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## Fundamental Analysis: Stock Valuation

(Based on: Siegel's Stock for the Long-Run, chapters 6 and 7, last ed. is 2014)

Reasons why one should know the firm's value; three valuation approaches

Wealth, comparative and dynamic firm or stock valuations, with examples

Dividend policy and earnings allocation

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Stock price valuation in 2017

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Summary

## REASONS why the firm's stock market value need to be known

– The “equilibrium” or “fair” market value of a firm need to be known in the following instances:

- By **the firm** to decide its **initial public offering** (IPO) price.
- By **the firm** to decide whether or not to **issue additional new shares**.

If the market price exceeds the equilibrium level, then it's in the firm's interest to issue new shares, because the issue price will be higher than the equilibrium price of existing (outstanding) shares; if not, it is not the appropriate moment for the firm to issue new shares.

- By **firms** in an operation of **merger & acquisition**.
- By the firm's **shareholders** to make **investment decisions**.

If the equilibrium price exceeds the actual market price, then shareholders should buy more stocks and wait until the market price rises to its equilibrium level; if not, then they should sell stocks they hold before the market price falls to its equilibrium level.

– There are three approaches in determining equity prices.

- The **wealth (or patrimony) approach** consists in valuating the stock according to the patrimony that the firm has acquired in the past. This is also called the **past approach**.
- The **comparative approach** consists in valuating the stock with respect to the financial ratio of a firm which is similar to the firm to be evaluated and is actually listed on the equity market. This is also called the **present approach**.
- The **dynamic approach** consists in valuating the firm according to the dividend flows shareholders will receive in the future. This is also called the **future approach**.

# 1. The wealth (patrimony/past) approach

- The firm's market value is based on the book value of the firm.
  - The **book value** of a firm is the value of the firm's tangible or physical assets minus that of its liabilities, both evaluated at historical costs. So

**Historical book value (HBV) = Assets – Liabilities (both estimated at historical costs)**

- ▶ Book value is limiting because it uses historical prices and thus ignores the effect of changing prices on the value of the assets or liabilities. To wit, If a firm had purchased a plot of land for \$1 million that is worth today \$10 million, examining its book value will not reveal this value increase. To correct these distortions, book value should be “revalued” or adjusted.
- The **present or revalued book value** is the book value adjusted to take into account today's market value of the assets and liabilities.

**Present book value (PBV) = Historical Book value + Re-valuation difference**

**or** **PBV = HBV + Δ Re-valuation**

- ▶ re-valuation only concerns tangible or physical assets, while intangible or non-physical assets (such as trademarks, skills, clients, group synergy and intellectual capital), are not taken into account. For example, Microsoft has a present book value of about \$50 billion but a stock market value seven times as large.
- The **goodwill**, namely any difference between the sale price of the firm and its book value, should be added to the present book value.

**Stock (market) value = Historical book value + Re-valuation difference + Goodwill**

**or** **SMV = PBV + Goodwill = HBV + Δ Re-valuation + Goodwill**

## An example of the wealth (patrimony/past) approach

- The holding firm H holds 100% of the capital of firm A, 80% of that of B, 40% of that of C, and 10% of that of D (here capital means historical book value of assets). Furthermore, suppose that:
  - both historical book value and present book value of H's liabilities are 600 ME (€ million);
  - goodwill is 100 ME; and
  - additional information (all figures in ME) regarding firms A, B, C, and D at the date when H takes control is as follows:

	Historical b.-v. of assets	Present b.-v. of assets
A	1000	2000
B	600	1600
C	1000	500
D	8000	6000

- Historical book value =  $(100\% \text{ or } 1 \times 1000) + (0.8 \times 600) + (0.4 \times 1000) + (0.1 \times 8000) - 600 = 2080$  (ME);
- Re-valuation difference of A =  $(100\% \text{ or } 1) \times (2000 - 1000) = 1000$ ;  
Re-valuation difference of B =  $(80\% \text{ or } 0.8) \times (1600 - 600) = 800$ ;  
Re-valuation difference of C =  $(40\% \text{ or } 0.4) \times (500 - 1000) = -200$ ;  
Re-valuation difference of D =  $(10\% \text{ or } 0.1) \times (6000 - 8000) = -200$ ;  
Re-valuation difference =  $1000 + 800 - 200 - 200 = 1400$  (ME);
- Re-valuated book value =  $2080 + 1400 = 3480$  (ME);
- Stock market value =  $3480 + 100 = 3580$  (ME).

