

Introduction to Finance



by George Blazenko

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Chapter 8

Equities & Markets

“Understanding how to be a good investor makes you a better business manager and vice versa.” Charlie Munger (Berkshire Hathaway Corporation).

“I will go anywhere, provided it be forward.” — David Livingstone (explorer), 1813 – 1873.



In Chapter Eight We Learn:

1. How do equity and debt differ, fundamentally?
2. What is the Discounted Dividend Model?
3. What are typical dividend yields for preferred shares?
4. Determinants of common share expected returns?
5. Why do investors use “value” ratios like P/E and P/B?
6. Calculate expected return with market observables? Yes, we can (in several different ways with different inputs). You cannot be a good investor unless you can do this!
7. When is corporate growth “good” for shareholders?
8. Can we measure managerial commitment the shareholder wealth-maximization principle? Yes, we can!
9. What is the hypothesis of capital market efficiency?
10. Does dilution in equity financing diminish the wealth of pre-existing shareholders? No! Why not?
11. What is a common-share “rights” offer? Does it diminish pre-existing shareholder wealth? No! Why not?
12. Can we determine fractional ownerships in private equity financing? Yes, we can!

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(8.1) Introduction

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Legal “incorporation” creates a corporation with *common* and possibly *preferred shares* as its first financial assets. Thereafter, the corporation can enter into legal agreements required for sale of other financial assets (like, for example, debt).

Based on their best business judgment, a board of directors can cut or eliminate preferred or common share dividends (if they exist) and equity holders cannot sue the firm (generally). Because a corporation does not contractually *guarantee* dividends, they are neither a corporate expense nor tax deductible. On the other hand, “debt” is that financial asset class that makes contractually promised payments. Creditors can sue the borrower and seek remedy for default of payments and, thus, interest is a tax-deductible expense of a corporate borrower.¹

This chapter investigates equity financial assets. We describe the general characteristics of preferred and common shares in section (8.2). We study valuation of preferred and common shares in section (8.3). We discuss the efficient markets hypothesis, which is central to understanding how public financial markets function, in section (8.4). Section (8.5) presents the ways in which firms sell new common shares for the purpose of business financing for both public and private companies. Section (8.6) ends with a summary.

¹Interest is sometimes deductible for natural individuals. For example, if you borrow to invest in a common share, the interest you pay is tax deductible because the purpose of the investment is to earn (possibly) dividend income. On the other hand, funds you borrow for your *home* mortgage in Canada are not tax deductible because the purpose of the borrowing is not to earn income.

(8.2) Equity

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Incorporation creates a firm as a legal individual. This process also creates at least one share class. If you own a share from any class, you are a shareholder. In addition, you might be identified by the share class you own. If a share class has preferential dividend or liquidation treatment, that share class is “preferred” and you are a preferred shareholder. The share class for which there is no dividend or liquidation preference is the common share and you are a common shareholder. If the firm has only one share class, you are simply a shareholder.

A firm can have multiple common or preferred share classes. For example, a firm might have two classes of common shares (that differ with respect to voting rights, for example). There is no limit (other than administrative burden) to the number of share classes that a firm can have. If there are multiple share classes, incorporation articles (that is, the legal documents that create a corporation) describe the classes, any maximum number of shares that the firm can issue, and the rights, privileges, restrictions, and conditions attached to each class. Because any shareholder has access to incorporation articles that set out this information, each shareholder is aware of his/her position relative to other share classes.

Corporate legislation requires equality of rights, privileges, and restrictions for any shareholder within a class. For example, a corporation must give shareholders within a class the same dividends and voting rights, both per share. A firm cannot pay a dividend to a shareholder without paying the same dividend to all shareholders of that class. There is no explicit monitoring within a firm to ensure that a corporation observes shareholder rights relative to other classes. A shareholder must enforce his or her rights as an individual. On the other hand, in the case of a bond (see chapter 7), there is normally a bond trustee for each bond issue who monitors corporate activity to ensure that it does not violate bondholder rights. After incorporation, if a firm creates a new share class, it amends its incorporation articles. Approval for a new class can require a vote from pre-existing voting share classes.

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An important aspect of share ownership is limited liability. Because a firm is a legal individual, shareholders cannot be held responsible (with rare exceptions) for any liability, act, or default of the corporation. This share-ownership feature facilitates transferability and the sale of new shares to new shareholders (equity financing).



Debt and Equity Differences: 5 Minutes

8.2.1 Dividends

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The only direct payment (generally) between a firm and its shareholders is dividends. At a regular meeting (by law at least once a year but for most public companies, quarterly), the board of directors decides whether to pay dividends on a share-class and the dividend amount. For a public company, there are four dates associated with a dividend payment. In chronological order, these dates are:

- 1) declaration date,
- 2) ex-dividend date,
- 3) record date,
- 4) payment date.

The directors make dividend decisions for all share classes. If directors call for a dividend, they are “declared.” The declaration date, therefore, the same as the date of the board meeting. At this meeting, the board of directors also set the *record date* and the *payment date*. The following table gives these dates for 2018 and Q1 2019 for TD bank common shares:

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Dividends and Dividend Dates for Fiscal 2018 and Q1 Fiscal 2019

Amounts and dates subject to declaration by the Board of Directors:

Declaration Date	Ex-Dividend Date	Record Date	Payment Date	Dividends Declared	Dividend Re-investment Plan Discount
November 30, 2017	January 9, 2018	January 10, 2018	January 31, 2018	C\$0.60	0%
March 1, 2018	April 9, 2018	April 10, 2018	April 30, 2018	C\$0.67	0%
May 24, 2018	July 9, 2018	July 10, 2018	July 31, 2018	C\$0.67	0%
August 30, 2018	October 9, 2018	October 10, 2018	October 31, 2018	C\$0.67	0%
November 29, 2018	January 9, 2019	January 10, 2019	January 31, 2019		

The record date establishes a cutoff date to determine which investors receive dividends and which do not. If you are a shareholder of record (i.e., your name appears in the shareholders' registry) on the record date, you are entitled to receive the declared dividend. The record date is approximately four weeks after the declaration date. Because you are a registered shareholder (which means that you are in possession of the certificate that identifies you as a shareholder), the firm knows who you are (your name appears on the shareholder registry) and you receive your dividends directly through the mail (or possibly direct deposit into a bank account). The payment date is the date that appears on the dividend cheque, which is the date that the cheque is mailed. The payment date follows the record date by about three/four weeks. Below is an example of a dividend cheque received by the author. Yes, it is a real dividend cheque (actually, a preferred share cheque)! How many preferred shares did I own?

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Exhibit 8-0: A Dividend Cheque

GULF CANADA RESOURCES LIMITED
RESSOURCES GULF CANADA LIMITÉE
SENIOR PREFERRED SHARES, SERIES 1
ACTIONS PRIVILÉGIÉES DE RANG SUPÉRIEUR, SÉRIE 1

CHEQUE NO. / N° DE CHEQUE: 00283619
REF: BLAZEN2GEG6W002
DAY MONTH YEAR / JOUR MOIS ANNÉE: 12/09/00
RECORD DATE / DATE D'INSCRIPTION: 31/08/00
SHARES HELD / ACTIONS DÉTENUES: 10
CITY: CALGARY, ALBERTA
PER SHARE / PAR ACTION: \$0.25

PAY / PAYER: *****0 DOLLARS 25 CENTS *****0.25

TO THE ORDER OF / À L'ORDRE DE:
*GEORGE WILLIAM BLAZENKO
608 DECKER PLACE
COQUITLAM BC V3C 5W7

Non-Resident Tax withheld where applicable
Cet impôt a été retenu de vos dividendes si vous êtes résident étranger

MONTREAL TRUST COMPANY
COMPAGNIE MONTREAL TRUST
DIVIDEND DISBURSING AGENT
AGENT PAYEUR DE DIVIDENDES

THE BANK OF NOVA SCOTIA
LA BANQUE DE NOUVELLE-ÉCOSSE
CALGARY, ALBERTA

AUTHORIZED OFFICER / AGENT AUTORISÉ: [Signature]

⑈00 28 36 19⑈ ⑆60889⑈00 2⑆ 00 106⑈18⑈

In addition to the record date for registered shareholders (who tend not to trade their shares), there is also a cutoff date for shareholders who hold their shares in *street* form. If you hold your shares in street form, your name does not appear on the shareholders' registry. The corporation paying dividends does not know who you are (generally). The firm knows only that there is an investor (or investors) with an investment account at a particular investment dealer who own shares (beneficially). The issuing firm sends dividends to the investment dealer by wire on the payment date and the investment dealer then deposits dividends to your account. The declaring firm often announces dividend information in the financial press. Exhibit 8–1 is a typical dividend announcement, which appeared in *The Globe and Mail* on February 28, 1996.

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Exhibit 8-1: Dividend Advertisement

Settlement on the Toronto Stock Exchange is a maximum of two trading days by regulatory requirement but it is one trading day for most common shares in practice (see TD dividend announcement above). Settlement is the date that shares and cash *actually* trade hands in a secondary market trade for common shares (which has been negotiated but not completed a trading day previously). For example, if you buy a share on a Monday, the funds do not come out of your account and you are not the *beneficial* owner of the shares until Tuesday. You take ownership of the shares and have the rights and benefits of ownership only on the settlement date. As an illustration of the notion of beneficial ownership, you cannot vote your common shares until Tuesday at mid-night. If a share (common or preferred) pays a dividend around the time you purchase it, the exchange on which you trade must decide who receives the dividend (you or the investor from whom you purchased the share). The *ex-dividend* date is set by the exchange as one trading days prior to the date of record, inclusive. Ex-dividend means *without dividend*. As an example, suppose that the record date for a dividend is Tuesday. The ex-dividend date is then Monday. If you buy the share on Monday, you do not receive the declared dividend because settlement is not until 12pm on Tuesday so that you do not own the shares until then and, thus, cannot become registered to receive the dividend directly from the company by Tuesday. On the other hand, if you had bought the share on the previous Friday (and hold til at least Monday), you do receive the dividend because you could if you wanted become registered to receive the dividend

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directly from the company (as long as your name appears on the shareholder registry by Tuesday). For short, investors call the ex-dividend date, the “ex-date.”

There are two typical classes of equities: preferred shares and common shares.

8.2.2 Preferred Shares

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There are two senses in which preferred shares are “preferred” over common shares. First, the dividends of preferred shares have a dividend payment preference over common shares. The board of directors cut the dividends on common shares to zero before they cut or eliminate the dividends on preferred shares. Second, preferred shares have a payment preference over common shares in the liquidation of a business. In an orderly liquidation, the priority of claimants on business assets is: lawyers and accountants who administer the liquidation, tax liabilities, secured creditors, unsecured creditors (including customers, suppliers, employees), preferred shareholders, and, last, common shareholders.

Unless the incorporate articles provide for an alternative vote distribution in a firm, each corporate share (including preferred shares) entitles the holder to one vote at a meeting of shareholders. However, typically, the articles of incorporation are written in such a way that the voting rights on a preferred share are suspended unless the firm fails to make dividend payments at a prescribed rate for a stated number of quarters. In addition, preferred shares often have a cumulative feature. This feature requires that dividends which are in arrears (i.e., have not been paid because of poor operating performance of the firm) must be made up to preferred shareholders before common shareholders receive dividends.

While dividends on a preferred share are not contractually guaranteed, they do provide for a regular dividend. Under normal circumstances, the board of directors declares a dividend. Exhibit 8-2

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describes some fixed rate preferred shares that traded on the Toronto Stock Exchange as of December 2013. As an example, CIBC has a 5.75% non-cumulative (N/C) preferred share that pays a \$1.44 per year. This amount is constant and does not vary year to year. Under normal circumstances, the firm pays this dividend regardless of the operating performance of the firm. For example, even if operating performance for a year is exceptionally good, preferred shareholders receive a dividend no greater than \$1.44. There is typically no maturity for a preferred share (or a common share). The firm pays (but does not guarantee) dividends indefinitely. In liquidation, the par-value (generally \$25) is the maximum claim payable on a preferred share.

8.2.3 Common Shares

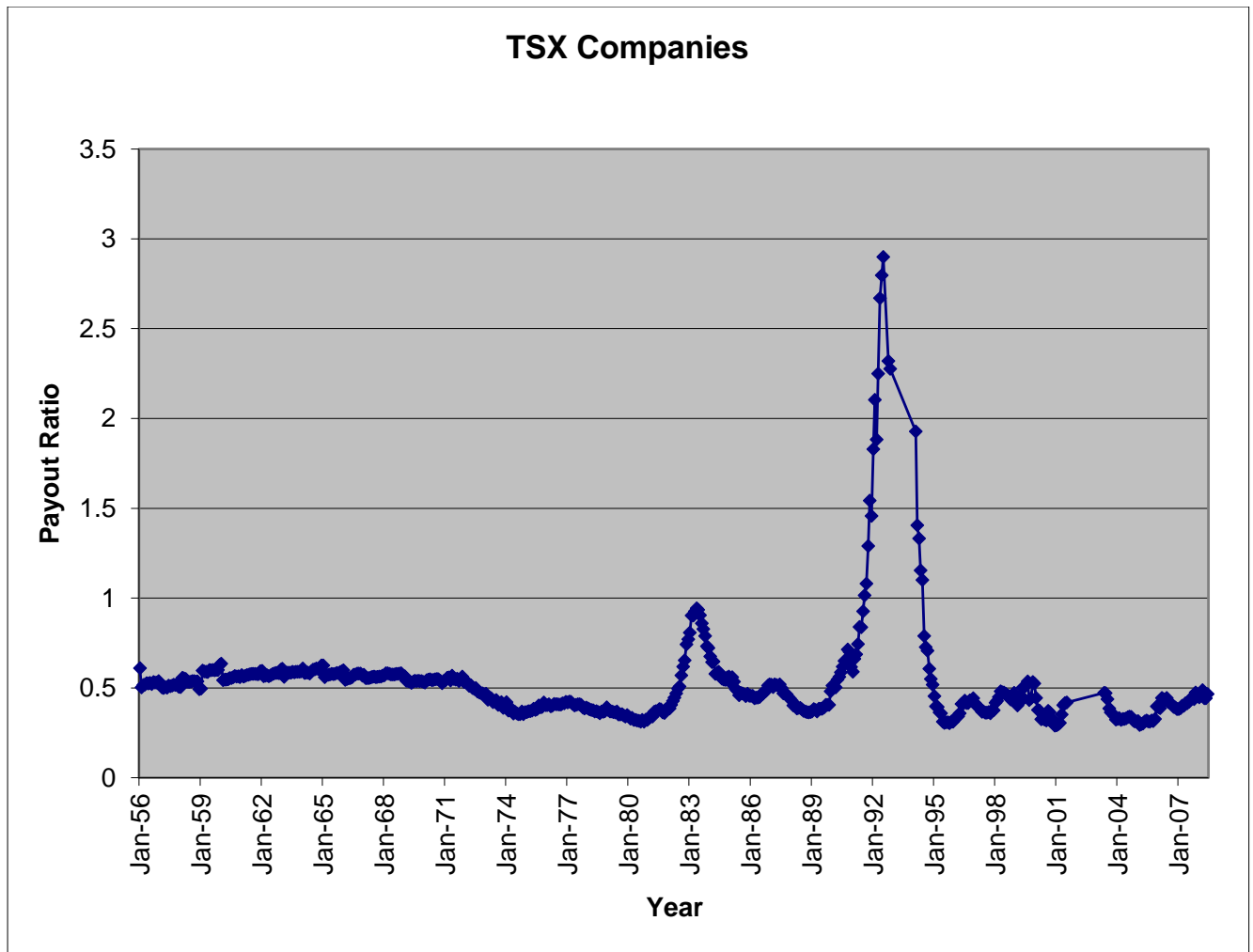
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A common share is that corporate share class (that must exist) for which there is no dividend or liquidation preference: common shareholders are the *residual* claimants in the firm. Being residual has advantages and disadvantages. If the firm survives and prospers and earnings grow, it can pay higher dividends to common shareholders. The amount of these dividends is not prescribed but they tend to increase with corporate earnings. On the other hand, in liquidation, employees, the government, suppliers, creditors and preferred shareholders all receive distributions on their claims before “leftovers” are available for common shareholders.

The following chart displays the ratio of dividends to earnings (the payout ratio) by year for the aggregate of Toronto Stock Exchange (TSX) firms from 1956 to 2007 (the data is from the CANSIM database maintained by Statistics Canada). For years other than the early 1990s, this ratio is remarkably stable at about 40 to 50%. This stability indicates that shareholders do indeed share in corporate earnings growth. Dividends (at least on average) keep pace with earnings for TSX firms. The high payout ratio in the early 1990s reflects the tendency of firms to maintain dividends even in the face of low earnings during an economic recession.



(8.3) Equity Valuation

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Equity promises dividends when and if declared by the board of directors. As a shareholder, the only thing of value you ever received from a firm (at least directly) is dividends². These might be

²Firms sometimes make distributions to their common shareholders of other financial assets: like a preferred share. Also, sometimes corporations buy back their own common shares from shareholders. However, if the stock market values shares based on future dividend potential, then the cost to the firm of this purchase is the discounted value of

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regular dividends, special dividends, or even liquidating dividends. The implication of this observation is that the ultimate source of share value is dividend paying potential. Even if a corporation is not currently paying dividends, common shares still have value because of future dividend potential.

Of course, the ability of a firm to pay dividends depends upon its earnings but, nonetheless, the direct link between a firm and its shareholders is dividends. Because the only promised payments from a firm to shareholders are dividends, discounted cash flow analysis requires we value a share by discounting predicted future dividends. This application of DCF for share valuation is the *discounted dividend model* (DDM). Most equity analysts, explicitly or implicitly, along with other analysis, use the DDM to value shares, form portfolios, and recommend investments to clients.



The Discounted Dividend Model (DDM): 8 Minutes

8.3.1 Fixed Rate Preferred Shares

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Preferred-shares typically have a par-value, which is often \$25 for Toronto Stock Exchange traded preferred-shares. Preferred share par-value is less important than a bond's par-value. Loosely speaking, par-value of a bond is principal repayment at the maturity of the bond. On the other hand, for a preferred share (and for a common share as well), there is typically no maturity, which

expected future dividends per a remaining share. Thus, theoretically, when a firm buys back its own common shares, it neither increments nor decrements share-price.

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means that par-value is never “repaid” in normal circumstances. As the table below illustrates, preferred shares can trade at either a premium or a discount to par-value. However, because a preferred share has no maturity, we have no expectation, at least in the first instance, that a preferred share premium or discount will dissipate. This is very different from a discount or premium for a bond that we expect to dissipate as maturity approaches (see chapter 7).

Par-value is part of the dividend calculation for a preferred share. Investors identify fixed rate preferred share by their rate. Multiply this rate by par-value to find the annual dividend: typically paid quarterly. The preferred share dividend rate is part of the identifier for each of the preferred shares in the table below. The CIBC N/C 5.75% SR-26-A preferred share has a per annum dividend rate of 5.75% and, thus, the per annum dividend is $0.0575 \times 25 = \$1.4375$ paid quarterly.

Many preferred shares offer a fixed dividend per quarter indefinitely³. Dividends continue as long as the issuer's earnings ability is not impaired. Abstracting from possible non-declaration, a preferred share is a perpetuity of dividend payments.

As an example of preferred share valuation, suppose that a preferred share offers a quarterly dividend of \$1.00 per share and that the preferred share has just made a dividend payment. You have determined from your observation of the preferred share market that the opportunity cost rate of return for shares in the same risk class is about 2.5% per *quarter*. What is its value? Using the present value formula for a perpetuity of payments, the value of the preferred share is $\$1.00 / 0.025 = \40 per share.

What is your expected rate of return on a preferred share purchase? Because you expect dividends to remain constant into the indefinite future, the capital gain component of your expected rate of return is likely minimal. Let us suppose that it is zero. All your expected rate of return is in the form of income. Income on a preferred share is dividends. Your expected rate of return is the

³ Some preferred shares are “floating rate,” which means that the dividend-rate adjusts periodically (usually at month-end) for changes in interest rates in the economy. On the other hand, many recent issues of preferred shares have “reset clauses,” where the dividend-rate adjusts upwards or downwards over a longer interval depending upon whether a benchmark interest rate in the economy has increased or decreased. The reset period is usually five years: so, the dividend-rate adjusts every five years but is fixed within any five-year period.

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dividend yield calculated as the promised dividend on the share divided by the current market price. In the above example, your expected rate of return is: $\$1.0/\$40.0 = 2.5\%$ per quarter. So, in normal circumstances, the opportunity cost rate of return for a preferred share—your expected rate of return—is dividend yield.

The following exhibit describes a sample of Toronto Stock Exchange trades for fixed rate preferred shares on December 4, 2013. Notice that the dividend yields vary from 4.7% per annum to 11.4% per cent, which reflects, by and large, variation in the credit worthiness of the issuers.

