later, I will discuss my suggested approach.

EQUITY RISK PREMIUM

The ERP is the expected return an investor requires above the risk-free rate for investing in a portfolio of equities. It makes sense that if 10-year Treasury yields represent the safest long-term investment (risk free), then

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in order to invest in something with more risk, like corporate bonds or equities, investors require a premium. My experience valuing businesses showed me how important this number can be; valuations change dramatically based on ERP assumptions. This is discussed further in the next section (Impact of Risk Premium on Market Valuation). Overall, the equity risk premium is also an important number in corporate finance, corporate decision making, regulatory matters such as utility rates, and investment analysis. Because of its importance and in order to reign in the divergent methodologies, some jurisdictions explicitly specify the method. For example, Utah specifies the exact method for determining the risk premium for property apprasials:

> *The risk premium shall be the arithmetic average of the spread between the return on stocks and the income return on long term bonds for the entire historical period contained in the Ibbotson Yearbook published immediately following the lien date.*[3]

The most common approach for determining ERP is to measure the historical premiums that investors have received relative to Treasury yields and assume that investors will expect that rate of return in the future. This method is very sensitive to the dates selected for measuring the growth, since different periods show different returns. Because the goal is to measure expectations, some argue that recent periods are more relevant, while others argue that using long-term return going back to the 1920s is the best measure.

There is also disagreement on whether to use geometric or arithmetic means for calculation. The geometric method uses the difference in compound growth rates, while the arithmetic takes the annual returns in each year, then averages them. Depending on method and time period, this can range from 3 percent to more than 7 percent. Other methods include surveys and forward-looking estimates based on current stock market levels. There is a huge body of research on measuring risk premiums. Books have been written on the equity risk premium. For example, UCLA professor Bradford Cornell wrote *The Equity Risk Premium: The Long-Run Future of the Stock Market* in 1999.[4] *Cost of Capital* by Shannon P. Pratt and Roger Grabowski devotes considerable space just to the equity risk premium.[5]

In the survey approach, a range of corporate executives, investors, and academics are asked what risk premium they are currently using. For example, Pablo Fernandez, Professor of Corporate Finance, IESE Business School, published, "Market Risk Premium Used in 2010 by Analysts and Companies: A Survey with 2,400 Answers" in May 2010.[6] They found the average in the United States was 5.1 percent for analysts and 5.3 percent for

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corporate participants. The spread was even larger in Europe and the United Kingdom, with 5.0 percent in Europe and 5.2 percent in the United Kingdom for analysts and 5.7 percent and 5.6 percent for corporate practitioners in Europe and the United Kingdom, respectively. The large spread between equity analysts and corporate is interesting, since it would tend to bias equity analysts toward higher valuations than their corporate counterparts. Despite the intuitive appeal of surveys, they are not used frequently.

The implied approach typically uses a variation of the constant growth equation ($P = E/(C - G)$). Using a current index price, it solves for C, using the current level of earnings, dividends or cash flow and current price. The current risk-free rate is subtracted from C to arrive at the risk premium. The approach is very sensitive to estimates of G and sometimes relies on analysts estimate. Since it is entirely dependent on current price of the index (P), it implies high risk premium when the P is high, and low when P is low. It tells us nothing about current price relative to fair value or the drivers of the risk premium.

The effort devoted to evaluating different methods and the large variation in estimates suggests that despite the importance of the ERP, current methods are not satisfactory.

IMPACT OF RISK PREMIUM ON VALUATION

Despite the considerable effort devoted to calculating the ERP, most currently accepted methods produce a huge variation in result. This has a huge impact on valuation—decreasing ERP from 7 percent to 3 percent more than doubles value. (I suspect this contributes to some distrust of DCF valuations.) Table 1.4 demonstrates the impact different ERP assumptions (3 percent – 7 percent) can have on valuation as illustrated by the P/E. Using the constant growth model, where $P/E = 1/(C - G)$, if we assume that the market will grow with long-term estimates of real GDP at 2.6 percent plus long-term inflation at 2 percent, our estimate of stock market P/E would

TABLE 1.4 ERP Drives Valuation

R_f	ERP	Cost of Equity	GDP + Inflation	Predicted P/E
5.0%	3.0%	8.0%	4.6%	29.4
5.0%	4.0%	9.0%	4.6%	22.7
5.0%	5.0%	10.0%	4.6%	18.5
5.0%	6.0%	11.0%	4.6%	15.6
5.0%	7.0%	12.0%	4.6%	13.5

have P/E = 1/(C – 4.6 percent). (*Note:* Real GDP + Inflation is nominal GDP). If Treasury yields are currently 5 percent, then our range of cost of capital (R_f + ERP) is 8 percent – 12 percent. Table 1.4 shows the P/E implied for the overall market in this range.

To put this in perspective, if the S&P 500 were at 800 with a P/E of 13.5, it would more than double to 1,741 with a P/E of 29.4 and the same level of earnings!

Many researchers have argued that the equity risk premium changes over time—and that such fluctuations are a major source of stock price changes—and also that the ERP has experienced a "secular" decline during the past few decades. In *Dow 36,000*, Kevin Hassett (no relation) and James Glassman argued that the risk premium was declining because investors were viewing stocks as less risky. They went so far as to suggest that that the risk premium could vanish entirely since, given a sufficient amount of time, stocks appeared virtually certain to outperform bonds.[7] In *The Myth of the Rational Market,* Justin Fox quotes Eugene Fama, one of the pioneers of the efficient market hypothesis as saying, "My own view is that the risk premium has gone down over time basically because we've convinced people that it's there."[8] Ibbotson suggested that the decline in the risk premium is a onetime event. "We think of it as a windfall that you shouldn't get again," he said.[9] I think Glassman and Hassett were right about the decline in the ERP, but not about the underlying cause.

CHAPTER RECAP

The constant growth formula is the key to understanding stock market value. With S&P operating earnings used as a proxy for cash flow, the constant growth equation can be used to estimate market value or P/E ratios by capitalizing current earnings as a perpetuity.

Two forms of the equation are:

$$P = E/(C - G)$$

$$P/E = 1/(C - G)$$

where

P = Price (value of S&P 500 Index).
E = Earnings (reported operating earnings for the prior four quarters as reported by S&P) as a proxy for cash flow.
G = Expected long-term growth rate.
C = Cost of capital.

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If you understand these two equations, you can understand the stock market. Applying the constant growth equation helps understand the impact of its inputs on value:

- Impact of changes in cost of capital and growth on value where small changes in growth or cost of capital make a big difference in value.
- Cost of capital is important, so we better get it right.
- Earnings drive value (stock price) but also contain information. While we can determine current earnings, we need to forecast growth and determine the right cost of capital.
- Changes in earnings expectations drive stock price. Exceeding expectations may increase growth expectations, resulting in a higher P/E, while missing earnings expectations could signal lower growth and result in a lower P/E.
- Cost of equity according to CAPM: Cost of Equity $= R_f + \beta \times (ERP)$

  where

  R_f = Risk-free rate (10-year or 30-year Treasury yields are used as a proxy).
  β = Beta, the sensitivity to market risk (by definition for the entire market, it is 1.0).
  ERP = Equity risk premium.

- ERP estimates cover a wide range, typically 3 to 7 percent with little consensus. ERP has a huge impact on valuation. With an R_f of 5 percent, an ERP dropping from 7 percent to 3 percent would more than double stock price by increasing P/E ratios.