## 2. The comparative (or present) approach

- The firm's market value is computed by using a financial ratio from another stock which has similar characteristics.
  - A first financial ratio is related to the firm's economic value (i.e. the market value of its equity + the market value of its liabilities):
    - ▶ **Sales (or Turnover) ratio = Economic Value / Sales (or Turnover)**
      - ✍ It can be interpreted as 1) the number of years necessary for the firm to get cumulative sales whose amount is equivalent to its economic value; 2) the price shareholders and bondholders are prepared to pay for one unit's worth of sales.
    - Three other financial ratios are related to the firm's aggregate value (# of shares times the value of each share) or to its per-share price:
      - ▶ **PER (Price-Earnings Ratio) = Stock Market Value / Earnings**
        - ✍ It is either 1) the number of years necessary for the firm to get cumulative earnings whose amount is equivalent to its stock market value; or 2) the price shareholders are prepared to pay for one unit's worth of current earnings.
      - ▶ **PBR (Price-to-Book Ratio) = Stock Market Value / Book Value**
        - ✍ It is either 1) the number of years necessary for the firm to get a cumulative book value which is equivalent to its stock market value; or 2) the price shareholders are prepared to pay for one unit's worth of book value.
      - ▶ **Dividend Yield = Dividend / Stock Market Value**
        - ✍ It is the dividend expressed as a % of the price paid by shareholders. Its reverse is the number of years necessary for shareholders to get back their investment through dividends.

## An example of the comparative approach

- X, a manufacturer of computer games, wants to list its shares. It asks its bank to determine the firm's value for an initial public offering (IPO). To do this, the bank locates a firm Y, which is already listed. Suppose that:
  - Y has the same activity and the same size as X;
  - Some financial aggregates of X and Y are as follows (all figures in M€):

	Stock market value	Liabilities	Sales	Earnings
X	?	3700	240	60
Y	1000	2000	100	20

- Compute the value of X by reference to the sales or turnover ratio:
  - ▶ Sales multiple of X = (Stock market value of X + 3700) / 240
  - ▶ Sales multiple of Y = (1000 + 2000) / 100 = 30
  - ▶ Sales multiple of X = Sales multiple of Y  
⇒ Stock market value of X = 3500 (M€)
- Compute the value of X by way of the aggregate PER:
  - ▶ PER of X = Stock market value of X / 60
  - ▶ PER of Y = 1000 / 20 = 50
  - ▶ PER of X = PER of Y  
⇒ Stock market value of X = 3000 (M€)
- The IPO value proposed by the bank is between 3000 and 3500 M€.

### 3. The dynamic(or future) approach

- The firm's market value is the discounted value of all future dividends of the stock. The approach is often referred to the “**discounted dividend model**” (DDM).
  - Why should future dividend flows be used to evaluate stocks?
    - ▶ In contrast to a work of art, stocks have market value because their potential cash flows come primarily from dividends.
  - Why future cash flows need to be discounted?
    - ▶ The **innate preferences of most individuals** is to enjoy consumption today rather than wait for tomorrow;
    - ▶ **Productivity** allows funds invested today to yield a higher return tomorrow;
    - ▶ **Inflation** reduces the future purchasing power of cash received in the future;
    - ▶ There is a **risk** insofar as the recovery of the present value is not sure. Due to this uncertainty, investors ask for the risk-free rate on a bond plus a **risk premium**.
  - Which discount rate should the shareholders used?
    - ▶ The discount rate to be used is the expected return on the firm's stock.
    - ▶ The latter is determined by way of the **Capital Asset Pricing Model**. This means that the riskier is the stock, the higher is its expected return. Namely
$$E(R_i) = R_f + \beta_i \times [E(R_M) - R_f]$$
where  $E(R_i)$  is the expected return of the stock,  $R_f$  the risk-free interest rate,  $E(R_M)$  the expected return of the whole equity market,  $\beta_i$  the systematic risk of the stock compared with the whole market.
  - In practice, dividend flows are sometimes replaced by available or free cash flows.