Exhibit 8-2
Fixed Rate Preferred Share Trades: December 4, 2013

Preferred Share	Price/share	Annual Dividend	Par-Value	Dividend Yield
CIBC N/C 5.75% SR-26-A PF	25.65	1.44	25	0.056
CO-OP Gen 7.25%-E S-D PFD	25.50	1.81	25	0.071
Power Financial 4.8%-S PF	23.30	1.20	25	0.052
SHAW COMM 4.5% CL-2-A PF	23.01	1.13	25	0.049
RONA 5.25% S6-A PFD	20.26	1.32	25	0.065
Atlantic Power 4.85% S1 PFD	10.61	1.21	25	0.114
CDN West. Bnk 7.25%-S3 PF	25.60	1.81	25	0.071
Brookfield Office-AAA-L PF	25.83	1.69	25	0.065
Dundee Corp 6.75% S2 PFD	25.70	1.69	25	0.066
Manulife Fin. 4.2%-1 S3 PF	22.34	1.05	25	0.047
Nat. Bnk Can S16 4.85% 1pf	25.30	1.21	25	0.048



Preferred Shares: 8 Minutes

8.3.2 Ex-Dividend Share Price Changes

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There are no “accrued dividends” for shares in secondary market trading similar to accrued interest in the bond market. Accrued dividends cannot exist because dividends are not known until declared by the board of directors, and declaration is only shortly prior to the ex-date. There is a considerable period immediately after an ex-date, but before the next dividend declaration, that investors do not know the amount of the upcoming dividend. If investors do not know the dividend amount, then, one cannot calculate “accrued dividends.” Because there are no accrued dividends, other things equal, prices of preferred and common shares increase up to the ex-date. If you buy the share the day before the ex-date (and hold to at least the ex-date), you receive the declared dividend. If you buy the share on the ex-date, you buy the share without the dividend (which is why it is called the ex-dividend date). Consequently, share price should fall by the dividend amount (ignoring tax effects and other things equal) on the ex-date.

As an example, suppose that a preferred share offers a quarterly dividend of \$1.00 per share. You have determined, from your observation of the preferred share market, that the dividend yield for shares of about the same risk is 2.5% per quarter. Today is the ex-dividend date for a recently declared dividend. Therefore, the next dividend is in one quarter. The price of the preferred share is $\$1.00/0.025 = \40 . Now suppose that one quarter passes, general interest rates in the economy are unchanged and the credit worthiness of the preferred share issuer does not change. The price of the preferred share is now $\$1.00 + \$1.00/0.025 = \$41.00$. Tomorrow, on the ex-date, the share will trade for \$40.

Why does the share price fall when an issuer pays a dividend? If dividends are the source of value for shares, should not share prices increase when issuers pay dividends? To answer these questions, first recognize that share values are based on *expected* future dividends. If dividend expectations increase, the price of the share will increase. This increase is not inconsistent with a fall in the value of share when a dividend is paid. The composition of your wealth changes as the result of a

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dividend payment, but the level of your wealth does not. The day before the ex-div date, your wealth (as it is represented in your investment in one preferred share) is \$41. On the ex-date, your wealth is the \$1.00 cash (to be received shortly, in fact) plus a share, which is now worth \$40. The sum of these two amounts is \$41, which is the same as your wealth immediately prior to the ex-date.



Ex-Date Share-Price Changes: 9 Minutes

8.3.4 Common Shares

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Valuation of common shares is more difficult than valuation of bonds or preferred shares for two reasons. First, the cash flows in the numerator of discounted cash flow analysis are more difficult to predict. Exhibit 8-2 illustrates that dividends depend on earnings. Because corporate earnings are difficult to predict, future dividends are also difficult to predict. Second, the market capitalization rate (your expected rate of return if you buy a common share; the “denominator” of discounted cash flow analysis) is also more difficult to determine. Because of the variability of stock market returns is so great, recent past performance of an individual share or even a portfolio of common shares is inadequate to forecast future performance. The determination of what might be an appropriate opportunity cost rate of return for common shares requires a long-term historical perspective on the stock market and/or reliance on financial theory. In particular, if one is willing to assume constant growth, in later analysis, we give several expressions investors can use with only investment industry observable measures to calculate expected common-share return.

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The *market capitalization rate* (MCR) is the opportunity cost rate of return for common share valuation that we occasionally referred to as the *required rate of return*, *expected rate of return*, *the equity cost of capital*, or the *equity discount rate*. The DDM discounts forecast future dividends indefinitely at the market capitalization rate.

8.3.5 Constant Growth DDM

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If you expect constant indefinite growth, then, you can value a common share with the present value of a growing perpetuity formula. Suppose a company makes year-end growth investments equal $g\%$ of beginning of year invested capital, indefinitely. This presumption is appropriate only for firms with a number of common features: mature rather than new-ventures, profitable rather than unprofitable, and, large rather than small (because they have undertaken successful past business endeavors). In addition, we also restrict our analysis to public rather than private firms to access public corporate information. Last, often, although not always, firms we investigate pay dividends currently over a regular interval (for example, quarterly).⁴ This class of corporation represents most of the largest and most important economic businesses in our world economy.

The constant growth DDM for common share valuation was first popularized by Gordon (1962) and, thus, is often called the *Gordon Growth Model*. However, it originates with a PhD dissertation and subsequent book by John Williams (1938). We expand their analysis (which is rather dated now) in the current chapter to make it useable/practical for both business persons and investors in ways that neither Gordon nor Williams would have imagined possible. The application short-coming of Gordon (1962) and William (1938) is that they presume the existence of an opportunity cost rate of return for common share valuation from an unidentified external source, like, for example, one's understanding of historical financial-market average rates of return or possibly

⁴ In section 8.3.14 we investigate how to calculate expected common share return for a company that does not currently pay common share dividends.

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some type of statistical estimation. Then, one discounts forecast future growing dividends to determine an appropriate share value.

Alternatively, we postulate that investors use a rate for this discounting (without knowing its amount in the first instance) to arrive at realized share prices. Then, with (and only with) market observables based on share-price (thus determined) and a modeling presumption for investor discounting, we calculate the rate investors have hypothetically employed to arrive at share-prices. This opportunity cost rate of return is *implied* by a combination of observables in stock-market trading and our investor-modeling for common-share pricing (the Gordon/Williams dividend growth model). Being able to calculate an opportunity cost rate of return is invaluable for both financial analysis and investing.

Sometimes, especially for corporations with high growth rates, financial analysts use two-stage (or even multiple-stage) growth modeling techniques.⁵ However, the advantages of a calculated rate of return far outweigh (in my view) specification error we might adopt. There are statistically demanding methods (for example, Fama and French, 1992) to *estimate* an expected rate of return for common shares, but Fu and Blazenko (2017) show that portfolios of common shares selected with implicit constant growth modeling have statistically better portfolio performance measures (the realized Sharpe ratio). They conclude that estimated expected equity returns with time-series estimation methods (monthly returns generally over a past historical period) are dated by the time of portfolio formation compared to the implicit constant growth expected returns we study in the current chapter (that use current/timely analysts' forecasts).

If one is willing to presume constant growth, we can develop a number of expressions for expected return.⁶ With observable ratios/measures from the investment industry we can use any of these

⁵ Dynamic two-stage growth modeling makes more economic sense than does static two stage-growth modeling. For example, Blazenko and Pavlov (2009) develop a two-stage growth model in which business managers indefinitely suspend/restart growth-investment upon stochastically inadequate/adequate profitability. They determine value-maximizing hurdle rates managers should adopt to make this decision. In this case, expected common share return has a "real-options" component that requires a corporate-profitability statistical-variance estimate. This type of modeling is most applicable to firms in financial distress (or at risk of financial distress). We do not investigate this type of firm in this chapter. Fu and Blazenko (2015) argue that it is the real-options character of firms in financial distress that gives them *low* rather than high average rates of return that one might expected in the first instance.

⁶ If an investor is not willing to assume constant expected growth, then other more general asset pricing models are available that in application require statistical estimation. These other asset pricing models include the Capital Asset

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expressions to *calculate* an expected return. Being able to calculate an expected return is invaluable for being a good investor and without an expected return you are at danger of being an inept investor. Coupled with risk measures that we study in Chapter 11, you can then design optimal common equity portfolios that maximize expected return relative to the risk you bear. From a portfolio perspective, this analysis answers the question: “Is this a good common equity investment?” The expected return expressions we develop are theoretically identical and with consistent inputs they generate the same numeric value. With inconsistent inputs from the investment industry (which is possible and likely), they generate differing expected return values. As you develop your financial judgment with these expressions, you will learn that each has application advantages and disadvantages for application.

The constant growth presumption does not guarantee that a firm grows at a constant rate, g . There can be significant and unexpected variability in yearly growth rates. For example, the fact that a firm’s revenues fall by 50% or increase by 50% does not invalidate the constant expected growth presumption. After either of these unexpected events, we, nonetheless, expect future constant growth thereafter. *Expected* growth rather than realized growth is constant.



Constant Growth DDM: 24 Minutes

Pricing Model (CAPM) developed independently by Sharpe (1964), Lintner (1965), Mossin (1966), and Jack Treynor and the Arbitrage Pricing Theory (APT), proposed by Ross (1976) and implemented recently by Fama and French (1992). Treynor’s manuscript was never published, but a version edited by French (2002) is available at SSRN: <http://ssrn.com/abstract=628187>. Haugen and Baker (1996) estimate expected returns for individual companies with cross-sectional regression analysis over the 3000 companies in Russell 3000 index for dozens of corporate financial, accounting, and market based explanatory variables. They find that high expected and realized returns associate with low rather than high risk. They argue that this result is inconsistent with the Efficient Markets Hypothesis (EMH) that we discuss later.

8.3.6 What About Capital Gains?

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Is the discounted dividend model for share valuation inappropriate, misleading, or wrong because it focuses on dividends and ignores capital gains? Most investors purchase common shares for expected capital rather than immediate dividends. What happened to capital gains in the discounted dividend model?

The answer to this question is that the discounted dividend model does not ignore capital gains. They are hidden, but they are there. Capital gains are implicit in the growth of dividends over time. If dividends grow, you can sell shares at a greater price at the end of your holding-period (other things equal) because the purchaser recognizes the value of greater dividends that they anticipate receiving. In other words, a portion of your common share expected rate of return is in the form of income (dividends) and part is expected capital gain.

More formally, if we expect dividends to grow by a factor of "g" per period, if "r" is the market capitalization rate per period (your expected rate of return if you buy a common share), if $r > g$ (because $D > 0$), and if the expected dividend in one period is "D," then share price, P_0 , is,

$$P_0 = \frac{D}{r - g} \quad (8.0)$$

Rearrange this equation:

Market Capitalization Rate = Expected Return =

$$r = MCR_{dy+g} = \frac{D}{P_0} + g = dy + g, \quad (8.1)$$

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where dy is the forward dividend yield, $dy = \frac{D}{P_0}$ (dividend forecast one period from today divided

by share price). Dividend yield is the income component of your expected rate of return. The capital gain component of your expected rate of return is "g," which is dividend growth.



**Forward Dividend-Yield
is MCR less Growth: 3 Minutes**

As an example, suppose that a firm has just made a dividend payment: today is the ex-date. The dividend expected in one quarter is \$1. You expect dividends to grow at the rate of one percent per quarter. You have determined that the market capitalization rate for this common share is 10% per annum compounded quarterly. Your best estimate of the value of the share is, therefore, $\$1.00 / (0.025 - 0.01) = \66.67 . Suppose that you purchase this common share for \$66.67, hold it for exactly one quarter, receive the dividend at that time and then immediately sell the share. What are the dividend and capital gains components of your expected rate of return?



**Expected Common Share Rate of Return
in the Constant Growth DDM: 3 Minutes**

First, the expected sale price of the share in one quarter, immediately after the dividend payment is: $1.01 / (0.025 - 0.01) = \67.33 (the "hypothetical" here is that interest rates do not change, the

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risk of the firm does not change, and the earnings ability of the firm does not diverge from expectation). The number 1.01 is in the numerator of this expression rather than \$1, because the second dividend is 1% greater than the first. The capital gains component of your return over the quarter, is therefore, $(67.33 - 66.66)/66.66 = 1\%$. This result verifies that your expected capital gain is equal to the quarterly dividend growth factor. In addition, the dividend yield is $\$1/66.67 = 1.5\%$. The sum of the dividend yield and the expected capital gain is: $0.015 + 0.01 = 2.5\%$ per quarter, which is your expected rate of return.



**Corporate Growth Versus
Growth in Shareholder Wealth: 6 Minutes**

8.3.7 Common Share Expected Return Determinants

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Financial markets determine expected returns for any financial asset. Therefore, the determinants of the market capitalization rate, the expected return on a common share, are the same as for any other financial asset: interest rates in the economy and risk. We know from our analysis in chapter three that firms with greater operating leverage and financial leverage are more risky as equity investments. We expect firms with greater operating or financial leverage to have greater expected rates of return to compensate shareholders for this risk that they bear. The way that this process takes place in financial markets is that more risky common shares, other things equal, have lesser prices, which increases their expected returns. There are other aspects of equity risk, especially portfolio related risk, but we study these more advanced aspects of risk in chapter 11.

8.3.8 Earnings, Dividends, and Growth

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The discounted dividend model (DDM) we have studied so far is rather superficial because it makes explicit neither the relation between dividends and earnings (the source of corporate dividend paying ability), nor corporate profitability as a growth determinant. The primary forecast in the investment industry is for earnings per share (EPS) rather than dividends directly. So, we have to work with earnings forecasts as our primary equity-valuation input and forecast dividends indirectly. Exhibit 8-2 illustrates that dividends indeed depend on earnings (at least generally).

Let E be expected per annum earnings per share of a firm in the upcoming year. Because investors predict these earnings, we refer to them as *forward* earnings. As an example, suppose that forward earning per share E is \$3.50. These are earnings per share in the upcoming year. Earnings for years thereafter will be higher by a growth factor as we will discover.

One way (in fact, the primary way) a firm can finance required incremental growth investment is to retain earnings rather than pay dividends. Let b be the retention ratio:

$$b = \frac{\text{earnings} - \text{dividends}}{\text{earnings}} = \text{retention ratio}$$

Suppose that the firm under investigation has a retention ratio of 60%. This number means that for every dollar of earnings available for distribution to shareholders, the firm distributes 40 cents as a dividend to shareholders and retains 60 cents for business reinvestment and growth. The firm's *payout ratio* is 40%.

$$1 - b = \frac{\text{dividends}}{\text{earnings}} = \text{payout ratio}$$

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Rearrange this equation to find that a dividend/share forecast is an earnings per share forecast times the payout ratio:

$$D = (1 - b) * E$$

So, if forecast earnings/share in the upcoming year is \$3.5, then a dividend per share forecast is $0.4 * 3.5 = \$1.4$.



Forecasting Dividends from Earnings: 8 Minutes

The forward rate of return on equity, “ROE,” is the business return (per annum) that investors expect from a firm per incremental dollar-investment by a firm for shareholders (that is, book equity). The source of this shareholder investment might be direct if the firm sells new shares in a primary market sale or, indirect, through retained earnings. The sum of these two amounts, share capital and retained earnings, is book-equity. If, for example, ROE is 20% per annum, then an incremental dollar invested into business activity by the firm for shareholders generates expected earnings of \$0.2 per annum indefinitely.

If a firm has a retention ratio of “b” and a forward rate of return on equity of “ROE,” the rate of growth of, (1) book equity, (2) ex-dividend share price, (3) dividends, (4) earnings, (5), sales, (6) book assets, (7) debt, (8) CAPX, and (9) Trade Capital (TC) are all equal to:

$$g = \text{growth factor} = b \times ROE \quad (8.2)$$

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Sustainable Growth: 5 Minutes

This growth factor is sometimes called a firm's sustainable growth, because it is the rate at which a firm grows without changing any of its fundamental financial ratios. On the other hand, if sales growth is faster (or slower), then one or more of the firm's fundamental ratios changes. In particular, often, in this case, a firm's financial leverage increases or decreases.

To understand why corporate growth is equal to this product, let us consider possible extremes for a firm's retention ratio. If the firm's retention ratio is zero, growth in equity must be zero because the firm retains no earnings for reinvestment. On the other hand, if the retention ratio is 100%, then the rate of growth of equity is ROE because all earnings are retained within the firm. Intermediate to these two extreme cases, the rate of growth of equity is the retention ratio times the rate of return on equity. Other things equal, the greater is retention or the higher is ROE, the higher is corporate growth. For the firm in the above example, its growth factor is $0.60 \times 0.2 = 12\%$ per annum.

In the constant growth discounted dividend model, we expect almost all corporate characteristics to grow at the sustainable growth rate: $g = b * ROE$: dividends, earnings, book value of assets, book value of equity, invested capital, EBITDA, sales, debt, and the ex-dividend share price. The primary exception to this observation is that we expect shareholders' wealth to grow at the market capitalization rate, MCR. Since, expected return upon purchasing a common equity, the MCR, is dividend yield plus growth, $MCR = dy + g$, the expected growth of shareholder wealth is faster than dividends, $MCR > g$.

We now have enough information to value a share in this firm using the constant growth discounted dividend model. Suppose the $MCR = r = 15\%$ per annum. Then, share-price, P_0 , is

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$$P_0 = \frac{D}{r-g} = \frac{(1-b) \times E}{r - b \times ROE} \quad (8.3)$$

$$= \frac{(1-0.6) \times 3.5}{0.15 - 0.12} = \$46.67$$

If you buy a common share in this company at \$46.67, your expected rate of return is 15%. This rate of return is composed of a dividend yield of $1.4/46.67 = 3\%$ per annum and an expected capital gain of 12% per annum (the corporate growth rate). Equation (8.3) says that share price depends on interest rates in the economy and risk, through the market capitalization rate, r , the earnings ability of the firm, E , and future growth prospects, $g = b * ROE$.

8.3.9 Price Earnings Ratio

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One of the most commonly used “value” ratios in the investment industry is the price/earnings ratio (the P/E ratio), which measures the amount that investors pay for a dollar of earnings. Of course, this is only “loosely speaking” because shareholders never receive earnings from a corporation. They receive dividends and only dividends.

Because expected common-share rate of return (MCR) is not directly observable in financial markets, investors often use “value” ratios to try to identify what they believe might be “cheap” or “expensive” common shares for their portfolios. We know, however, that this is crude and rudimentary financial analysis. What constitutes “cheap” versus “expensive” can only be determined in a portfolio context after having calculated expected common share return and incremental portfolio risk. We will not complete this more appropriate (but also more exacting) analysis until Chapter 11 of this E-Finance book. We begin this analysis in the current chapter by calculating expected common equity return with observables from the investment industry.

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Typical values for a P/E ratio range from a low of about 5 to a high of about 40. Keep in mind, however, that there are real economic reasons why a firm might have a high or low P/E ratio. The principal economic determinant of P/E ratios is corporate growth. Firms with good growth prospects have high P/E ratios. Firms with poor growth prospects have low P/E ratios.

What are all the determinants of a P/E? We can use equation (8.3) to answer this question.

Divide both sides of equation (8.3) by earnings, and you get the price to forward earnings ratio,

$$\frac{P_0}{E} = \frac{(1-b)}{r-b \times ROE} \quad (8.4)$$

The right hand side of equation (8.4) identifies the determinants of a firm's P/E ratio:

- (a) interest rates in the economy
- (b) risk of the particular firm in question
- (c) growth

When interest rates are high (in particular, real interest rates), the denominator of equation 8.2 is relatively high, and the firm's P/E ratio is relatively low (ignoring the impact of interest rates on earnings). When interest rates are high, prices of all financial assets tend to be low, and so the price that investors pay for a dollar of current earnings is also lower. When the risk of the firm in question increases, the discount rate in the denominator of equation (8.4) increases and the P/E ratio falls. When risk increases, investors pay less for any financial asset. When expected future growth of a firm increases, the denominator of equation (8.4) decreases, and so the P/E ratio increases. If a firm is expected to grow rapidly in the future, investors might be willing to pay a steep price for future prospects even though the current earnings of the firm might not be high. Small firms tend to have higher growth prospects than do larger firms, so small firms tend to have larger P/E ratios than large firms. High-tech firms tend to have strong growth prospects, and so also they tend to have high P/E ratios compared to an average industrial firm.

The P/E ratio in equation (8.4) uses expected future earnings: forward earnings. In practice, a P/E ratio is often calculated using the past year's earnings. Past earnings can be positive, negative, or

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zero. The implication of this observation is that the P/E ratio becomes unstable when current earnings approach zero and undefined when current earnings become negative.



The Price to Forward Earnings Ratio: 7 Minutes

Note that the numerator of Equation (8.4) is the payout ratio and the denominator (expected return less growth) is the forward dividend yield. Therefore, the price to forward earnings ratio is the ratio of two ratios: the payout ratio and the forward dividend yield,

$$\frac{P_0}{E} = \frac{1-b}{dy} = \frac{\text{payout ratio}}{\text{dividend yield}} \quad (8.5)$$

In our example, the price to forward earnings ratio is,

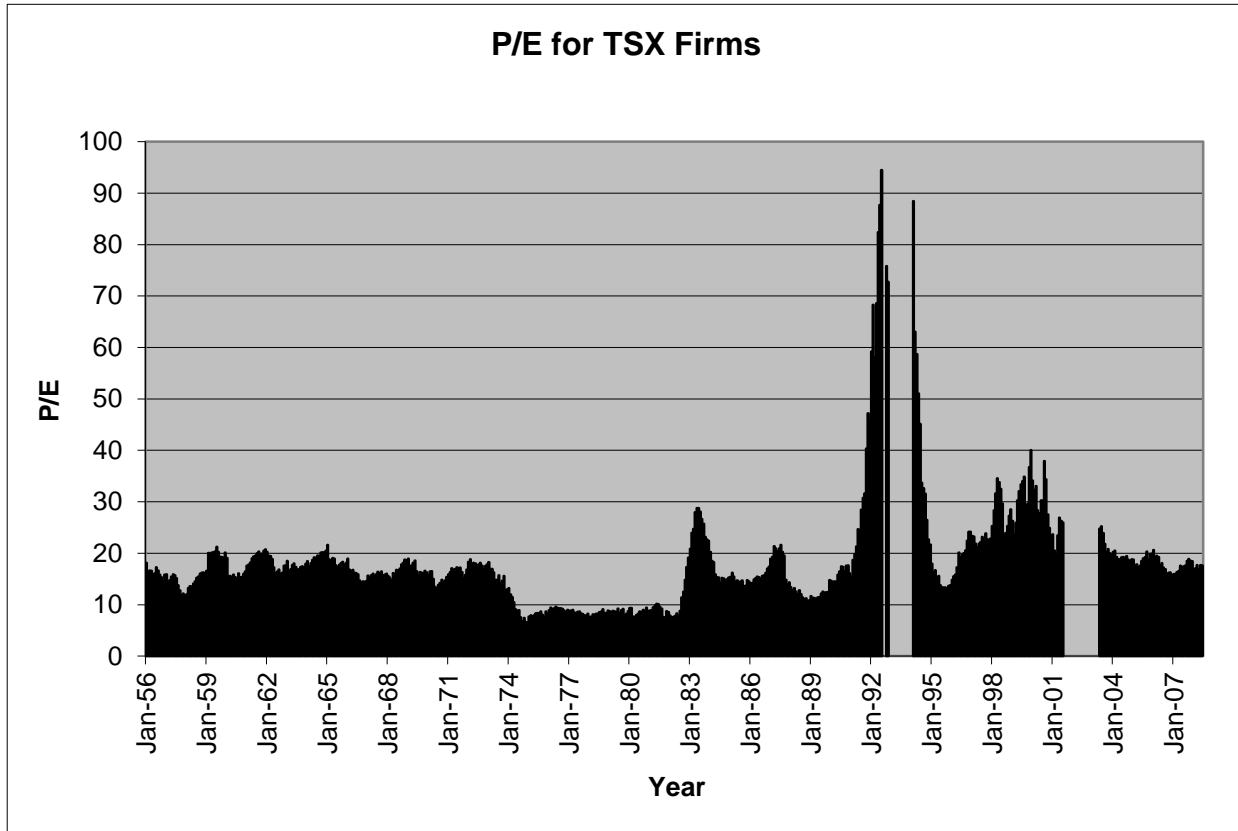
$$\frac{P_0}{E} = \frac{\text{payout ratio}}{\text{dividend yield}} = \frac{1-b}{dy} = \frac{(1-0.6)}{0.03} = 13.33$$

At \$46.67 per share, investors pay \$13.3 per forward earnings dollar.

The following exhibit plots the P/E ratio for Toronto Stock Exchange firms between 1956 and 2007. As you can see, the P/E ratio typically varies, other than exceptional circumstances, between

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about 10 and 20. Of course, this P/E ratio is for the overall stock exchange. The P/E ratio for an individual company can differ markedly.



8.3.10 Market/Book (Price/Book)

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Another commonly used “value” ratio in the investment industry is the market to book ratio (price to book), which measures value per dollar invested by a firm for shareholders. Shareholder-investment is either direct through primary market sales of common shares or indirect through retained earnings (the sum of which is book-equity). The market to book ratio measures value to expenditure: the value of a share relative to the business investment by the firm for shareholders. The market to book ratio is typically greater than one, which indicates most firms create

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shareholder wealth. A dollar of business investment that the firm makes for shareholders is now worth more than a dollar. Some firms have market to book ratios below one because corporate expectations for business profitability have not been realized. Typical values of market/book for equity are slightly less than unity to about ten.

What are the economic determinants of a firm's market to book ratio? We can use Equation (8.3) to answer this question. Represent forward earnings per share as the forward rate of return on equity (ROE) times the book value of equity per share. In symbols, $E = ROE * BVE$, where BVE is the book value of equity per share. Substitute into equation (8.3). Share price is,

$$P_0 = \frac{(1-b) * ROE * BVE}{r - b \times ROE} \quad (8.6)$$

Divide both sides of Equation (8.6) by BVE , and you get the market to book ratio,

$$\frac{P_0}{BVE} = \frac{(1-b) * ROE}{r - b \times ROE} \quad (8.7)$$

The right hand side of equation (8.7) identifies the determinants of a firm's market to book ratio. These determinants are the same as the determinants of a firm's P/E ratio:

- (d) interest rates in the economy
- (e) risk of the particular firm in question
- (f) growth

When interest rates are high (in particular, real interest rates), the denominator of equation 8.5 is relatively high, and therefore, the firm's market to book ratio is relatively low (ignoring the impact of interest rates on earnings). When interest rates are high, prices of all financial assets tend to be low, and therefore, share price and the market to book ratio tend to be low. When the risk of a firm increases, the discount rate in the denominator of equation (8.7) increases, and therefore, the market to book ratio falls. When risk increases, investors pay less for any financial asset. When expected future growth of a firm increases, the denominator of equation (8.7) decreases, and so the market to book ratio increases. If a firm is expected to grow rapidly in the future, investors

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might be willing to pay a steep price for future prospects even though the original investment made by shareholders in the firm might be modest. Small firms tend to have higher growth prospects than do larger firms, so small firms tend to have larger market to book ratios. High-tech firms tend to have strong growth prospects, and so also they tend to have high market to book ratios compared to an average industrial firm.

In our example of sections 8.3.8 and 8.3.9, ROE=20% and forward earnings per share (that is, E) is \$3.5. In this case, $0.2 = E/BVE = 3.5/BVE$, so BVE= \$17.5 per share. So, the market to book ratio is share price of \$46.67 (see equation 8.3) divided by \$17.5. Thus, the market to book ratio for this common equity is $\$46.67/17.5 = 2.67$. Alternatively, if you substitute $b=0.6$, ROE=0.2, and $r = 0.15$ into equation (8.7), you also find that the market to book ratio is 2.67.



**Market/Book in the
Constant Growth DDM: 8 Minutes**

8.3.11 Market/Book and Forward P/E

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Equations (8.4) and (8.7) are similar to one another. In fact, they differ only by the forward ROE on the right hand side of Equation (8.7). So, market/book is proportional to forward price/earnings,

$$\frac{P_0}{BVE} = \frac{(1-b) * ROE}{r - b * ROE} = \left(\frac{P_0}{E} \right) * ROE \quad (8.8)$$

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In our example, because forward price/earnings is 13.33 and forward ROE is 20% per annum, market/book is $13.33 \times 0.2 = 2.67$. Value to expenditure for the shareholders is 2.67, which exceeds one and indicates that this firm has created shareholder wealth.

Equation (8.8) is a useful relation for investors. There are many financial information sources for market/book and forward price/earnings ratios. From these two ratios, we can calculate forward ROE as the ratio of market/book and forward price/earnings. As an example, on Dec 18, 2008, yahoo finance (www.yahooofinance.com) reports market/book and forward price/earnings for Microsoft Corporation as 5.25 and 8.69, respectively. These values mean that Microsoft's forward ROE is $\frac{5.25}{8.69} = 60.4\%$. Financial analysts' average forecast⁷ is the "earnings" used in the forward price/earnings ratio: the so-called consensus analysts' earnings forecast.

8.3.12 Forward Growth

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Recall Equation (8.7) for market/book,

$$\frac{P_0}{BVE} = \frac{(1-b)*ROE}{r - b \times ROE} = \frac{(1-b)*ROE}{dy}, \quad (8.9)$$

where dy is the forward dividend yield. Rearrange Equation (8.9) and use Equation (8.2),

⁷ There are numerous research papers that study biases in financial analysts' earnings forecasts. In one of these, Chan, Karceski, and Lakonishok (2007) argue that biases arise from investment banking relations that analysts' firms have with the company for which they forecast earnings. The authors report evidence of a greater proportion of positive earnings surprises in the equity bull market of the 1990s, especially for "growth" compared to "value" firms. They use the market to book ratio to distinguish growth from value firms. Growth firms have higher market to book ratios than value firms.

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$$\left(\frac{P_0}{BVE} \right) dy = (1-b)*ROE = ROE - b*ROE = ROE-g \quad (8.10)$$

Rearrange Equation (8.10),

$$g = ROE - \left(\frac{P_0}{BVE} \right) dy \quad (8.11)$$

Equation (8.11) says that expected future corporate growth is forward ROE minus market/book times forward dividend yield. Corporate growth on the right hand side of Equation (8.11) uses terms that are either easily forecast (ROE) or observable from a combination of stock market trading (share price) and corporate financial reports (book equity).

Notice that equations (8.11) and (8.2) for corporate-growth are not different. These are two ways to calculate the same thing. However, equation (8.11) is easier to use in practice because the realized retention ratio, b , in equation (8.2) can be rather erratic in calculation as earnings approach zero. Earnings vary significantly while corporate boards of directors maintain dividends despite earnings declines (often). On the other hand, we can calculate equation (8.11) from three ratios commonly reported in the investment industry: the forward dividend yield (dy), the price to book ratio (P_0 / BVE), and the price to forward earnings ratio (P_0 / E). Equation (8.8) tells us that the ratio of the price/book ratio and the price to forward earnings ratio is forward ROE , which then gives us the three measures to calculate forward growth in equation (8.11).

From www.yahoofinance.com, on December 3, 2013, the forward dividend yield of Telus is 3.9% per annum, their price/book ratio is 2.96, and their price to forward earnings ratio is 14.82. Forward earnings is from Capital IQ is an average of financial analyst's forecasts. Using equation (8.8), forward ROE for Telus is $2.96/14.82 = 20\%$ per annum. Thus, a Telus growth-forecast is $0.20 - 2.96*0.039 = 8.4\%$ per annum. We might call this amount profitability based growth (PBG) because its principal determinant is forward profitability as measured by ROE.

8.3.13 MCR and Profitability Based Growth

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To a close approximation, expected return when buying a preferred share is dividend yield, which is observable. Expected return for a bond investment is yield to maturity, which is also observable. We also have some sense of preferred-share and bond risk (like from an independent credit rating agency) and, therefore, informed investing is relatively easy for these securities. The principal reason that common equity investing is more difficult than fixed-rate security investing is that common-equity expected return does not have a directly observable measure from the investment industry. Without expected return guidance, it is impossible to make an informed investment decision. However, with the guidance of a little financial theory (constant growth PV analysis), we can develop several expected return expression and calculate expected return with observable ratios/measures from the investment industry.

Of course, investors must exercise caution when estimating or calculating expected return for individual common shares.⁸ Financially fool-hardy decisions can result from over reliance on simple financial models without critical analysis. There is great variability of common share returns around expectation. Realized returns might be close to expected for a portfolio over a relatively long time period, but not for an individual common share over any time period. Consequently, without careful study and analysis, an investor should not place undue reliance on measures we are about to calculate. Recognizing these caveats, we proceed.

Because expected return is dividend yield plus growth, and with Equation (8.11),

$$MCR_{PBG} = dy + g = ROE + \left(1 - \frac{P_0}{BVE}\right) dy \quad (8.12)$$

⁸ Fama and French (1997) emphasize the significance of errors that arise from estimation of either the CAPM or APT for expected returns of individual common shares.

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“PBG” in the subscript above stands for “profitability based growth” because corporate profitability as measured by forward ROE is the principal determinant of growth in equation (8.11). To illustrate that both equation (8.11) for growth and equation (8.12) for expected return work, let’s continue the example of sections 8.3.8 – 8.3.11. In that example, we presumed an expected return (MCR) of $r = 0.15$ and a corporate growth rate of $g = 0.12$. However, these presumptions are unrealistic because these values are not directly observable from financial markets. Nonetheless, implicitly, investors recognize these values (and others in our example) to generate in stock market trading a price to forward earnings ratio of 13.33 (see section 8.3.9) a market/book ratio of 2.67 (see section 8.3.10) and a forward dividend yield (dy) of 0.03. So, in investor trading, we *observe* from financial markets a price to forward earnings ratio of 13.33, a market to book ratio of 2.66, and a forward dividend yield of 3%.

Equation (8.13) tells us that the market to book ratio equals the price to forward earnings ratio times forward ROE:

$$\frac{P_0}{BVE} = \frac{(1-b) * ROE}{r - b \times ROE} = \left(\frac{P_0}{E} \right) * ROE \quad (8.13)$$

So, for the firm in our example,

$$\frac{P_0}{BVE} = 2.67 = \left(\frac{P_0}{E} \right) * ROE = 13.33 * ROE$$

Solve this equation to find that forward ROE is 20% per annum.

The stock-market’s assessment of forward growth for this firm is contained in equation (8.11):

$$g = ROE - \left(\frac{P_0}{BVE} \right) dy = 0.2 - 2.67 * 0.03 = 0.12$$

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From only observables from financial markets, we have been able to determine that the stock-market as a whole assesses the growth prospects of this firm at 12% per annum.

Next substitute $ROE = 20\%$, $dy = 3\%$, and $market/book = 2.67$ into equation (8.12):

$$MCR_{PBG} = ROE + \left(1 - \frac{P_0}{BVE}\right) dy = 0.2 + (1-2.67)*0.03 = 0.15.$$

From only observables from financial markets, we have been able to determine that the stock-market assesses the expected common-share rate of return of this firm as 15% per annum.

Equation (8.12) says that expected return for constant growth common shares is the forward ROE plus dividend yield times one minus the market to book ratio. Since the market to book ratio for most firms is greater than one, and dividend yield is always positive, expected return is generally less than forward ROE.



**Profitability Based Constant Growth Expected Return
With Market Observables: 11 Minutes**

On the other hand, expected return equals forward ROE when the market to book ratio equals one. This observation is consistent with Equation (8.7) for the market to book ratio that indicates that the market to book ratio is one when expected return equals forward ROE.

Finally, when the market to book ratio is less than one, Equation (8.12) indicates that expected return exceeds the forward ROE. If expected return exceeds the forward ROE, then growth-

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investment is a negative NPV investment and should not be undertaken by corporate managers. Alternatively, in this instance, the firm should be either a “no-growth” or “declining” firm for which earnings and dividends do not increase.

Equation (8.12) for expected return is not different from equation (8.1) for expected return. These are two ways to calculate the same thing.

Expected return on the right hand side of Equation (8.12) uses terms that are observable from stock market trading reports. For example, for Telus, using numbers from above, common share expected return is,

$$\text{MCR} = 0.20 + (1 - 2.96) * 0.039 = 12.3\% \text{ per annum}$$

While expected return is a critical input to equity financial analysis, to determine whether or not 12.3% per annum is sufficient for an investor to purchase a Telus share, an investor must do a complete financial analysis, including a risk assessment. Our discussion of operating and financial leverage from chapter 3 is helpful for this purpose. The “beta” in the table below is a financial-market measure of risk that incorporates both operating and financial leverage. A benchmark for beta is one, so that a common share with a beta above one is above average risk and vice versa. Telus has below average market risk but also below average expected return compared to some of the other corporations in this table. A complete portfolio perspective on incremental risk that a common share adds upon inclusion, requires our study in chapter 11.

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Profitability Based Constant Growth Expected Returns, Selected Common Shares: Dec 3, 2013

Corporation	Annual Forward Div. Yield	Price/ Book	Price/Forward Earnings	Forward ROE	Forward Per Annum Growth	MCR	Beta
Tim Hortons	0.017	7.45	17.67	0.422	0.295	0.312	0.7
BCE	0.05	2.88	13.76	0.209	0.065	0.115	0.41
Encana	0.015	2.61	19.02	0.137	0.098	0.113	1.4
Can. Pacific Railway	0.009	4.45	18.19	0.245	0.205	0.214	1.58
Potash Corp	0.045	2.76	15.29	0.181	0.056	0.101	1.05
Magna International	0.015	1.88	10.5	0.179	0.151	0.166	1.62
Sunlife Financial	0.039	1.47	12.27	0.120	0.062	0.101	1.46
Bank of Montreal	0.04	1.6	10.29	0.155	0.091	0.131	0.76
Telus	0.039	2.96	14.82	0.200	0.084	0.123	0.79
Royal Bank	0.039	2.19	10.88	0.201	0.116	0.155	1.01
Goldcorp	0.006	0.84	19.36	0.043	0.038	0.044	0.77
Microsoft	0.03	3.93	13.16	0.299	0.181	0.211	0.79
Costco	0.01	4.99	22.33	0.223	0.174	0.184	0.42
CocaCola	0.028	5.51	18.04	0.305	0.151	0.179	0.26
Proctor & Gamble	0.028	3.38	17.93	0.189	0.094	0.122	0.38

A number of observations on these calculations are in order.

Expected equity returns on the right of the above table range from a low of 4.44% per annum for Goldcorp common shares to a high of 31.2% per annum for Tim Hortons common shares.

Tim Hortons has the highest forward ROE, the highest forward growth forecast, and the highest expected return. On the other hand, according to the beta calculation Tim Hortons common share is below average risk.

8.3.14 MCR for Non-Dividend Paying Companies

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A short-coming of the MCRs (market capitalization rate) in equations (8.1) and (8.12) is that they are strictly only applicable to companies that currently pay dividends: both equations require forward dividend yield (dy). Even though not all public companies pay dividends, a positive share price anticipates the corporate ability to pay *future* dividends. Based on our analysis of the price to book ratio (for equity) in section 8.3.10 we can develop an MCR expression that one can apply to either dividend-paying or non-dividend paying firms. We denote this expected return as $MCR_{P/B}$ because it is implied by the observed price/book ratio.

Rewrite equation (8.7) and do a little algebra,

$$\frac{P_0}{BVE} = \frac{(1-b) * ROE}{r - b \times ROE} = \frac{ROE - b * ROE}{r - b * ROE},$$

Since $g = b * ROE$ (equation 8.2),

$$\frac{P_0}{BVE} = \frac{ROE - b * ROE}{r - b * ROE} = \frac{ROE - g}{r - g}$$

Rearrange this equation for r , and call the result $MCR_{P/B}$, the market capitalization rate implied by the price/book ratio,

$$r = MCR_{P/B} = g_{FOR} + \frac{ROE - g_{FOR}}{P_0/BVE} \quad (8.14)$$

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where g_{FOR} is a growth forecast (possibly the so-called consensus analysts' long-term growth forecast). Notice this MCR expression does not require dividend yield, dy .

As an example, let's calculate the expected return for Paypal Holdings (ticker symbol, PYPL). Paypal does not currently pay dividends. On Dec 4, 2018, I collect three ratios from www.yahoofinance.com. From the "Statistics" tab: the price to forward earnings ratio and the price/book ratio. From the "Analysis" tab: "Next 5 years growth (per annum," (consensus analysts' growth forecast that we denote as g_{FOR}).

$$P/E = 29.13, P/BVE = 6.56, \text{ and } g_{FOR} = 20.51\%$$

Forward ROE is,

$$ROE_{FOR} = \left(\frac{P}{BVE}\right) / \left(\frac{P}{E}\right) = \frac{6.56}{29.13} = 22.51\%$$

So, substituting these numbers into equation (8.14), expected per annum return for Paypal is,

$$MCR_{P/B} = 0.2051 + \frac{0.2251 - 0.2051}{6.56} = 20.81\%$$

Paypal's BETA is 0.89, which is less than unity, and, thus, we get the sense that Paypal might be a high return but low risk investment. However, we don't really know whether Paypal is a good incremental portfolio investment until we do some portfolio risk analysis in chapter 11.

8.3.15 MCR and the Constant Growth Cost of Capital

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There is one final expression we can develop to calculate expected common share return (MCR) from financial market observable ratios/measures. This one is based on the implicit constant growth cost of capital – the opportunity cost rate of return for business investment – that we calculated in chapter 2. Although it can be applied more generally, this one is particularly useful for non-dividend paying companies that have negative (or low) book-equity so that the price to book ratio (for equity) and forward ROE = Forward EPS / BVE are economically unreasonable. We repeat some of the analysis we did in chapter 2 to develop this expression and we apply it to McDonalds Corporation, which you might remember from chapter 2, has negative book-equity.

Before we can calculate expected return for common shares (MCR), let us review calculating the opportunity cost rate of return for business investment analysis – the cost of capital – presuming constant growth. First, we must forecast ROIC (the rate of return on invested capital after tax and after depreciation). Forecasting ROIC with the right-hand-side of equation (2.1) in chapter 2, like we did for Canadian Pacific Railway in chapter 2, is problematic if book-equity (BVE) is negative or close to zero. In this case, ROE is either undefined or economically unrealistic.

We can deal with the negative BVE phenomenon in our analysis by forecasting ROIC directly with equation (2.2) in chapter 2 rather than indirectly with equation (2.1). Recall that there are two ways to calculate ROIC and, thus, there are also two ways to forecast ROIC. In particular, we can forecast ROIC with an adjusted EPS forecast. Most importantly, any earnings calculation subtracts \$INT (after tax), and, thus, to eliminate \$INT for an *operating* measure of business-return we add back forecast after-tax \$INT,

$$\begin{aligned} \text{NI} + (1 - t) * \$\text{INT} &= (\text{EBITDA} - \text{deprec} - \$\text{INT}) + (1 - t) * \$\text{INT} \\ &= (1 - t) * (\text{EBITDA} - \text{deprec}) \end{aligned}$$

which is the numerator of ROIC (after tax and after depreciation).

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Let EPS = forecast earnings per share approximately but at least one year hence, N = # shares outstanding, t = corporate tax rate, $\$INT$ = forecast dollar interest in the upcoming year. Then, we can forecast ROIC as,

$$ROIC = \frac{N * EPS + (1 - t) * \$INT}{IC}$$

This forecast presumes that financial statement depreciation forecasts capital expenditures that maintain the quality of existing depreciable assets (MCAPX) to prevent economic depreciation. For McDonalds, MCAPX is largely (most likely) modernizing renovations for restaurant locations.

For McDonalds (Nov 29, 2018) from either www.yahoofinance.com or the below embedded spreadsheet: $EPS = \$8.23$ (year-end 2019, see the “Analysis” tab for MCD at www.yahoofinance.com), $N = 770.91$ (million shares), $\$INT = r_D * DEBT_{2017} = 0.03 * 33,062 = 991.86$ (\$US million), $t = 0.394$, $IC_{2017} = \$30,913$ (\$US millions), and share-price = \$188.66 (notice that $BVD > IC$ because McDonalds has negative book-equity).

Thus, our forecast for ROIC for McDonalds for 2019 is,

$$ROIC_{2019} = \frac{770.71 * 8.23 + (1 - 0.394) * 991.86}{30,913} = \frac{6,944.01}{30,913} = 22.46\%$$



McDonalds

Next, we calculate the market to book ratio for a firm's *assets* in two ways: first with financial market observables, so that we can put a number on this ratio and, second, theoretically with DCF. Setting these amounts equal to one another allows us to calculate a firm's cost of capital.

A common way to calculate a firm's MVA (with market observables) is

$$\text{Market Value of Assets (Enterprise Value)} = MVA$$

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= Market Value of Equity (MVE) + book-value of debt (BVD).

BVD is an approximation to market value of debt (MVD), which is generally appropriate because most corporations use short-term rather than long-term debt. In refinancing debt in short-term sequences, market values never diverge far from borrowed values – book value (principal). As we learnt in chapter 7, alternatively, long-term corporate bonds that have fixed coupon rates (interest rates) that differ significantly from yields (the opportunity cost rate of return for a bond) can have market values that differ greatly from book-values (so called, par-value of a corporate bond).

For McDonalds for Dec 5, 2018, $MVE = 188.66 * 770.91 = 145,439.88$ (\$US millions)

$$MVA \text{ (Enterprise Value)} = MVE + BVD = \$145,439.88 + \$33,062.0 = \$178,501.88$$

(over 178 billion \$US)

So, at Nov 29, 2018, McDonalds' observed asset market/book ratio is:

$$\frac{MVA}{IC} = \frac{178,501.88}{30,913} = 5.77$$

Next, we calculate asset market/book from a theoretic DCF perspective. In DCF, MVA is discounted growing predicted future FCF. Recall from chapter 2, we forecast FCF in one year as

$$FCF = [ROIC - g] * IC.$$

Recall also for a growing business, value (MVA), measured by PV (after business investment), is

$$MVA = PV = \frac{FCF}{r - g},$$

where FCF is operating free cash flow forecast in one year, r is the opportunity cost rate of return for business investment – the cost of capital – and g is corporate growth.

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Substitute the FCF expression into the numerator, to find,⁹

$$MVA = \frac{[ROIC-g]*IC}{r-g}.$$

Divide both sides by IC to find the DCF representation of the asset market to book ratio,

$$\frac{MVA}{IC} = \frac{[ROIC-g]}{r-g} \quad (8.15)$$

Now we have an observed asset market-to-book value from financial markets and a theoretic asset market-to-book from DCF. Set these two market/book measures equal to one another, which presumes that financial markets use the same theory of value as you and I (DCF),

$$\frac{MVA}{IC} = 5.77 = \frac{[ROIC - g]}{r - g}$$

The growth forecast we use in this ratio the consensus analysts' long-term growth forecast, $g = 9.3\%$ per annum from the "Analysis" tab for ticker symbol MCD at www.yahooofinance.com. Now, complete the right-hand-side equation (8.15) with our ROIC forecast from above and the consensus analyst growth forecast,

$$\frac{MVA}{IC} = 5.77 = \frac{[0.2246-0.093]}{r-0.093} \quad (8.16)$$

Solve this equation to find the cost of capital implied by this observed asset market/book ratio and constant growth DCF: the opportunity cost rate of return for McDonalds' business investments is, $r = 11.56\%$ per annum.

⁹ Notice in our application of equation (2.4) below for CPR, both forward ROIC and the implied constant-growth cost of capital are less than forecast growth. If we discount negative FCF indefinitely at a cost of capital less than forecast growth, then DCF asset-value is, nonetheless, positive. The cost of capital need not be less than forecast growth even for a growing perpetuity. Alternatively, for corporations with high growth rates, financial analysts often use two stage growth modeling techniques (see, for example, chapter 8). We believe this modeling often unnecessarily complicates financial analysis (which is complicated enough) and diminishes its practicality, usefulness, and applicability.

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Let's use the acronym ICGCoC for the implied constant growth cost of capital. Then, for McDonalds,

$$r_{ICGCoC} = 11.56\% \text{ per annum.}$$

In the last step of our analysis, we translate this business-investment opportunity cost rate of return into a common-share opportunity cost rate of return — the market capitalization rate (MCR).

Beyond the constant-growth implied cost-of-capital we have just calculated, there is another methodology to calculate a firm's cost of capital: the weighted average cost of capital (WACC). WACC is a weighted average of opportunity cost rates of return for a firm's financial assets that produces the opportunity cost rate of return for a firm's business investments. WACC is, in fact, more general than the constant growth implied cost of capital because it does not presume constant growth. Nonetheless, when we employ equivalent presumptions, these two methodologies yield the same value for a firm's cost of capital.

The weighted average cost of capital, r_{WACC} , is,

$$r_{WACC} = (1 - t) * r_D * \frac{BVD}{MVA} + MCR * \frac{MVE}{MVA} \quad (8.17)$$

where, r_D is the interest rate on debt, t is the corporate tax rate, MCR is the market capitalization rate on common equity, MVE is the market value of equity (that is, market cap), MVD is the market value of debt, and the sum of MVD=BVD and MVE, $MVA = MVE + BVD$ is the market value of asset (enterprise value).

The weights in the WACC are the fractions of the firm, which are capitalized by each of its financial assets, respectively, using *market value weights*. The weight on debt is the debt to asset ratio with market values for both debt and assets. The weight on equity is the equity to asset ratio with market values for both equity and assets. An *after corporate tax* discount rate is used for debt because interest is tax deductible for a firm, and therefore, is “less costly” than is equity (recall

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that dividends are not tax deductible for a firm). The after corporate tax opportunity cost rate of return bonds is the interest rate on debt times one minus the tax rate. The opportunity cost rate of return for equity is the market capitalization rate.

Notice that equation (8.17) for WACC looks similar to the indirect calculation for ROIC in equation (2.1) in chapter 2 that we repeat here and denote as equation (8.18),

$$ROIC = (1-t) * r_D * \frac{Debt}{IC} + ROE * \frac{BVE}{IC} \quad (8.18)$$

While there are similarities, there are important differences between equation (8.17) for WACC and equation (8.18) for ROIC. First, equation (8.17) is a weighted average of opportunity cost rates of return that yields an opportunity cost rate of return for business investment. On the other hand, equation (8.18) is the weighted average of business returns that yields a business return for all financial asset-holders. The weights in equation (8.17) are financial market based weights; weights in equation (8.18) are book-value weights from the invested capital balance sheet.

For McDonalds from the above spreadsheet, $t = 39.4\%$ (for 2017) and $r_D = 0.03$. In applying equation (8.17), we presume that the interest rate on a firm's debt, r_D (like the coupon rate on bonds) equals the opportunity cost rate of return on debt (like the yield on bonds), so that the market value of debt equals the BVD (MVD=BVD). Also, recall for McDonalds, that MVA = \$178,501.88 (over 178B \$US), MVE = \$145,439.88 (over \$145B \$US), and BVD = \$33,062.0 (over \$33B \$US). Last, we presume $r_{ICGCoc} = r_{WACC}$. So, for McDonalds,

$$r_{ICGCoc} = 0.1156 = (1 - 0.394) * 0.03 * \frac{33,062}{178,501.88} + MCR_{WACC} * \frac{145,439.88}{178,501.98} \quad (8.19)$$

We denote the market capitalization rate implied by the WACC methodology as MCR_{WACC} . Solving equation (8.19),

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$$MCR_{WACC} = 13.79\% \text{ per annum}$$

McDonalds' BETA is 0.19, which is less than unity, and, thus, we get the sense that McDonalds is a relatively high return but low risk investment. However, we don't really know whether McDonalds is a good incremental investment for a portfolio until we do some portfolio risk analysis in chapter 11.

8.3.16 Comparing MCR Methods

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We have discussed four different ways we might calculate MCR with only financial-market observable ratios/measures in equations (8.1), (8.12), (8.14), and (8.17),

$$MCR_{dy+g} = dy + g, \quad (8.1)$$

$$MCR_{PBG} = ROE + \left(1 - \frac{P_0}{BVE}\right) dy \quad (8.12)$$

$$MCR_{P/B} = g_{FOR} + \frac{ROE_{FOR} - g_{FOR}}{P_0/BVE} \quad (8.14)$$

$$MCR_{WACC} = \frac{r_{ICGCoC} * MVA - (1-t) * r_D * BVD}{MVE} \quad (8.17)$$

where, r_{ICGCoC} is,

$$r_{ICGCoC} = g_{FOR} + \frac{ROIC_{FOR} - g_{FOR}}{[MVA/IC]}$$

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and ROE_{FOR} , $ROIC_{FOR}$, g_{FOR} , are forward ROE, ROIC, and growth.

If we use consistent inputs, then all four expressions produce the same expected return (MCR) value. However, in picking and choosing different input measures and ratios from financial markets that are not inherently consistent with one another in financial market practice/pricing we get different MCR results. Further, for application purposes, each MCR expression has advantages and disadvantages.

Equation (8.1) has the disadvantage that it can only be applied to dividend paying companies. Its primary forecast, growth, is independent of any earnings/profitability forecast, like, for example, ROE. Without an obvious profitability based foundation for growth, analysts' forecasts might be unreasonable/unrealistic. On the other hand, we can apply equation (8.1) for companies like Boeing or McDonalds that have negative book equity and, thus, P/BVE and forward ROE are economically unrealistic. Equation (8.1) requires neither of these measures.

Equation (8.12) also can only be applied to dividend paying companies. In addition, we cannot use it if book equity is negative or close to zero so that P/BVE and forward ROE are economically unrealistic. It does have the attraction that it uses a profitability based growth forecast in equation (8.12) and, thus, is possibly more grounded in economic reality than analysts' consensus long-term growth forecasts.

Equation (8.14) has the attraction that we can use it for dividend or non-dividend paying firms. It allows flexibility in our growth forecasts. We might use either a profitability based growth forecast from equation (8.11) or analysts' consensus long-term growth forecasts. It does have the disadvantage that it requires an economically realistic ROE forecast that might not be possible if book equity is negative or close to zero.

Equation (8.17) has the attraction that the principal business return it employs (r_{ICGCOC}) is forward ROIC rather than ROE. ROIC is much less likely to have extreme values than ROE because IC is

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less likely to approach zero than is BVE. So, MCR in equation (8.17) is less likely to be economically unrealistic than equations (8.12) or (8.14). Equation (8.17) also has the attraction that it combines corporate profitability (ROIC) and growth in ways that equation (8.1) does not. In particular, one might be concerned that consensus analysts' growth forecast might not be sustainable based on corporate profitability. Equation (8.17) has the disadvantage that it requires more input variates than the other three equations.

We apply MCR_{dy+g} , $MCR_{P/B}$, and MCR_{WACC} , in Exhibit 8-4 below with analysts' consensus long-term growth forecasts. Alternatively, MCR_{PBG} uses profitability based growth in equation (8.11): forward ROE less the equity price/book ratio times forward dividend yield. Many more firms have consensus analysts' earnings forecasts (at least one year hence) compared to consensus analysts' long-term growth forecasts. Possibly, analysts are more willing to forecast the relative near-term rather than the long-term. If one insists on analysts' growth forecasts for, for example, security selection to construct an equity portfolio, then the available subset of companies is about 3/4s of the set for which consensus analysts' earnings forecasts are available. Of course, alternatively, or in conjunction, one might use other growth forecasts, like, for example, profitability based growth in equation (8.11). There are also publicly traded companies that have neither analysts' earnings forecasts nor analysts' long-term growth forecasts. For these firms, one might forecast ROE for profitability based growth in equation (8.11) with latest realized ROE or some recent past average.

To illustrate how these MCR calculations might differ for a variety of different companies, some non-dividend paying, some with negative book-equity, some dividend-paying with economically realistic ROE forecasts, I collect a number of ratios and measures from www.yahooofinance.com: share price, price to forward earnings ratio, number of shares outstanding, forward dividend yield (for dividend-paying firms), and consensus analysts' long-term growth forecast. Then, MVE (market value of equity) is share price times outstanding shares. Then I retrieve BVE (in total), the effective tax rate, and the effective interest rate, from an invested capital balance sheet for latest fiscal year possible like we did in chapter 2 from Capital IQ financial statements and the interface of WRDS (Wharton Research Data Services). Then the equity price/book ratio is MVE/BVE. I calculate rather than collect this measure because, for many companies, I like my definition of

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BVE better than that offered by other financial analysts. If you prefer, you can simply retrieve P/B from www.yahoofinance.com. Forward ROE is the price/book ratio divided by the price to forward earnings ratio. Exhibit 8-3 summarizes inputs for a number of companies.

Exhibit 8-3

Financial-Market Inputs for MCR

Company	Growth	P	# shares	BVD	MVE/BVE	MVA/IC	dy	ROIC	ROE	t	r _D
TransCanada	5.80%	\$40.19	907	48,559	1.197	1.076	5.25%	6.10%	8.30%	-2.70%	4.60%
Telus	4.70%	\$35.19	598	15,099	2.003	1.416	4.68%	7.00%	12.80%	27.20%	3.90%
Premium Brands	24%	\$74.02	34	655	4.582	2.628	2.69%	13.60%	26.10%	24.80%	4.20%
Costco	24%	\$221.02	438	7,581	7.388	5.047	1.04%	17.30%	28.20%	28.40%	2.10%
Macy's	-1.20%	\$33.58	307	7,545	1.518	1.246	4.72%	10.00%	16.50%	-1.90%	4.10%
Verizon	5.90%	\$59.85	4,130	151,640	3.326	1.765	4.11%	12.10%	25.80%	-48.30%	3.60%
CPR	12.4%	\$206.61	145	9,139	3.068	2.068	0.97%	12.00%	18.50%	3.7%	5.2%
Paypal	20.50%	\$84.19	1,180	2,908	6.208	5.407	0.00%	18.30%	21.60%	18.40%	0.00%
Walmart	4.20%	\$97.19	2,930	51,010	3.485	2.53	2.19%	11.70%	17.00%	30.40%	4.60%
McDonalds	9.30%	\$188.66	771	33,062	-67.69	5.774	2.55%	23.00%	-303.00%	39.40%	3.00%

Notes: “g” is the consensus analysts’ long-term growth forecast. “P” is share price. #share is number of outstanding shares (in millions). BVD is book value of debt (in \$US millions). “MVE/BVE” is the price to book ratio for equity. “MVA/IC” is the market to book ratio for assets. “dy” is the forward dividend yield. “ROIC” is the forward rate of return on invested capital after tax and after depreciation. “ROE” is the forward rate of return on equity. “t” is the effective corporate income tax rate. “r_D” is the effective interest rate calculated as *Interest* from the latest annual income statement divided by average debt: year-beginning debt plus year-end debt divided by two.

With inputs from Exhibit 8-3, we calculate MCR four times with equations (8.1), (8.12), (8.14), and (8.17). Exhibit 8-4 reports results.

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Exhibit 8-4

Expected Common Share Return with Market Observables

Company	MCR_{dy+g}	MCR_{PBG}	$MCR_{P/B}$	MCR_{WACC}
TransCanada	11.0%	7.5%	8.0%	7.9%
Telus	9.4%	8.2%	8.8%	8.7%
Premium Brands	26.7%	17.5%	24.5%	24.5%
Costco	25.0%	21.6%	24.6%	24.3%
Macy's	3.5%	14.0%	10.4%	10.4%
Verizon	10.0%	16.5%	12.0%	11.9%
CPR	13.4%	16.5%	14.4%	14.4%
Paypal	20.5%	21.6%	20.8%	20.7%
Walmart	6.4%	11.5%	7.8%	7.9%
McDonalds	11.9%	N/A	13.8%	13.9%

Notes: MCR_{dy+g} is expected common share return calculated with equation (8.1): forward dividend yield plus consensus analysts' long-term growth forecast. MCR_{PBG} is expected common share return calculated with equation (8.12), forward ROE plus one minus equity price to book ratio times forward dividend yield. $MCR_{P/B}$ is expected equity return calculated with equation (8.14), which is consensus analysts' growth forecast plus forward ROE minus growth divided by the equity market to book ratio. MCR_{WACC} is expected common share return implied by the weighted average cost of capital formula (WACC) and implied constant growth cost of capital, which is consensus analysts' long-term growth forecast plus forward ROIC less growth divided by the asset market to book ratio.

We can make a number of observations about the common share expected returns in Exhibit 8-4. First, of the four methods, MCR calculated as dividend plus consensus analysts' long-term growth forecast (MCR_{dy+g}) is the most extreme. That is, for each company, it is either the highest or the lowest amongst the four methods. This observation suggests that analysts may be overly optimistic or pessimistic in growth forecasts depending upon whether they favor a particular company or not. Growth forecasting tempered by a company's profitability outlook may be less subject to extremes. Second, for all of the firms, $MCR_{P/B}$ (MCR implied by the equity market/book ratio) and MCR_{WACC} (MCR implied by the WACC and the implied constant growth cost of capital) are always very similar. Since, MCR_{WACC} is more demanding with respect to calculation inputs, $MCR_{P/B}$ is possibly sufficient for most if not all aspects of your/my financial analysis and investing. Further, $MCR_{P/B}$ appears to be robust even for difficult companies. Because of negative book equity, P/B and forward ROE are economically unreasonable for McDonalds. Nonetheless, even inputting economically nonsensical values, $MCR_{P/B}$ is almost identical to MCR_{WACC} (which we expect to be

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robust against corporate financial abnormalities).¹⁰ Both \mathbf{MCR}_{dy+g} and \mathbf{MCR}_{PBG} are strictly only applicable for dividend-paying companies. However, for Paypal in Exhibit 8-4, I apply them with $dy = 0$. In this case, $\mathbf{MCR}_{dy+g} = g$ and $\mathbf{MCR}_{PBG} = ROE$.

$\mathbf{MCR}_{P/B}$ is most usefully for non-dividend paying firms because it does not require dividend yield. However, I apply it (with success, I believe) in Exhibit 8-4 for both dividend-paying and non-dividend paying firms.

Finally, a word of caution. Premium Brands, Costco, and Paypal have exceptionally high expected common equity returns regardless of the calculation method in Exhibit 8-4. However, we do not know whether these are good incremental common share investments for our portfolio until we do some portfolio risk analysis in Chapter 11. Possibly because of high risk, we might not want any of these common shares in our portfolio. Similarly, possibly because of low risk we might like in our portfolio common shares like TransCanada or Telus even though they have relatively modest expected common equity returns.

8.3.17 Growth is not always Good

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Positive growth in the constant growth DDM makes economic sense only if the forward ROE exceeds the market capitalization rate, MCR. Or, possibly better said, not all of a firm's growth is necessarily "good."

Note that the market to book ratio in Equation (8.8) exceeds one when the forward ROE exceeds the market capitalization rate, r . If a firm can earn a higher rate of return for shareholders (ROE)

¹⁰ For companies with extreme P/B and forward ROE, one can show that $\mathbf{MCR}_{P/B}$ is forecast growth plus forward earnings yield (forecast earnings per share divided by share price).

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than shareholders' opportunity cost (r), then, the firm creates shareholder wealth and value exceeds expenditure. When the forward ROE equals the market capitalization rate, r , then, the market to book ratio in Equation (8.8) equals one. Last, if the market capitalization rate exceeds the forward ROE, then positive growth makes no economic sense. If managers were to retain earnings for investment and growth then, they destroy rather than create shareholder wealth. Every corporate growth investment is a negative NPV investment because its rate of return, ROE, falls short of shareholders' opportunity cost, r . In this case, the alternative corporate investment strategy of "no-growth," with retention set to zero, $b = 0$ is better for shareholders than is positive growth.

As an example, suppose that $ROE=0.12$, $r=0.15$, and, inappropriately, this firm's managers pursue a growth strategy that they finance with a retention ratio $b=0.4$. Then, the market/book ratio is

$$\frac{(1-b)*ROE}{r - b \times ROE} = \frac{0.6 * 0.12}{0.15 - 0.4 * 0.12} = 0.705. \text{ The market/book ratio is less than one because}$$

growth investments are negative NPV, which destroys rather than creates shareholder wealth. Managers of this firm can increase shareholder wealth by following a "no-growth" investment strategy. To do this, they can set the retention ratio to zero, $b=0$. In this case, the market to book

ratio becomes, $\frac{ROE}{r} = \frac{0.12}{0.15} = 0.8$. The market to book ratio increases from 0.705 to 0.8. This

increase represents greater shareholder wealth. However, the market to book ratio remains less than one because the existing assets of the firm earn a rate of return lesser than shareholders' opportunity cost. However, this investment is irreversible and cannot be undone. The managers made an investment in the past, which is now not as attractive as when the investment decision was original made. For example, sales for the business might be lesser than originally anticipated. If managers could undo their investment decision, they would. However, they cannot, and therefore, possibly their best corporate strategy now is to operate the business in the best possible way, but without growth, which we know destroys shareholder wealth.

Wealth creation by firms is inextricably bound to the workings of financial markets. Business asset-values depend on investors' opportunity costs rates of return, which, in turn, represent return expected from alternative *financial* investments. Shareholders who believe that a firm will not earn

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the opportunity cost of capital sell their shares. If many shareholders share a negative opinion, share prices fall until the market price reflects a fair rate of return. Falling share prices reduce capital available to managers. In this way, markets work to reallocate capital, increasing the resources available to managers who succeed to earn at least the opportunity cost of capital and decreasing the resources available to unsuccessful managers.

Recognize that our analysis and presumptions are sufficiently crude that any amount we calculate should not be interpreted as being unduly exact. So, a forward ROE just below the market capitalization rate means that it is reasonable to conclude that this firm's corporate performance is just meeting the expectations of financial investors.

Note that forward ROE in Exhibit 8-4 is generally greater than each of the four MCR calculations in Exhibit 8-3. This comparison suggests that growth is an appropriate corporate objective for each of these firms.

Recognize that a forward ROE represents the return for shareholders on a large number of business investments (at least for a large firm), some that are likely more profitable than others. So, by selling/disposing/liquidating some operations this firm might be able to increase shareholders' wealth (by eliminating negative NPV investments). Remember that we presume that the objective of managers in operating a business is to maximize shareholders' wealth. So, if a firm can increase shareholders' wealth by curtailing and/or selling some value destroying operations, then it should do so. In particular for a public company, by eliminating negative NPV investments, share price should increase to the immediate benefit of shareholders. If a firm has forward ROE near its MCR rather than ROE far exceeding MCR, then a greater portion of its business investments are likely value destroying than value creating, which sets the stage for some strategic corporate planning.

8.3.18 ROE Versus MCR

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Equation (8.3) illustrates that there are two important rates in the determination of a common share's price: forward ROE and the market capitalization rate, r .

Suppose that you predict, based on your financial analysis of a firm, that ROE in the future will be 20% per annum. On the other hand, being a student of financial markets, you have applied your skill and judgment to determine that the market capitalization rate is 10% per annum. Notice that the ROE is much greater than the market capitalization rate. Recall that the rate of return on equity is the rate of return that the firm earns for shareholders on funds invested on their behalf. The market capitalization rate is your opportunity cost. If the firm can earn 20% when your opportunity cost is 10% does this mean that an investment in this firm is a “must” for you or your clients?

Unfortunately, equity markets are more subtle than is implied by the above investment scenario. One can often make investment decisions by comparing rates of return, but in some cases, rates of return can be misleading and they must be treated with caution and respect. This is one of those cases. When you purchase a share (or any other financial asset) an important question is the price that you will pay. In particular, if you buy a share of the above described firm, you may, in fact, pay a price that recognizes and reflects the high ROE. The ability of financial markets to correctly price financial assets is an aspect of *capital market efficiency* which we investigate and discuss in some detail in section 8-4 of this book. In our example here, let us presume that markets are informationally efficient. This presumption means that the stock market as a whole (not necessarily every investor) recognizes the high ROE of the firm (and the common share is priced accordingly).

Suppose that predicted earnings in the upcoming year are \$3.50 and the firm's retention ratio is 20%. In this case, the price of a share is \$46.65 (using equation 8.1).

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If you buy a share at this price, what is your expected rate of return, 20% or 10% per annum? Your expected rate of return, as we will demonstrate, is equal to the market capitalization rate of 10% per annum. The fact that this company is expected to be very profitable and have a high ROE is reflected in the share price of \$46.65. The firm may have worked very hard to increase its ROE to its current high level. The existing shareholders will then have likely realized a significant capital gain over the recent past as share price rises to reflect the favorable operating performance of the firm (and possible future prospects). If you buy the share as a “Johnny come lately,” and if financial market are *informationally efficient*, you buy the share at \$46.65 which reflects the high ROE. In this case, because you purchase at a price that has already increased over the recent past to reflect the favorable operating performance of the firm, your expected rate of return is the opportunity cost of 10%. This rate of return is no greater and no lesser than you can receive on any other financial asset of equal risk.

To verify these claims, let us calculate your holding period rate of return for a year. Suppose you buy the share today for \$46.55, hold it for one year, receive the dividend at that time and then immediately sell your share. What is your expected rate of return?

The dividend in one year is $0.80 \times \$3.50 = \2.80 . The expected sale price of the share in one year is $(1 - 0.20) \times \$3.50 \times (1.04) \div (0.10 - 0.04) = \48.63 . Your expected rate of return is, therefore,

$$\text{One-year holding period return} = \frac{\$(2.80 + 48.63 - 46.65)}{\$46.65} = 10\%$$

When you buy a share, your expected rate of return is not the rate of return on equity. Your expected rate of return is determined in financial markets and is equal to the rate of return on more or less equivalent risk financial assets – the market capitalization rate.

This example illustrates that while accounting numbers might be helpful for predicting the rate of return that a firm earns for its shareholders, it is financial markets which determine expected rates of return for common share investment. These two rates are related to the principal components

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of discounted cash flow analysis: the cash flows in the numerator and the discount rate in the denominator. Rates of return on equity from a firm's financial statements are useful for predicting dividends to be paid on a common share in the future (the numerator of discounted cash flow analysis). On the other hand, financial markets determine the benchmark for corporate return performance (the denominator of discounted cash flow analysis). The reconciliation of these two rate of returns in the trading and investment decisions made by investors determines the price of a common share.

8.3.19 Business Growth Versus Shareholder-Wealth Growth

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In the constant growth DDM, almost all corporate characteristics grow at the growth rate “g” (that is, equation 8.2 or 8.11), including: book equity, ex-dividend share price, dividends, earnings, sales, book assets, debt, ex-dividend share-prices. The principal exception to observation that everything grows at “g” is shareholder-wealth. Expected growth of shareholder-wealth is the market capitalization rate, MCR, which is forward dividend yield plus growth,

$$MCR = \frac{D}{P_0} + g = dy + g ,$$

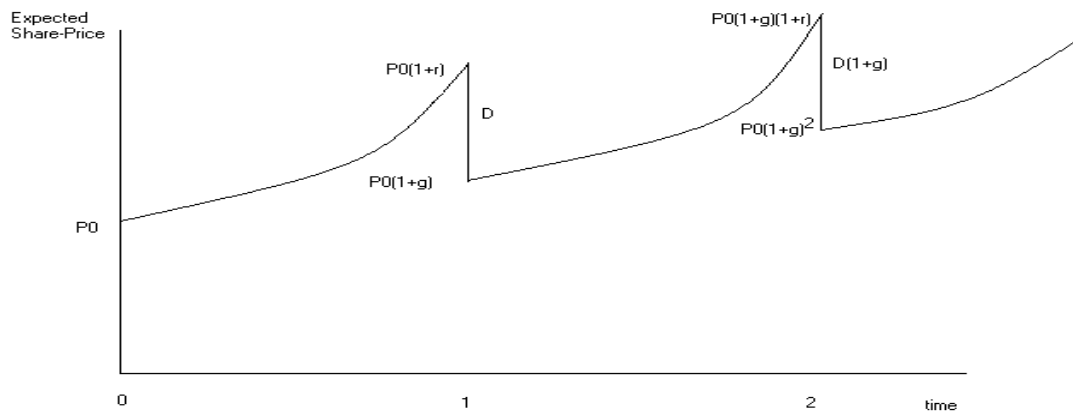
which is greater than “g” because we presume that the corporation pays dividends and, thus, dividend yield is strictly positive, $MCR = dy + g > g$. The growth rate of shareholder-wealth is greater than corporate growth.

Over any holding period, whether or not that holding period includes a dividend, as long as shareholders reinvest dividends into the common shares of the same company, expected shareholder wealth growth is the MCR. An interesting holding period is between an ex-dividend

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date and the trading-day prior to the ex-date in one dividend payment period. Because this holding period has no dividend payment, expected shareholder return is entirely capital gain - expected share price increase. From an ex-date to the day prior to an ex-date in one dividend period, the expected rate of share-price increase is the MCR. In addition, we know, ignoring tax effects, that the expected fall in share price on an ex-date is the amount of the dividend (previously declared). Also, between adjacent ex-dates expected ex-price growth is “g.” We illustrate these characteristics of expected future share price in the following diagram.

Constant Growth DDM
Figure 1



In Figure 1, from ex-date to ex-date, share price grows at g , that is, from P_0 to $P_0(1+g)$. On the other hand, from ex-date to the day prior to the next ex-date, share price grows at the $MCR = r$, that is, from P_0 to $P_0(1+r)$. Let's consider a problem that works with Figure 1.

Problem: You believe that the constant growth discounted dividend model is a reasonable representation of ABC share value. ABC pays common share dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). ABC retains a constant

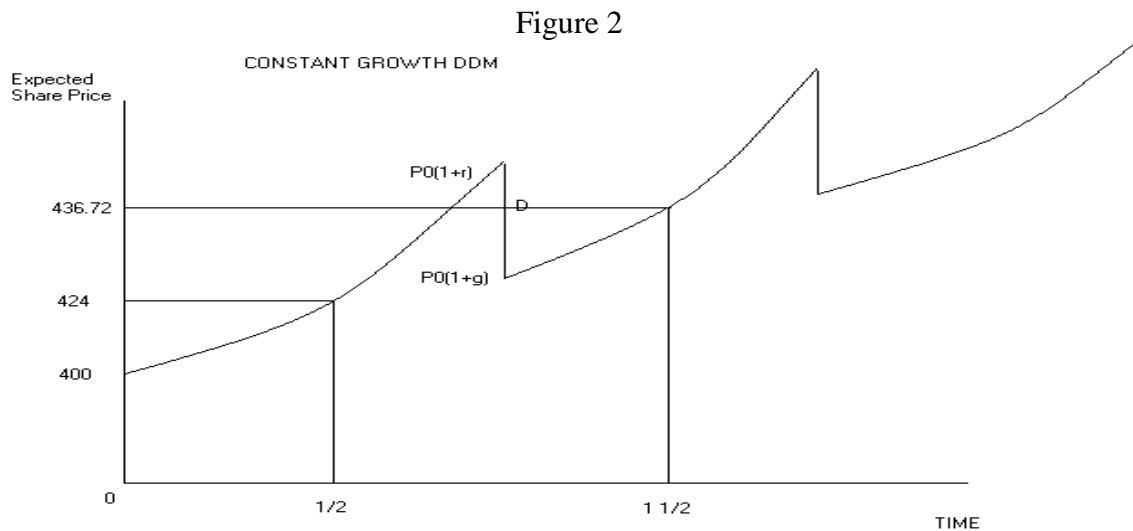
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fraction of earnings each year for reinvestment and growth (i.e., constant retention ratio). ABC has a price to forward earnings ratio of 10. The current share price is \$400.00. Expected share price, other things equal, in six months is \$424.000. Expected share price in 1 ½ years is \$436.72 (also, other things equal).

Required:

- (a) What is the expected dividend one year from today?
- (b) What is the constant retention ratio?
- (c) What is the expected ROE for ABC common shares?
- (d) What is the market to book ratio for ABC common shares?

The following diagram is helpful to answer this question (not drawn to scale).



Business Growth Versus Growth in Shareholder Wealth: 20 Minutes

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Solution:

(a) Expected rate of return when you buy a common equity is the market capitalization rate (MCR). In addition, for any period between dividend payments your expected return on a common equity is entirely capital gain.

Because expected capital gain over 6 months is $\frac{424 - 400}{400} = 6\%$, $MCR = 1.06^2 - 1 = 12.36\%$ per annum. Between today and one day before the ex-date in one year, there is no dividend, so expected share price in one year immediately prior to the ex-date at that time is,
 $400 * 1.1236 = \$449.44$ (or equivalently, $424 * 1.06 = \$449.44$)

Let P_1 be the ex-dividend price in one year. Then, between the ex-dividend date in one year and the expected price 1 ½ years from today, there is also no dividend. In addition, because we know that expected rate of return over 6 months is 6% and this return is entirely capital appreciation, expected increase in share price,

$$1.06 * P_1 = 1.06P_0(1 + g) = \$436.72, \text{ and therefore, } P_1 = P_0(1 + g) = \$412.$$

This result tells us that the expected ex-date share price in one year is \$412.

In addition, we already know that one day prior to the ex-date, share price is \$449.44. Further, we know that share price falls by the amount of a dividend on an ex-date (ignoring tax effects). So, the dividend is the difference between share price one day before the ex-date and share-price on the ex-date. Thus, the dollar amount of the forward dividend one year from today is $\$436.72 - \$412 = \$24.72$.

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(b) In the constant growth discounted dividend model, one of the corporate characteristics that grows at the growth factor, g , is the ex-dividend share price. Because the ex-price in one year is \$412 and the ex-price today is \$400, the growth factor is,

$$g = \frac{412 - 400}{400} = 3\%$$

Forward dividend yield is $0.1236 - 0.03 = 9.36\%$. Or alternatively, the forward dividend yield is $37.44/400 = 9.36\%$. The price to forward earnings ratio is the ratio of the payout ratio and forward dividend yield,

$$10 = P/E = \frac{1 - b}{0.0936}$$

So, the retention ratio is $b = 6.4\%$.

(c) Recall that growth is retention times forward ROE, $g = b * ROE = 0.03 = 0.064 * ROE$. So, $ROE = 46.875\%$.

(d) Finally, because the market to book ratio is the product of the price to forward earnings ratio and forward ROE,

$$\text{Market to Book} = 10 * 0.46875 = 4.6875$$

(8.3.20) Shareholder Wealth Maximization (Revisited)

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In chapter 1, we raised the question of how financial analysts might measure the commitment of a corporation's managers to the objective of shareholder wealth maximization? How can we rank companies (at least publicly traded companies) on this commitment? Sometimes, financial analysts suggest the price/book ratio for this purpose. However, we know from our studies that the primary economic determinant of price/book is growth opportunities, which the industry in which a firm operates largely determines rather than the actions of individual business managers, specifically. Alternatively, sometimes, financial analysts suggest ROE for this purpose. Unfortunately, while ROE is a shareholder corporate-performance measure, it ignores shareholders' expectations for this performance and, further, risk differences require differences in these expectations across companies.

As an alternative measure, we propose the difference between forward ROE (expected business return for shareholders) and shareholders' opportunity cost rate of return, MCR, as a measure of managerial commitment to the shareholder-wealth-maximization principle. Recall that forward ROE is that rate of return a firm earns for shareholders, whereas, the shareholder opportunity cost rate of return is shareholders' expectation for this business performance. If a business undertakes only business investments for which return exceeds shareholder opportunity costs, then the overall rate of return on all business investments (some more and some less profitable than expected when originally made) will exceed shareholder opportunity cost rates of return. In this case, the business meets shareholder expectations because managers actively manage their businesses to ensure that this is so. In this case, forward ROE far exceeds MCR. On the other hand, if this difference is close to zero or negative, then the firm in question has undertaken (possibly inadvertently) an embarrassment of business investments that destroy rather than create shareholder wealth and in not eliminating/disposing/selling/turning-around these business investments their corporate objective does not appear to be shareholder wealth maximization.

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In Exhibit 8.5 below (from Exhibits 8-3 and 8-4) we report for ten companies: forward ROE, constant growth MCR implied by the price/book ratio ($MCR_{P/B}$), and the difference between these rates. We rank these firms from highest to lowest on this rate-difference.

Exhibit 8-5
Forward ROE less MCR

Company	ROE	$MCR_{P/B}$	ROE less $MCR_{P/B}$
Verizon	25.8%	12.0%	13.8%
McDonalds*	22.5%	11.7%	10.8%
Walmart	17.0%	7.8%	9.2%
Macy's	16.5%	10.4%	6.1%
Telus	12.8%	8.8%	4.0%
CPR	18.5%	14.5%	4.0%
Costco	28.2%	24.6%	3.6%
Premium Brands	26.1%	24.5%	1.6%
Paypal	21.6%	20.8%	0.8%
TransCanada	8.3%	8.0%	0.3%

* McDonalds has negative book equity and, thus, its forward ROE makes no economic sense. Thus, for this company, rather than ROE and MCR, we report forward ROIC and the constant growth cost of capital implied by the asset market/book ratio (see chapter 2).

This ranking suggests that Verizon, McDonalds, Walmart, and Macy's are most committed to the principle of shareholder wealth maximization. As a gross generality, these are also companies for which the "marketing" business-function is relatively more important than the "production" business-function in terms of opportunities and risks that these firms face (see chapter 3). So, this ranking suggests the possibly there is a connection between a customer orientation in business management and shareholder wealth maximization. This is something we can investigate in future business studies.

But, be careful. Whether or not corporate managers are committed to shareholder wealth maximization does not necessarily make a common share a good/bad investment. In Exhibit 8-5, TransCanada is possibly a great investment for a portfolio based on its risk/return properties. Possibly Verizon is a terrible investment based on its risk/return features. We must await our study

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of chapter 11 to determine whether individual common shares are “good” portfolio investments or not.

(8.4) The Hypothesis of Capital Market Efficiency

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A definition of the Efficient Markets Hypothesis is that “information is widely and cheaply available to investors and all relevant information is reflected in share price.” The term “reflected” means that investors have bought and sold financial assets in response to new information so that this information has changed security prices. If these new prices completely reflect this information, when investors purchase at these new prices they do not generate for themselves a rate of return (at least on average) which exceeds a “normal” rate of return. A normal rate of return is the market capitalization rate for the share (the opportunity cost, which is the rate of return for investments in financial assets of equal risk). In other words, prices in financial markets should adjust rapidly so that expected rates of return on financial assets of equal risk are the same. Efficient Markets Hypothesis is sometimes referred to as informational efficiency because it is a statement about the *speed* at which financial market use information.

The Efficient Markets Hypothesis is not a statement of fact but a hypothesis. Any hypothesis is no more than conjecture unless it is subject to empirical testing. The general way to test for informational efficiency is to try to demonstrate that there exists private information that, if used, would generate an average return greater than the market risk-adjusted return of the implied investment strategy. For example, if you can find a trading strategy that has the same level of risk as an investment in the Toronto Stock Exchange (TSE) index, but that offers a higher rate of return (at least on average), then you have a counterexample to the efficient market hypothesis. Finding an investment strategy that offers abnormally high returns is not an easy task. There have been thousands of projects, theses, and academic papers about the efficient market hypothesis. The bulk of these studies have failed to reject the hypothesis. In fact, it is often claimed that this hypothesis

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has more empirical support than any other proposition in economic study. However, failure to reject a hypothesis does not mean that it is *true*.¹¹ For example, statistical tests might fail to reject the hypothesis, even if it is false, if we do not yet know enough about what constitutes a “normal” rate of return in financial markets. The benchmarks we use to assess investment strategies might be inappropriate.

We said in a previous chapter that share price for public traded firms could be used as a measure of shareholder wealth (as it is represented in the ownership of a share). Using share prices to measure shareholder wealth presumes that financial markets provide an accurate assessment of value. If markets do not price securities accurately, then presumably it would be easy to design investment strategies which offered superior rates of return. However, in most cases, it is very difficult to demonstrate that such investment strategies exist and that they work *consistently*. The implication of this observation is that (at least as a first pass) financial market can be relied upon for an accurate assessment of share value. In fact, it is fairly safe to say the stock market’s assessment of value is much better than your own. The price of a share on the stock market is an aggregation and amalgamation of all the information of the participants in the stock market. Do you believe you know more than the aggregate of investors who trade the shares of the firms in which you invest? Your assessment of value is based only on your personal information. The aggregation of the information of stock market participants is much broader.

One way to describe capital market efficiency is to say that financial markets do a good job of pricing financial assets. Financial markets would *not* “do a good job” if it were easy to find overvalued securities, or if one could point to private information that would generate superior returns. Capital market efficiency means that such pockets of private information are discovered quickly by investors. When investors trade on new information, they affect prices. As prices adjust, the new information is less valuable to the next investor who finds it. Capital market efficiency is the process by which private information becomes “essentially” public. Information is essentially public when it can no longer be used to generate superior rates of return.

¹¹ Like any significant economic theory, there are detractors of capital market efficiency. See Haugen (1995) for a clearly written case against CME.

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Capital market efficiency implies that financial markets act as if all information were public -- in the sense that by the time you or I (or any individual investor, at least on average) find out about some new piece of information, other investors have invariably already found it, they have bought and sold securities, prices have changed so that the value of the private information has dissipated. This process is likely to occur quickly in financial markets because (i) information technology allows for the rapid transmission of information, (ii) money moves quickly to attractive opportunities (i.e., liquidity is great in financial markets), and (iii) there is a very strong greed motive on the part of investors.

Capital market efficiency does not say that private information does not exist -- it does. What capital market efficiency does say is that information is used so rapidly in financial markets so that you or I are unlikely to consistently find unused pockets of valuable private information (with which we can make trades that will earn superior rates of return). Financial markets use information so quickly that an individual investor is invariably a “Johnny come lately” with respect to any new information. The first person (and there always is a first person) with private information gets an above normal rate of return but it is extremely difficult to consistently be first. If you are not first (or high in the list of investors who assess the new information) you don’t get the superior returns.

Why is it difficult to be consistently first when searching out private information? The reason that it is difficult to be first, is that the search for this information is extremely competitive. To outperform financial markets (or an *average* investor who is represented by this market), you must be very clever. However, you are competing for private information in a market where there are many clever individuals. Because of this intense competition for private information between clever individuals, you are seldom first in the race for private information. A second-place finish in financial markets is not helpful. The implication of being an “also ran” in this race is that, even you, a very clever individual, will have great difficulty in outperforming even an average investor. How humbling!

8.4.1 The Paradox of the Efficient Markets Hypothesis

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A paradox of capital market efficiency is that most investors do not believe that the hypothesis. Because they don't believe the hypothesis to be true they think that it is easy to find unused pockets of private information. These investors are, therefore, busily searching out this information. A few investors actually find valuable private information. They use this information and prices change to reflect this information. This process is fast because there is intense competition for this private information arising from investors who do not believe in capital market efficiency. Because prices adjust quickly to new information, financial markets are informationally efficient even though participants do not believe it to be so. On the other hand, if investors *did* believe that capital market efficiency were true, there would be little incentive for them to search out private information (it is extremely difficult to find, so why bother). However, if investors are not out there searching for this information, then as it arrives it is unused. The existence of this unused information implies that financial markets are inefficient even though participants believe them to be so.

If financial markets are informationally efficient, then why do investors search out private information? The answer to this question is that the search for information is part of the *process* by which market become efficient. In some kind of steady state, the extra rate of return generated from the search for private information should just offset the incremental costs borne in this activity.

8.4.2 Lessons of the Efficient Markets Hypothesis

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You should not dogmatically accept the notion of capital market efficiency. It is simply a proposed property of financial market that approximates reality and which is helpful for you as a student of financial markets in trying to understand the determination of prices.

One of the most important lessons that you can take away from the hypothesis of capital market efficiency is that unless you have very strong evidence to the contrary, your first reaction to any new investment situation should be that the prices you see in financial markets are an accurate assessment of value. If you fail to heed this advice, you will be wrong much more often than you are right. It is indeed “hard to beat the market.” However, that doesn’t mean that you will not be the exception.

The second lesson of capital market efficiency is that in the stock market, it is extremely difficult to separate skill from luck (i.e., random and unpredictable price movements). For example, is the investment manager who generates a 100% rate of return on his/her portfolio skillful or lucky? This observation is akin, in statistical terms, to a sample size of one. With a sample size of one, it is impossible to make a meaningful judgment. On the other hand, the investment manager who generates a rate of return of 2% per annum above (on average) his/her benchmark portfolio (i.e., same risk) over the past 30 years is likely to be skillful. The statistical and performance information in this history is much more meaningful. Most investment managers *do not* have a sufficiently long track record of performance for you (or anyone else) to assess their skill. A portfolio manager who is ranked in the first quartile of investment managers is hard pressed to repeat this performance year after year.

The third lesson of capital market efficiency is that the capital market efficiency protects (but does not coddle) naive investors. As long as you follow some basic rules of investing, like recognize the virtues of diversification and avoid over-trading, your return performance on average and over

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a long period of time will be, more or less, the same as your benchmark portfolio. For example, if you hold a diversified portfolio of Toronto Stock Exchange (TSE) stocks, then over a long period of time, your average rate of return will be similar to the TSE as a whole (possibly measured by an index like the TSE 300 index). Capital market efficiency implies that it is difficult to “beat the market,” but the corollary to this principle is that it is also hard to do worse than the market. This is the sense in which capital market efficiency protects naïve investors. Because it is hard to do worse than the market, you should evaluate critically the investment advice of your advisors. They may not be doing anything that you could not equally well do yourself. There is often more “hype” than substance in the marketing of many investment products and advice. Don’t be misled. The reason that hype is prevalent is that it is difficult to disprove exaggerated claims. Because stock market returns are so variable, it might take, for example, 30 years of return observations to conclude that an investment manager is performing no better or no worse than his/her benchmark. The application of your financial judgment in these situations is critical. An understanding of the notion of capital market efficiency is integral to this judgment.

(8.5) Equity Financing

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A public distribution of shares is a sale of new shares (typically from a firm’s treasury) to new shareholders for the purpose of financing a firm’s business activities. If a firm has not previously had its shares trade on an organized public stock exchange (an *unlisted* company), the issuing firm must file a *prospectus* with the appropriate financial market regulators. This issue is called an initial public offering and the firm will then have a listing on the stock-market after the share sale. The prospectus describes the firm, its business, introduces the directors and officers, and describes the securities to be sold.

If a firm already has a listing on a stock exchange, in Canada, the firm can sell new shares to new shareholders by simply notifying the exchange and possibly provincial securities regulators with

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a *exchange offering prospectus*. This document is simpler and less detailed than a traditional prospectus. A sale of new shares by a firm with a listing is called a seasoned issue.



Equity Financing Intro: 3 Minutes

In sections 8.5.1 to 8.5.6 we investigate seasoned public issues of common shares. In section 8.5.7 we discuss private equity financing for entrepreneurs and small business owners. That is, the sale of a private corporation's common shares to private investors. Financial "theory" is the same for private firms and public firms, but for private firms, shares do not trade on an organized stock exchange. We do not have share price to use as a guide. Therefore, for private equity financing we must rely on our theory of value, *Discounted Cash Flow* analysis, to a greater extent. Because the application of this theory can differ between financial analysts, negotiations for private equity financing are more likely contentious than for public equity financings.

8.5.1 Seasoned Equity Issues

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A public firm can issue new shares in one of two ways: a general cash offer or a rights issue. A general cash offer is a sale of new shares to any investor, more or less, who wishes to purchase. In a rights issue, the existing shareholders are given first "right" to buy new shares in proportion to their existing ownership.

8.5.2 General Cash Offer

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In Canada, on the Toronto Stock Exchange (TSE), firms can raise a maximum of \$5 million over a six month period with an exchange offering prospectus. The exchange offering prospectus must be accepted by the TSE but is not necessarily required by provincial securities regulators. Larger issues require a traditional prospectus and must go through the approval process of provincial securities regulators. In an exchange offering prospectus, new shares are sold, more or less, directly onto the Toronto Stock exchange for immediate trading (thus the name *exchange* offering prospectus).

8.5.3 Dilution in a General Cash Offer

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When a firm sells new shares to new shareholders, the fractional ownership of existing shareholders is *diluted* (i.e., dilution). Earnings are “shared” amongst a greater number of shareholders, and the fractional ownership of any original shareholder is diminished. Should firms avoid the use of general cash offers to avoid the impact of dilution on their shareholders? The answer to this question is: not necessarily. We will show in a numerical example that if financial markets are informationally efficient, existing shareholders are not necessarily worse off because of the general cash offer (i.e., their wealth is not decreased).

The intuition for this result is as follows. Think of firm’s market equity as a pie. When the firm sells new shares to new shareholders, two things occur. First, the pie is cut into more pieces (i.e., dilution). But, second, the size of the pie grows because of contributions from new shareholders. If the size of the pie grows sufficiently, it is possible that original shareholders are not worse off. The size of your slice of the pie might be unchanged. In financial markets, share price is the financial equivalent of the area of your pie slice. If financial markets are informationally efficient,

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share price is undiminished in a general cash offer (other than possibly because of transactions costs in the share issue).

To illustrate that share price is not diminished in a general cash offer, let us consider an example. We describe the issuing firm with its market value balance sheet immediately before the issue.

ABC Company: Market Value Balance Sheet before Equity Financing			
Tangible Assets	\$10 Million	Equity	\$15 Million
Intangible Asset	NPV = \$5 Million		
Total	\$15 Million	Total	\$15 Million

ABC has two assets. The first asset is the existing operations. The market value balance sheet estimates that these existing operations could be sold for \$10 million. In addition, ABC has a new venture planned. This new venture has a NPV of \$5 million. The new venture has not yet been financed so it has no trade capital assets nor any plant, property and equipment. That is the purpose of the general cash offer: to raise funds to finance trade capital and depreciable asset investment for the new venture. Presume that the NPV of \$5 million is a PV of \$6 million and a required expenditure of \$1 million (i.e., $\$5 = \$6 - \$1$). Because the required investment for this new venture is \$1 million, we need to sell this amount of new shares. In the process of financing this venture and purchasing trade capital and plant, property, and equipment, the intangible asset will be transformed into a tangible operating asset of the firm (like existing operations).

Suppose that the current number of shares outstanding in ABC is 2 million. The share price of ABC is, therefore, the total market equity value of \$15 million divided by 2 million shares, which is \$7.5. In doing this calculation we have presumed capital market efficiency. The \$15 million total market value of equity presumes that investors “see through” the ABC’s activities and recognize that the new venture has a NPV of \$5 million dollars. They are, therefore, willing to

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pay an additional \$5 million dollars for the existing shares of ABC. Thus, they are willing to pay $\$2.5 = \$7.5 - \$5$ per share for growth prospects associated with ABC's planned new venture.

At what price will ABC sell new shares to new shareholders? The general answer to this question is that ABC should sell shares for as great a price as possible. There are limits, however. For example, ABC cannot sell shares for a price of \$10. No investor will pay \$10 for a new share when they can buy an existing share for \$7.5 in current secondary market trading. In addition, ABC will not want to set a price much less than \$7.5. An analogy is your used car. If you have a used car worth \$10,000, it makes no sense to sell it for \$1,000. Similarly, if ABC has existing shares that are worth \$7.5, it makes no sense to sell new shares at, for example, \$1. If ABC under-prices its new shares, then dilution will indeed be to the detriment of shareholders. In actual markets, ABC must set a price which is just slightly less than \$7.5 in order than investors find the new shares more attractive than existing shares and will purchase in the offering. This *discount* can be viewed as a transaction cost of the issue to the existing shareholders. Let us abstract from this discount and presume that ABC can sell its shares at exactly \$7.5 which is the current share price in secondary market trading. ABC must sell $\$1 \text{ million} / 7.5 = 133,333$ new shares at \$7.5 to raise \$1 million dollars and finance its new venture. The fractional ownership of existing shareholders will fall from 100% to $2/2.133333 = 93.75$ percent. This reduction illustrates the dilution of the general cash offer.

ABC Company: Market Value Balance Sheet After Equity Financing

Tangible Assets	\$10 Million		
Tangible Asset	PV = \$6 Million		
		Equity	\$16 Million
Total	\$16 Million	Total	\$16 Million

After financing, the market value of equity is increased by the \$1 million contributed by the new shareholders. The firm takes these funds and purchases trade capital assets and plant, property and equipment for the new venture. The venture is thereby transformed from an intangible asset (an idea) to a tangible operating asset. The value of this operating asset is the present value of the future predicted benefits which is \$6 million dollars. Notice that this calculation is a present value

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(PV) rather than a *net* present value (NPV) because the required expenditure on new assets has been made.

What is the share price for existing and new shareholders immediately after the financing operation? The total market value of equity is now \$16 million. When this amount is divided by the number of shares outstanding, $16/2.1333333$, we find that the share price is \$7.5. Notice that share price is unchanged for existing shareholders by the equity issue. In this instance, therefore, shareholders are not worse off because of dilution that is inherent in the general cash offer.

Notice, in this example, that because the firm set the correct price in the offer (i.e., \$7.5), there has been no leakage of the NPV of the new venture from existing to new shareholders. The original shareholder begin with equity which has a total value of \$15 million and they end up with equity which has a total market value of \$15 million (i.e., $0.9375 \times 16 = 15$ million). The implication is that the financial transaction between the firm and new shareholders is zero NPV.

If there is no leakage, and new shareholders get a zero NPV investment, why should they purchase? They purchase because on their investment they expect a rate of return which just compensate for the risk which they bear – the market capitalization rate. If they were to get a higher return, the firm would be under-pricing its new shares.



General Cash Offer: 40 Minutes

8.5.4 Rights Issues

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In Canada, in the articles of incorporation of a firm, a share class can be given a *preemptive right* to purchase their fractional ownership of a share class in any new distribution of that class. However, this is not a common corporate provision. In its absence, courts in Canada¹² have ruled that a class of shareholders does not have this right and that public firms can sell their shares to any investor (subject to securities regulations). However, in a particular issue, a firm can always allow existing shareholders the option to maintain their fractional ownership by using a *rights* issue to sell new shares. A rights issue is, therefore, an immediate (more or less) sale of new shares where existing shareholders have the option to purchase their fractional ownership of the existing firm in the new issue. Shareholders have this option for approximately three weeks.

A rights issue is akin to a combination of a new share issue and a *stock split*. The stock split aspect of the issue causes share price to fall. However, the fall in share price does not mean that shareholders are worse off in the issue as long as they do one of two things: (1) use their rights and purchase their fractional ownership of the firm in the new issue (i.e., exercise their rights), or, (2) sell their rights. Rights issues are typically designed to facilitate the ability of existing shareholders who do not wish to increase their dollar investment in the firm to sell their rights. Rights are sold on the same exchange as a firm's common shares.

¹² The situation is different in the United States. Unless firms explicitly remove the “right” in their articles of incorporation, courts have ruled that shareholders have a preemptive right to maintain their fractional ownership in any distribution of that share class.

8.5.5 Rights Issue Example

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Suppose that ABC Company Ltd. decides to use a rights issue to finance their new venture rather than a general cash offer of new common shares. ABC sends, in the mail, one “right” per share outstanding. For example, if you own one hundred shares, you receive 100 rights. This is a standard feature of a rights issue. However, it typically takes more than one right to purchase a new share. For example, suppose that ABC decides that it will take 4 rights to purchase a new share. ABC has 2 million currently outstanding common shares, and therefore, they will sell $2,000,000/4 = 500,000$ new shares. What price should ABC require for a new share? This price is called the subscription price or, equivalently, the exercise price of the rights, or equivalently, the primary market price for the new share. If ABC wants to raise \$1 million dollars, and they intend on selling 500,000 new shares, the exercise price of a right must be $\$1,000,000/500,000 = \2 per share. Existing shareholders can, if they choose, in the rights issue, purchase a new share for every 4 existing shares at a price of \$2 per share. They do this by sending \$2 in cash and 4 rights directly to the firm. The firm then sends a new share back.

What is the price of a share of ABC (in secondary market trading) after the rights issue is successful? The price is called the ex-rights share price. Total market value of equity after the sale of new shares is $\$15,000,000 + \$2.0 \times 500,000 = \$16,000,000$. There will be $2,000,000 + 500,000 = 2,500,000$ shares outstanding after the issue. Share price will, therefore, be $\$16,000,000/2,500,000 = \6.4 . Share price falls in the rights issue from \$7.5 to \$6.4.

This fall in share price does not mean that the original shareholders are worse off as long as they either use their rights or sell their rights. To confirm this assertion, let us consider a very special shareholder. Let us call this individual Judy. Immediately before the issue, Judy has exactly \$2 in her pocket and owns four shares of ABC. We could consider any shareholder, but Judy’s wealth conveniently mimics the characteristics of the rights offering. Judy’s original wealth is $\$2 + 4 \times \$7.50 = \$32$.

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Suppose that Judy exercises her rights in the offer. She has received exactly four rights in the mail from ABC Co. (i.e., one right per share). Judy adds a cheque for \$2 to these rights and puts them back in the mail to ABC. ABC then sends Judy a new ABC share. Judy now has five shares in ABC, worth \$6.40 each after the rights issue. Judy's wealth is, therefore, $5 \times \$6.40 = \32 . Notice that Judy's wealth is undiminished by the rights issue.

On the other hand, suppose that Judy does not want to increase her dollar investment in ABC, and therefore, she decides to sell her rights. Judy has four rights from ABC. How much can Judy earn if she sells a single right? We may think of each original ABC share as a new share and a right (recall that there is one right per original share). If the original share was worth \$7.50, then the value of the new share and the value of a right must sum to \$7.50. However, we know that the value of a new share after the rights issue will be \$6.40. The value of a right must, therefore, be $\$7.50 - \$6.40 = \$1.10$. Judy can sell each right for \$1.10, and so she will receive \$4.40 for the sale of four rights. In addition, Judy has four shares worth (after the rights issue) \$6.40 each. Therefore, her investment in ABC is worth $4 \times \$6.40 = \25.60 . Last, add the \$2.00 that Judy still has in her pocket because she did not exercise her rights. Judy's total wealth is $\$4.40 + \$25.60 + \$2.00 = \32 . Once again, Judy's wealth is undiminished by the rights offering even though share price falls in secondary market trading from \$7.50 to \$6.40.

8.5.6 Three Share Prices in a Rights Offer

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There are three important share prices in rights offerings. First, there is the original share price in secondary market trading. Let us refer to this price as “ P .” Second, there is the primary market price of the new share sold in the rights offering. Let us refer to this price as “ E ,” (for exercise price). Finally, the last price is the “ex-rights” price of a share. The ex-rights price is the price that share will trade at when the right can be bought and sold separately from the share. The ex-rights price is the price of all shares, the original shares and the newly issued shares, in secondary

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market trading when the issue is successful. Let us refer to the ex-rights share price as “EX,” (for ex-rights). The relation between the original share price, the primary market price, and the ex-rights price is given in the following:

$$EX = \frac{P + (1/NR) * E}{1 + 1/NR}, \quad (8.20)$$

where NR is the number of rights required to purchase a new share in the issue. In this expression, the term $1/NR$ is the number of new shares sold in the offering per one original share. The numerator is, therefore, the total market value of equity after the issue per one original share outstanding. The denominator is the number of shares outstanding after the issue per one original share outstanding. Then, of course, the new secondary market share price is the total market value of equity divided by the number of shares outstanding (both after the equity issue).

To simplify the above expression, you can multiply top and bottom by NR . An alternative expression for the ex-rights price is then,

$$EX = \frac{NR * P + E}{NR + 1} \quad (8.21)$$

In our example of the last sub-section, $EX = (4*7.5+2)/(4+1) = \$6.4$.

8.5.7 Rights Issues, Fractional Ownership, \$Investment

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In a rights offer, outstanding shares increase by $1/NR \times 100\%$. In our example, $1/NR \times 100\% = 1/4 \times 100 = 25\%$.

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If you do not subscribe in the rights offer, then you sell your rights. In this case, your fractional ownership in the firm falls to

$$\frac{1}{1+1/NR} \quad (8.22)$$

of what it was before the rights issue. In our example, if you owned (as a for-instance) 10% of the shares in the company before the offering, then, you own $1/(1+1/4) \times 10\% = 8\%$ of the shares in the company. In addition, your dollar investment in the firm falls because the rights-sale partially liquidates your holdings. Your dollar-investment falls by the absolute value of

$$\frac{EX - P}{P} \times 100\% \quad (8.23)$$

In this expression, the numerator is the fall in secondary-market share-price as the result of the rights offer and the denominator is the share-price before the rights offer. Substitute (8.21) into (8.23), then, your dollar investment falls by the absolute value of,

$$\frac{(E - P)/P}{NR + 1} \times 100\% \quad (8.24)$$

In our example, when you do not exercise, your dollar investment falls by the absolute value of $100 \times (6.4 - 7.5)/7.5$, which is 14.67% (that is, equation 8.23). Equivalently, your dollar investment falls by the absolute value of $100 \times ((2 - 7.5)/7.5)/5 = 14.67\%$ (that is, equation 8.24).

If you do exercise your rights, you maintain your fractional ownership in the company but you must increase your dollar-investment. The percentage increase in your dollar-investment is

$$\frac{(NR * P + E) - NR * P}{NR * P} = \frac{E}{NR * P}$$

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This amount is your dollar-investment after the exercise minus your dollar-investment before the exercise divided by your dollar-investment before the exercise. In our example, if you exercise your rights, your dollar investment increases by $2/(4*7.5)=6.67\%$.



Rights Offer: 40 Minutes

8.5.8 Private Equity Financing

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If you are a small business owner or an entrepreneur of a private corporation, you do not have access to the stock market to sell new shares to finance your new venture. Therefore, when you sell new shares to private investors, you have to be more careful than in public offerings about “sharing” and business partners’ fractional ownership. We do not have share price to use as a guide to ensure appropriate fractions.

To finance a new venture with common equity, partners should receive a fractional ownership equal to their contribution to business value after financing and new venture start. The entrepreneur contributes, typically, existing operations and the new venture to be financed. We use present value (PV) and net present value (NPV) to establish business values. Because existing operations are already financed, their value is the *PV* of predicted future *free cash flow*. Because the new venture is not yet financed, its value is the *NPV* of predicted future *free cash flow*. Business value after financing and after new venture start is the PV of existing operations plus the new venture NPV plus new venture financing. The equity investor who finances the new venture contributes the new venture financing. Therefore, his/her fractional ownership after the financing

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should be the amount of the new venture financing divided by the PV of existing operations plus the new venture NPV plus the new venture financing. Unless a corporation uses what is called project financing, which is specific to a particular project, recognize that new common shareholders share not only in the new venture, but all of the corporation's businesses: existing operations and the new venture.



Private Equity Financing: 11 Minutes

Problem: Your business is comprised of existing operations and a new venture opportunity. The book value of existing operations is \$10,000,000. Forecast free cash flow for existing operations for the upcoming year is \$2,400,000, which you expect to grow thereafter at 5% per annum. There is no debt in the financial structure of your business. You need new venture financing. Unfortunately, you do not have the funds required for the expenditure to transform the new venture from the planning to the operating phase. However, you have found an investor who will finance your new venture in exchange for a fractional common equity ownership in your business. Required financing for the new venture is \$I, which is the expenditure necessary to transform the new venture into an operating business. Once the financing is complete, which you expect to take place in the very near term, and the new venture begins operations, you expect that new venture incremental free cash flow at the end of the first year will be \$1,750,000, which grows thereafter at 6% per annum. Before the equity financing, you own 100% of shares in your firm. The cost of capital for existing operations and for the new venture is 20% per annum. You have offered and the new investor has demanded a 40% equity ownership in your firm in exchange for his/her financing of the new venture in the amount of \$I.

Required: What is the amount of the required financing, \$I, for the new venture?

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Solution: The cost of capital is the discount rate for business investments (see chapter 9).

$$\text{New Venture NPV} = \frac{1,750,000}{0.2 - 0.06} - \$I = \$12,500,000 - \$I$$

$$\text{Value of Existing Operations} = PV = \frac{2,400,000}{0.2 - 0.05} = \$16,000,000$$

$$\text{Therefore, } \frac{I}{[I] + [12,500,000] + [16,000,000 - I]} = 40\%$$

Solve to find $I = \$11,400,000$. Notice that the book value of existing operations, \$10,000,000, is not necessary to solve this problem. The amount that partners contribute to the business is the economic value of assets rather than their book value. Book values are, therefore, irrelevant in the determination of fractional ownership.

(8.6) Summary

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This chapter book investigates equity financial assets and the markets in which they trade. First, we discuss how equity securities differ from debt. Second, we investigate the valuation of equities, either common shares or preferred shares, with the Discounted Dividend Model. Third, we discuss the efficient markets hypothesis, which is central to an understanding of how public financial markets function. Last, we discuss the ways in which firms sell new common shares for the purpose of financing their operations.

(8.7) APPENDIX: Dividend Reinvestment

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Many companies have dividend reinvestment plans. In fact, at the bottom of the dividend announcement of Exhibit 8-1, Scotiabank gives shareholders the option of receiving dividends in cash or Scotiabank shares through Scotiabank's "Shareholder Dividend and Share Purchase Plan." If a shareholder chooses to receive shares rather than cash dividends, then a Scotiabank agent buys Scotiabank shares on the stock exchange (not from Scotiabank's treasury). Because there are many shareholders who participate in the "Shareholder Dividend and Share Purchase Plan" this agent buys shares in volume and with accounting entries, in effect, distributes even fractional shares to small shareholders. Shareholders do not formally receive fractional shares. The agent purchases full shares that are "shared" by so many plan participants that these participants effectively own "fractional" shares. The agent accounts for and accumulates fractional shares until participants individually have a full share. At this time, the agent distributes that share. If participants sell fractional shares, then the agent buys these shares, at the market price for other plan participants in lieu of cash dividends. If more plan participants want to sell fractional shares than buy, the agent sells full shares on the stock exchange. If more plan participants want to buy fractional shares than sell, the agent buys full shares on the stock exchange to accommodate.

Recall that over any holding period, whether or not that holding period includes a dividend payment or not, as long as shareholders reinvest dividends into common shares of the same company, expected shareholder wealth grows at the MCR. This property of the DDM is true generally, but we demonstrate it with the constant growth DDM.

To demonstrate that with dividend reinvestment, the annualized expected holding period rate of return is the MCR, let us suppose that today is an ex-date. The common share has just paid a dividend and the next dividend is in one year. Let us also suppose that our holding period is n

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years from today, which is also an ex-date.¹³ Between today and the ex-date in n years, we receive n cash dividends that we reinvest in additional common shares. We buy new shares at the ex-price because, at least conceptually, we receive cash dividends before we buy new shares. We say “conceptually” because if you participate in a dividend reinvestment plan, you never receive cash dividends, but only additional shares.

Figure 1 or 2 above is helpful to focus our thoughts. Today is an ex-date and share price is P_0 . Expected dividend in one year is D . We buy additional shares at the ex-dividend price at that time, which is $P_0(1+g)$. So, for one year-beginning share, we have $1 + \frac{D}{P_0(1+g)}$ shares on the ex-date in one year. The share growth rate, $\frac{D}{P_0(1+g)}$, is the forward dividend yield, $\frac{D}{P_0}$, divided by one plus the growth factor, g .

As an example, if a firm has a forward dividend yield of 6.6% per annum and sustainable growth of 10% per annum, then, with dividend reinvestment, the number of new shares at year-end per one year-beginning share is $\frac{0.066}{1.1} = 0.06$. Fractional shares are possible because we buy new shares through the dividend reinvestment plan. Share holding (number of shares) grows at 6% per year through dividend reinvestment.

Let us now consider the second year that we participate in the dividend reinvestment plan. For every one year-beginning share in the second year, we have $1 + \frac{D(1+g)}{P_0(1+g)^2}$ year-end shares. The amount $D(1+g)$ is the dividend expected two years from today, which has grown from the first dividend at the sustainable growth rate, g . With the cash dividend $D(1+g)$ we buy additional shares at the ex-price in two years, $P_0(1+g)^2$. This amount is today’s ex-price, P_0 , having grown

¹³ One could use any holding period, but this one is convenient for the purpose of calculation.

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at the sustainable rate, g , for two years. The number of year-end new shares for every one year-beginning share is the cash dividend divided by ex-price, $\frac{D(1+g)}{P_0(1+g)^2} = \frac{D}{P_0(1+g)}$. Notice that this fraction is the same as for the first year. The reason for this equality is that both cash dividends and the ex-price grow at the factor $1+g$. This factor cancels, numerator and denominator, and therefore, the fraction remain constant indefinitely. This result means that for any future year, the share growth rate is $\frac{D}{P_0(1+g)}$, which is 6% per year in our example.

Today we begin with one share. Other than today, for any future year, we have more than one year-beginning share because of previous share purchases through dividend reinvestment. For example, at the beginning of year two we have $\left(1 + \frac{D}{P_0(1+g)}\right)$ shares. At the beginning of year

three we have $\left(1 + \frac{D}{P_0(1+g)}\right)^2$ shares. To determine share holdings, compound the share growth rate. Compound because not only the original share, but also shares purchased through dividend reinvestment pay cash dividends at year end, which we use to buy additional shares at the ex-price at that time. Share holdings n years from today on the ex-date at that time is,

$$\text{share holdings } n \text{ ex-dates from today} = \left(1 + \frac{D}{P_0(1+g)}\right)^n$$

In our example, in 10 years, on the ex-date at that time, we have $1.06^{10} = 1.790848$ shares.

Next, what is total share *value* in n years? Share value is number of shares, $\left(1 + \frac{D}{P_0(1+g)}\right)^n$, times ex-price at that time, $P_0(1+g)^n$ (recall that ex-prices growth at the sustainable rate, g). Therefore, the total share value is,

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$$\left(1 + \frac{D}{P_0(1+g)}\right)^n * \left(P_0(1+g)^n\right).$$

Let us add to the example we have been working on. Suppose today's share price is \$20, $P_0 = 20$. Then, expected share value in 10 years is 1.790848 shares at $20 * (1+0.1)^{10} = \$51.87$ each. Total share value is, $1.790848 * 51.87 = \$92.90$.

Because we have no cash (we used dividends to buy additional shares), HPRR for a 10 year holding period is total share value less original price, all divided by original price, $HPRR = \frac{92.90 - 20}{20} = 364.5\%$. Annualized HPRR is $(1 + 3.6449977)^{1/10} - 1 = 16.6\%$. To confirm this result, recall that the forward dividend yield is 6.6% and the sustainable growth rate is 10%. So, MCR, dividend yield plus growth, is, $6.6\% + 10\% = 16.6\%$. Our annualized HPRR with dividend reinvestment is the MCR, which we wanted to show.

More formally, the HPRR for an n year holding period is,

$$\frac{\left(1 + \frac{D}{P_0(1+g)}\right)^n * \left(P_0(1+g)^n\right) - P_0}{P_0} = \left(1 + g + \frac{D}{P_0}\right)^n - 1 = (1 + MCR)^n - 1$$

The first equality follows from a little algebra and the second results because dividend yield plus sustainable growth is the MCR in the constant growth DDM. Annualized HPRR is,

$$\left(1 + \left[(1 + MCR)^n - 1\right]\right)^{1/n} - 1 = MCR$$

(8.8) Suggested Readings

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(8.9) Problems

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1. ***Equity Valuation.***

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Investors currently require a market capitalization rate of 12 percent per annum on the shares of Nickel Corporation, whose dividend payment for this year *was* \$0.60. The current market price is \$12.50. What is the implied long-run rate of growth in dividends?



Solution

2. ***Equity Valuation.***

[Title Page](#)

Consider two firms that are identical except for their share prices and their rates of return on equity (and, therefore, the growth of dividends). Capital markets are efficient with respect to the information on these firms. How do the share prices of the firms differ? Is either one preferred by you as an investor?



Solution

3. ***Equity Valuation.***

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From past investments, ABC expects earnings next year of \$1 per share and this amount is expected every year thereafter indefinitely into the future. ABC reinvests 50% of yearly earnings at a reinvestment rate of return of 20% per annum in perpetuity. DEF Company is in the same industry and has similar risk characteristics to ABC. DEF, unlike ABC, does not

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reinvest any earnings. DEF expects constant yearly earnings and has a P/E ratio of 8. At what price would you expect ABC Company shares to trade?



Solution

4. ***Equity Valuation.***

[Title Page](#)

Consider a firm that pays its dividends yearly. The ex-dividend date is today. The expected dividend in one year is $\$D$. Thereafter, each year, the expected dividend is 90 percent of the dividend paid in the previous year. For this firm, which of the following is larger: the market capitalization rate on the share, or the dividend yield (calculated as D divided by the price of the share)? Explain.



Solution

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5. *Complete the Sentence.*

[Title Page](#)

Explain why your choice is the most realistic answer. High P/E ratios are associated with —

- a) low firm risk, low earnings growth, and high market rates of interest,
- b) low firm risk, low earnings growth, and low market rates of interest,
- c) high firm risk, low earnings growth, and high market rates of interest,
- d) high firm risk, low earnings growth, and low market rates of interest,
- e) low firm risk, high earnings growth, and high market rates of interest,
- f) low firm risk, high earnings growth, and low market rates of interest,
- g) high firm risk, high earnings growth, and high market rates of interest,
- h) high firm risk, high earnings growth, and low market rates of interest.



Solution

6. *Equity Valuation.*

[Title Page](#)

Consider the following two hypothetical firms. If financial markets are informationally efficient with respect to the below information on these firms. Using only the information given below, which common share do you prefer as an investor? Explain.

	Firm A	Firm B
market capitalization rate	12 %/annum	12%/annum
retention ratio	40%	40%
rate of return on equity	15%	20%
payment of dividends	yearly	yearly
next dividend payment	in one year	in one year
forecasted earnings from past investment	\$3.00 per share	\$3.00 per share



Solution

7. *Rights Offering of New Common Shares.*

[Title Page](#)

Superior Ltd. has concluded that additional financing is required to increase their production capacity and that these funds are best obtained through a rights offering. The firms has correctly

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concluded that as a result of the rights offering, share price will fall from \$50 to \$48 (the \$50 is the rights-on price and the \$48 is the ex-rights price). The company is seeking \$10 million in additional funds. There are 10 million shares outstanding prior to the offering. The firm will give one right per common share. What is the subscription price in the rights issue?



Solution

8. *Rights Offering of New Common Shares.*

[Title Page](#)

Assume that financial markets are informationally efficient with respect to information on the firm described below.

ABC is composed of two divisions. The electronics division is well established and could easily be sold for 20 million dollars. The chemical division has been in the development stages but is now ready for financing. The chemical division requires assets of 16 million dollars to begin production. ABC is planning to use a rights offering of new common stock to raise the needed funds. One right will be given to each outstanding share. One right will be required to buy a new share at the subscription price. The financing will double ABC's outstanding common shares. Share price is expected to fall by 25% after financing. Rights are expected to sell for \$0.80 each.

What is the number of outstanding shares before and after the financing? What is ABC's common share price before and after financing? What NPV did financial markets attribute to the chemical division?



Solution

9. *General Cash Offer of New Common Shares.*

[Title Page](#)

JJJJ Pharmaceuticals wants to raise \$200 million in a new stock issue. The current number of shares outstanding is 100 million. The company's investment banker indicates that a sale of new stock will require a 5 percent under-pricing to the current share price and a 6 percent spread (the sale price of a new share to new shareholders minus the proceeds per share to the firm divided by the purchase price of a new share in the offer). The spread is the "commission" charged by the

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underwriter for the distribution of the share offering. Before the stock market becomes aware that the firm is planning the offering, the share price is \$56.

How many shares must the firm sell? How much money will the investment banker earn on the sale? Find the share price after the equity financing. What is the per share cost of the financing to the original shareholders?



Solution

10. *Rights Offering of New Common Shares.*

[Title Page](#)

Management of Superior Inc. has concluded that additional equity financing is required to increase production capacity and that these funds are best obtained through a rights offering. It has correctly concluded that as a result of the rights offering, share price will fall from \$50 to \$45. The company is seeking \$25 million in additional funds with a per-share subscription price of \$5. The firm has no debt its financial structure.

How many shares did Superior have prior to the issue? What was the market value of the firm's assets prior to the issue?



Solution

11. *Equity Valuation.*

[Title Page](#)

XYZ's common stock has just paid a dividend of \$1.50 and has an ex-dividend price of \$24. Dividends are expected to grow at 8 percent per annum. XYZ pays their dividends yearly.

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Decompose the per annum expected rate of return on XYZ common stock into dividend yield and expected capital gain per dollar invested in the share.



Solution

12. **Equity Valuation.**

[Title Page](#)

ABC Company has a retention ratio of 60% of earnings which is expected to continue. Financial analysts predict that ABC's cash earnings per share next year will be \$12 and the company's investments will earn an annual rate of return of 20%. ABC pays their dividends annually. The market capitalization rate on ABC's equity is 15 per cent per annum.

- a) What is the payout ratio?
- b) What is the value of a share in ABC?
- c) What is the expected rate of growth rate of dividends?
- d) What are dividends per share expected to be five years from now?
- e) How much of the value of a share in ABC should be attributed to future productive growth potential?



Solution

13. **Equity Valuation and Reinvestment (Challenging).**

[Title Page](#)

This is an adaptation of a problem written by Rob Heinkel, University of British Columbia.

Investors expect ABC to pay a dividend of \$2 per share in exactly one year. Thereafter, dividends are expected to grow at 5% per year. ABC pays its dividends annually. In addition, ABC has just been offered an investment opportunity. This investment requires an initial investment of \$10,000 plus project production costs for each of the upcoming two years (exactly one year from today and two years from today, respectively). ABC will finance the production costs by reducing dividends in one year and two years from today to \$1 per share. Exactly 3 years from today and each year thereafter, dividends will be equal to those expected by investors prior to the real asset investment opportunity plus incremental dividends arising from the investment opportunity. Incremental dividends will be paid, beginning exactly 5 years from today, equal to \$0.75 per share per year. There are 10,000 share outstanding in ABC Co. Ltd.

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The market capitalization rate for ABC shares and the discount rate for the real asset investment are both equal to 10% per annum.

What is the price per share of ABC before and after the announcement of this project?



Solution

14. ***Equity Valuation and Reinvestment (Challenging).***

[Title Page](#)

This is an adaptation of a problem written by Stuart Turnbull, Formerly of University of Toronto and Queens University. Since its establishment in 1955, ABC Company has had a constant perpetual stream of earnings (i.e., neither increasing or decreasing) which it consistently has paid out in full as yearly cash dividends. On January 1, 1996, ABC made the following announcement:

At the end of 1996, ABC will retain 100% of its earning for 1996 for an investment project “A” that will have an incremental ROE of 20% per annum indefinitely.

At the end of 1997, ABC will retain 50% of earnings for that year (including the incremental earnings generated from investment A) for an investment project “B” which will generate an incremental ROE of 15% per annum indefinitely.

After 1997, ABC will not make any new investments but will resume its full payout policy.

Very shortly after the announcement, ABC’s market value increased by \$3.4 per share.

The market capitalization rate for ABC shares is 10% per annum. Determine ABC’s yearly earnings (and dividends) before the new investment plan was implemented.



Solution

15. ***Ex-Dividend dates and Investment.***

[Title Page](#)

Other things equal, share prices should fall on ex-dividend dates. Does this prediction imply that an investor can make a sure profit by shorting a common share immediately prior to the ex-dividend date?

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Solution

16. *Discounted Dividend Model and Restricted Voting Shares.*

[Title Page](#)

Consider two classes of common shares in ABC. Class A shares are voting and Class B share are non-voting. Both shares trade on the Toronto Stock Exchange. The articles of incorporation of ABC require that dividends on the two classes of share be equal. What prices do you expect for the class A and B shares in stock market trading?



Solution

17. *Ex-Dividend dates and Investment.*

[Title Page](#)

You buy a common share today on an ex-dividend date and plan to sell it at the last traded price the day before the ex-dividend date one quarter from now. How does your rate of return compare to a similar investor, but one who plans to sell at the opening price on the ex-dividend date one quarter from now? Ignore tax effects and the one-day difference in the investment holding periods in this problem.



Solution

18. *Efficient Markets Hypothesis.*

[Title Page](#)

Discuss the following assertion: “Since capital market efficiency implies that the NPV of any financial asset investment is zero, there is no reason for investors to be interested in financial assets.”

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Solution

19. ***Efficient Markets Hypothesis.***

[Title Page](#)

Discuss the following assertion: “The theory of capital market efficiency predicts that there are no capital gains or losses on common shares, just a ‘normal’ rate of return.”



Solution

20. ***Efficient Markets Hypothesis.***

[Title Page](#)

Compare and contrast the following two statements:

- a) Capital markets are informationally efficient.
- b) Capital markets are omniscient with regard to future events (i.e., having total knowledge).



Solution

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21. *Efficient Markets Hypothesis.*

[Title Page](#)

Discuss the following extreme view of capital market efficiency: “Capital markets are informationally efficient, and therefore, the production of annual reports by firms is unnecessary.”



Solution

22. *Efficient Markets Hypothesis.*

[Title Page](#)

Discuss the following assertion: “Positive NPV real asset investments for firms are more likely than are positive NPV investments for financial asset investors.”



Solution

23. *Going Concern Versus Liquidation Valuation.*

[Title Page](#)

Victoria Principle is the only shareholder of the Vancouver Ritz Hotel Ltd. The Ritz caters to business and tourist travelers who are looking for good quality accommodation at reasonable prices. A professional manager operates the Ritz. The Ritz is centrally located and is about one mile from downtown Vancouver. Victoria originally purchased the Ritz (land, building, plus the business) 10 years ago for \$500,000. Since that time, land value in Vancouver has increased significantly. Victoria is concerned that the value of the Ritz as a going concern business has not kept pace with the opportunity cost of the land on which it is located. Recently, Victoria has been approached by a developer who is willing to purchase the land on which the Ritz is located for \$2,000,000. The developer would demolish the Ritz (at his expense) and build a high-rise office building.

In order to determine whether the Ritz should be operated as a going concern or whether it should be sold to the developer, Victoria has retained your services as a financial analyst. First, you observe that business at the Ritz has “seen better days.” Dollar revenues have been “flat” for the last several years and prospects for growth are nonexistent. You decide, therefore, in your “going concern valuation” to consider the Ritz a “non-growing” firm. You predict, based on past history and discussion with the manager, that dollar sales will be around \$2,000,000 per annum into the indefinite future. Contribution margin per dollar sales is 20% and per annum

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fixed costs are \$50,000 per annum. The tax rate for the Rittz is 35%. The accounting balance sheet for year-end 1994 is:

Cash	\$100,000	Accs. Payable	\$20,000
Accs. Rec.	\$100,000	Short-term Debt	\$500,000
Inventory	\$50,000		
Land	\$400,000		
Building	\$1,350,000	Equity	\$1,480,000

Because the Rittz is a non-growing business, all earnings are paid as dividends to Victoria. You consider the Rittz to be an “average risk” business with respect to other businesses in the North American economy, and therefore, you use the long-run rate of return on the stock market of 12% per annum as your discount rate for equity valuation. The interest rate on short-term debt is currently 8% per annum and this is your best prediction for the indefinite future. The current rate of interest in the economy on short-term debt is 8% per annum. If the Rittz remains a going concern, they intend to maintain short-term borrowing at the current level into the indefinite future (i.e., when the outstanding balance on short-term debt is due, the Rittz refinances this debt and continues to make interest payments on the unchanged outstanding balance). If Victoria sells the land on which the Rittz is located, she expects no salvage on the building, but she can liquidate trade capital. In liquidation of the Rittz, both accounts payable and the outstanding balance on short-term debt must be paid. Ignore capital cost allowances in this problem. Ignore the \$500,000 exemption on capital gains that exists for some qualified small businesses. Prepare a report for Victoria including the details of your analysis. Should Victoria sell the land on which the Rittz is located and liquidate operations, or should she continue operating the Rittz as a going concern?



Solution

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24. *Efficient Markets Hypothesis.*

[Title Page](#)

If the major North American stock markets are informationally efficient, how do you explain the fact that some people make very high returns? Expand and explain.



Solution

25. *Efficient Markets Hypothesis.*

[Title Page](#)

Discuss the following assertion: Last year, you earned a rate of return of 30% on your portfolio of common shares when the rate of return on an index of Toronto Stock Exchange stocks was only 12%. This occurrence proves that financial markets are not informationally efficient.



Solution

26. *Dates for a Dividend Payment.*

[Title Page](#)

In chronological order, what are the four dates associated with any dividend payment? What are the approximate time intervals between these dates? By whom are they set? What share price effects would you expect on each of these dates? Explain.



Solution

27. *General Cash Offer of New Common Shares.*

[Title Page](#)

A sale of common shares by a firm spreads the firm's earnings among a greater number of shareholders, and therefore, firms should avoid the use of equity financing. Comment on this assertion.

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Solution

28. ***Equity Valuation and Inflation.***

[Title Page](#)

Suppose that the price of a common share is \$20. The share paid a dividend yesterday of \$2. Dividends are paid once per year and the next and upcoming dividend is in exactly one year. Per annum dividends are expected to increase at the rate of inflation in the economy for each year into the indefinite future. Common shares of equivalent risk have a real expected rate of return of 10% per annum. What expected inflation rate or range of expected inflation rates is consistent with this market pricing?



Solution

29. ***General Cash Offer***

[Title Page](#)

A public firm is considering a general cash offer of new common shares. Describe and explain how this firm's "primary market" share price and its "secondary market" share price are related to one another. Explain. Use no numerical examples in your answer.



Solution

30. ***ROE Versus MCR***

[Title Page](#)

What are the primary factors that influence a firm's rate of return on equity? What are the primary factors that influence a firm's market capitalization rate for equity? Explain. Use no numerical examples in your answer.

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Solution

31. ***Market Capitalization Rate***

[Title Page](#)

Discuss the following assertion: “If the expected rate of return for ownership of a common share is high, investors are necessarily attracted to buy such a firm’s common shares, and therefore, the common share price is correspondingly high.” Use no numerical examples in your answer.



Solution

32. ***Rights Issue***

[Title Page](#)

For a public firm, there are three important “prices” related to common shares in a rights issue (of new common shares). Describe these three prices and how they relate to one another. Use no numerical examples in your answer.



Solution

33. ***ROE Versus Market Capitalization Rate***

[Title Page](#)

Comment on the following assertion. “Even if a firm has an expected rate of return on equity that exceeds the market capitalization rate on equity, there is never an incentive for any investor under any circumstance to buy the shares of this firm. The expected rate of return on this investor’s common share investment is nonetheless equal to the rate of return that investors can

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earn when investing in financial assets of equivalent risk (on average).” Use no numerical examples in your response.



Solution

34. *General Cash Offer*

[Title Page](#)

In a general cash offer of new common shares, shareholders “share” in a smaller fraction of a larger pie, and therefore, they can never be made worse off by a general cash offer. Comment on this assertion. Use no numerical examples in your response.



Solution

35. *Constant Growth DDM*

[Title Page](#)

Predicted earnings for ABC in the upcoming year are \$5 per share. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). Today, ABC’s share price is \$50. In one year, immediately prior to the dividend payment at that time, the share price is expected to be \$56. One day later, on the ex-date, share price is expected to be \$52. Ignore taxation in this problem. ABC retains a constant fraction of earnings each year for reinvestment and growth.

Required: Based on the constant growth discounted dividend model, (with retention and reinvestment) answer the following question. Based on the above information, find ABC’s ROE.



Solution

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36. **ROE Versus MCR**

[Title Page](#)

“Two firms of equal risk cannot have rates of return on equity that differ. Otherwise, the share prices in these firms would change so that once more they offered an expected rate of return on an investment in either share which was equal.” Discuss. Use no numerical examples in your response.



Solution

37. **Constant Growth DDM**

[Title Page](#)

Earnings per share of ABC company from past investment in business activity is predicted to be \$2 per share for the upcoming year. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). Growth in dividends and earnings is predicted to be about 6% per annum into the indefinite future. ABC retains a constant fraction of earnings each year for reinvestment and growth. ABC's price/earnings ratio (using earnings predicted in the upcoming year) is 15.0. ABC has a market to book ratio for its equity of 3.0.

Required: What is the current share price of ABC? What is the dividend yield on ABC's shares? What critical assumption(s) are you making in answering this question?



Solution

38. **Constant Growth DDM**

[Title Page](#)

ABC has a forward rate of return on equity of 12% per annum and a market capitalization rate of 15 percent per annum. Forward earnings per share are \$2 for the upcoming year. ABC is trying to decide on a retention ratio. Ignore bankruptcy costs, personal taxes and corporate taxes, and other market imperfections. What advice can you give to ABC? Explain.

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Solution

39. *General Cash Offer*

[Title Page](#)

ABC common shares trade on the Toronto Stock Exchange. ABC's market capitalization (market capitalization, often referred to as market cap, is share price times number of outstanding shares) is \$100,000,000. ABC has 10 million shares outstanding. You own 15% of the outstanding shares of ABC Company. ABC is contemplating a general cash offer of new common shares (a primary offering of new shares). The new issue share price will be exactly the same as the current secondary market share price of ABC shares on the Toronto Stock Exchange. You do not plan to buy additional shares for your portfolio from this new issue. Ignore transaction costs in this problem. As the result of the general cash offer, your fractional ownership of ABC shares will fall to 10%.

Required: How many new shares does ABC sell in the general cash offer?



Solution

40. *Rights Issue*

[Title Page](#)

The price of ABC Company Limited common shares is \$12 per share. You own 10% of the shares in ABC. Your total dollar investment in the common equity of ABC is \$1,500,000. ABC is planning, in the near future, a rights issue of new common shares. ABC gives one right to shareholders per share outstanding. If you do not subscribe in the rights issue (that is, you sell the rights), your fractional ownership of ABC common equity will fall to 8% and your dollar investment in ABC shares will fall to \$1,400,000.

Required: What is the exercise price of a new common share in the rights offering (the primary market price)?

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Solution

41. *Constant Growth DDM*

[Title Page](#)

ABC Company expects constant indefinite growth. ABC's retention ratio is "b". Their market capitalization rate for common equity is 10% per annum. Their forward rate of return on equity is 15% per annum and their forward earnings per share at the end of the upcoming year is \$2.00. Hypothetically, and other things equal, if the retention ratio were 0% rather than "b", and, in particular, if the risk of equity ownership remained unchanged, share price would be 33.33% lesser.

Required: What is ABC's retention ratio?



Solution

42. *Dividend Reinvestment*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of the value of ABC common shares. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). The next and upcoming dividend is in one year. The share price today is \$200. Expected growth in dividends, earnings, and the ex-dividend share price is 3% per annum. The market capitalization rate for ABC shares is 10% per annum.

You plan to buy a share of ABC Company today. You (as an investor) have a ten year investment horizon. With the dividends you receive over the next ten years, you plan to purchase additional ABC shares at the ex-dividend share price on the ex-dividend date in the future (fractional share purchases are possible). That is, for each ex-dividend date up to and including ten years from today, you will reinvest the dividends you receive. Dividends you receive on newly purchased shares will also be reinvested into additional ABC common shares.

Required: As the result of the initial purchase of one ABC share and your subsequent reinvestment of dividends, one, two, three, four, five, six, seven, eight, nine, and ten years from today, how many ABC common shares will you have exactly ten years from today?

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Solution

43. *Constant Growth DDM*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of the value of ABC shares. ABC pays a dividend on its common shares once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). ABC retains a constant fraction of earnings each year for reinvestment and growth (i.e., constant retention ratio). The share price today is \$90. The dividend expected in one year is \$9. ABC's price to forward earnings ratio is 7.5 and their market to book ratio for equity is 1.5.

Required: Find the expected share price 2 ½ years from today.



Solution

44. *ROE Versus MCR*

[Title Page](#)

Comment on the following assertion. "A firm creates wealth for shareholders when its forward ROE exceeds its industry average forward ROE." A complete response is required for full marks. Use no numerical examples in your response.



Solution

45. *Rights Issue*

[Title Page](#)

The current secondary market price for ABC Company common equity is \$40 per share. Your total dollar investment (as a shareholder) in ABC shares is \$4,000. ABC has just announced that they are planning a rights issue of new common shares (ABC gives existing shareholders one right per outstanding share). Ignoring commissions and transactions costs, if you do not

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subscribe in the rights offering, that is, you sell your rights, your dollar investment in ABC shares will fall by \$125. That is, dollar proceeds from your rights sale is \$125. Three rights plus the subscription price buy a new share from the firm in the rights offering.

Required: What is the subscription price of a new share in the rights offering?



Solution

46. *Constant Growth DDM*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of ABC common share value. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). The next and upcoming dividend is in one year. You belong to a dividend reinvestment plan that purchases additional shares for you (at the ex-dividend price at that time) with your dividends. Your expectation is that for every one share you begin the year with, your share holdings will increase by 4% at year-end. The forward dividend one year from today is \$0.84 per share. The market capitalization rate for ABC shares is 9.2% per annum.

Required:

- a. What is the ex-dividend share price one year from today?
- b. What is today's share price?



Solution

47. *New Venture Equity Financing*

[Title Page](#)

Your company is comprised solely of a single proprietary business opportunity (that is, you have exclusive rights to this business opportunity). Your business needs financing. Unfortunately, you do not have the funds required for capital expenditure to transform the venture from the planning to the operating phase. However, you have found a possible common equity investor who is willing to finance your new business venture in exchange for a fractional common equity ownership. That is, after financing, the investor will own X percent of outstanding common shares (new and old) and you will own $1-X$ percent of the common shares. You believe that the value of your new venture after financing and once operations commence – its present value – is

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\$7,500,000. Required financing for the new venture from the new common equity investor is \$1,500,000. That is, the dollar investment necessary to transform the venture into an operating business is \$1,500,000.

Required: What fraction, X , should you offer the new equity investor in exchange for his/her common equity financing? Equivalently, what fraction, X , will the new equity investor demand in exchange for his/her financing?



Solution

48. *Constant Growth DDM*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of ABC common share value. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). ABC retains a constant fraction of earnings each year for reinvestment and growth (i.e., constant retention ratio). The market capitalization rate for ABC shares is 10% per annum. Their market to book ratio is 5.0 and their forward ROE is 20% per annum.

Required: What is ABC's forward dividend yield?



Solution

49. *Economic Determinants of Share Price*

[Title Page](#)

The constant growth discounted dividend model (DDM) is a reasonable representation of both ABC Ltd. and DEF Ltd. common share values. ABC's share price is \$20 and DEF's share price is \$2. Give four realistic reasons for this difference. Use no numbers in your explanation beyond those appearing in the question. In your response, number your reasons from one to four and give a brief explanation of each.

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Solution

50. **ROE, MCR, and Market to Book Ratio**

[Title Page](#)

Suppose that the constant growth discounted dividend model (DDM) reasonably represents ABC Ltd. common share value. Comment on the following assertion. “If ABC’s forward return on equity, ROE, equals its market capitalization rate, MCR, then ABC’s market to book ratio is one.” Use no numerical examples in your explanation.

State whether you agree or disagree with the statement and then explain your answer.



Solution

51. **New Venture Equity Financing**

[Title Page](#)

Your business is comprised of existing operations, worth, \$10,000,000, and a proprietary business opportunity (that is, you have exclusive rights to this business opportunity). This new venture needs financing. Unfortunately, you do not have the funds required for capital expenditure to transform the new venture from the planning phase to the operating phase. However, you have found a possible common equity investor who is willing to finance your new venture in exchange for a fractional common equity ownership. That is, after financing, the investor will own 30 percent of outstanding common shares (new and old) and you will own 70 percent of the common shares. You believe that the value of the new venture, prior to financing, its net present value, is \$X. Required financing for the new venture from the new common equity investor is \$6,000,000. That is, capital expenditure required to transform the venture into an operating business is \$6,000,000.

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Required: Presuming that you have *correctly* determined the appropriate fractional equity ownerships for yourself and your partner after the new venture financing, what is the new venture's net present value (NPV)?



Solution

52. *Constant Growth DDM*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of ABC common share value. ABC pays common share dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). ABC retains a constant fraction of earnings each year for reinvestment and growth (i.e., constant retention ratio). ABC's forward dividend per share one year from today is \$1. The forward ex-dividend share price one year from today is \$26.75. The market capitalization rate on ABC shares is 11% per annum.

Required: What is ABC's forward dividend yield (forward dividend divided by today's share price)?



Solution

53. *Rights Issue*

[Title Page](#)

The current secondary market price for ABC Company common equity is \$40 per share. Your total dollar investment (as a shareholder) in ABC shares is \$4,800. ABC has just announced that they are planning a rights issue of new common shares (ABC gives existing shareholders one right per outstanding share). Ignoring commissions and transactions costs, if you subscribe in the rights offering, that is, you exercise your rights, your dollar investment in ABC shares will increase by \$1,400. If you sell your rights, your dollar investment in ABC shares will decrease by \$150 and your fractional ownership in ABC falls by 25%.

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Required:

- (a) How many rights does the offering require for a new share?
- (b) What is the exercise price for a new share in the rights offering (that is, the primary market price of a new share)?



Solution

54. *Economic Determinants of Share Price*

[Title Page](#)

ABC Company Ltd has a share price of \$20. DEF Company has a share price of \$2. Explain why an investment in DEF common shares is not necessarily preferable to an equal dollar investment in ABC common shares. Give a complete response for full marks. Use no numerical examples in your answer.



Solution

55. *Rights Issue*

[Title Page](#)

The current secondary market price for ABC Company common equity is \$20 per share. Your total dollar investment (as a shareholder) in ABC shares is \$8,000. ABC has just announced that they are planning a rights issue of new common shares (ABC gives existing shareholders one right per outstanding share). Ignore commissions and other transactions costs. If you do not subscribe in the rights offering, that is, you sell your rights, your dollar investment in ABC shares falls by \$600, which is proceeds from your rights sale. The subscription price of a new share in the rights offering is \$15.5.

Required: How many rights are required to buy a new share in the offering?



Solution

56. *Dividend Reinvestment*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of ABC common share value. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). The next and upcoming dividend is in one year. You belong to a dividend reinvestment plan that purchases additional shares for you (at the ex-dividend price at that time) with your dividends. Your expectation is that for every one share you begin the year with, your share holdings will increase by 6% at year-end (fractional shares are possible). ABC has a forward dividend yield of 6.6% per annum, forward earnings of \$1.65 per share for the upcoming year, and a forward ROE of 50% per annum.

Required: What is expected share price one year from today, immediately prior to the ex-date at that time?



Solution

57. *New Venture Equity Financing*

[Title Page](#)

Your business is comprised of existing operations and a proprietary new venture opportunity (that is, you have exclusive rights to this business opportunity). The book value of existing operations is \$10,000,000. Forecast free cash flow for existing operations for the upcoming year is \$2,400,000, which you expect to grow thereafter at 5% per annum. There is no debt in the financial structure of your business. You need new venture financing. Unfortunately, you do not have the funds required for the capital expenditure to transform the new venture from the planning to the operating phase. However, you have found an investor who will finance your new business venture in exchange for a fractional common equity ownership in your business. Required financing for the new venture is \$I, which is the amount of the capital expenditure necessary to transform the new venture into an operating business. Once the financing is complete, which you expect to take place in the very near term, and the new venture begins operations, you expect that new venture incremental free cash flow at the end of the first year will be \$1,750,000, which grows thereafter at 6% per annum. Before the equity financing, you own 100% of shares in your firm. The cost of capital for existing operations and for the new venture is 20% per annum. You have offered and the new investor has demanded a 40% equity ownership in your firm in exchange for his/her financing of the new venture in the amount of \$I.

Required: What is the amount of the required financing, \$I, for the new venture?

Equity Securities and Equity Markets



Solution

58. *Constant Growth DDM*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of ABC common share value. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). ABC retains a constant fraction of earnings each year for reinvestment and growth (i.e., constant retention ratio). Book equity per share, today, is \$12. You expect share price in one year on the ex-dividend date to be \$25.2 and one trading day earlier to be \$27. Forward earnings per share for the upcoming year are \$2.4.

Required: What is expected share price 2 ½ years from today?



Solution

59. *Constant Growth DDM*

[Title Page](#)

You believe that the constant growth discounted dividend model is a reasonable representation of ABC common share value. ABC pays dividends once per year and it has just made a dividend payment (i.e., the ex-dividend date is today). The next dividend is one year from today. ABC retains a constant fraction of earnings each year for reinvestment and growth (i.e., constant retention ratio). Expected share price in 2 years immediately prior to the dividend at that time is \$278.3. Expected dividend two years from today is \$13.8. ABC's market capitalization rate is 21% per annum.

Required: What is today's ABC share price?



Solution

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