## How to create value for shareholders?

- Earnings are used in four different ways to enhance shareholders' value:
  - **Payment of cash dividends**
  - **Repurchase of shares:** by reducing the number of outstanding shares, this increases future earnings per share, even if the firm's total earnings remain unchanged.
    - ▶ Some people argue that shareholders most value stocks' cash dividends. But this is not necessarily true. In fact, from a tax standpoint, share repurchases are superior to dividends when the marginal tax rate on dividend is higher than that on capital gains.
  - **Retirement of debt:** by reducing the interest expense, this increases the cash flow available to shareholders.
    - ▶ Others might argue that debt repayment lowers shareholders' value because the interest saved on the debt retired generally is less than the rate of return earned on equity capital. They also might claim that by retiring debt, the firm loses the ability to deduct the interest paid as an expense. However, debt entails a fixed commitment that must be met in good or bad times. Reducing debt lowers the volatility of shareholders' earnings and may not diminish shareholders' value.
  - **Reinvestment for future growth:** by investing in productive assets (financial or real), this will increase future profits.
    - ▶ Many investors claim that earnings reinvestment is the most important source of value, but this is not always the case. If retained earnings are reinvested profitably, value will surely be created. However, retained earnings may tempt managers to pursue others goals, such as overbidding to acquire other firms or spending on perquisites that do not increase the value to shareholders. That's why the market views the buildup of cash reserves and marketable securities with suspicion and discounts their value.



## Dividends and earnings

- The ultimate source of future dividend flows is the earnings of firms.
  - Earnings = Revenues (sales) - Costs of production (labor, material costs, interest on debt, corporate taxes, and allowance for depreciation). So,  $E = R - C$
  - Earnings can be paid out as dividends (called **distributed earnings**) or retained by firms (called **retained earnings**) to be put to work to provide greater cash flows in the future. To wit,  $Earnings = 0.4 \text{ Dividend} + (1 - 0.4) \text{ Retained Earnings}$ .
  - ✍ The ratio of cash dividends to total earnings is called the **dividend payout ratio, D/E**.
- How firms determine their dividend policy? They consider factors such as:
  - the difference in tax rates between dividend income and capital gains;
  - the need to generate internal funds to retire debt or to reinvest;
  - the desire to keep dividends relatively constant in the face of fluctuating earnings.
- Does the value of the stock depend on the dividend policy?
  - It appears that dividend policy is crucial to determining the value of the stock.
  - However, this is not generally true. In fact, as long as the firm earns the same return on its retained earnings as the discount rate, it does not matter how much is the payout ratio. Earnings not paid out today as dividends are reinvested by the firm and paid as even larger dividends in the future. The lower the present payout ratio, the smaller the actual dividends; but over time, dividends will rise and eventually will exceed the dividend path associated with a higher payout ratio.
  - ✍ This explains why firms that pay no dividends, such as Warren Buffet's Berkshire Hathaway, have value; their assets, which earn cash returns, can be liquidated and disbursed to shareholders in the future.

## Some models in the framework of the DDM

- **Irwing-Fisher model:** The price of a stock is equal to the sum of the present value of the future dividends over a period and the present value of the selling price of the stock at the end of this period. CP means capitaux propres in French; n end date with  $n < \infty$ . Caveat:  $E(R_{CP}) \equiv E(R_i)$ , the CAPM return defined p. 7

$$V_0 = \sum_{t=1}^n \frac{D_t}{[1+E(R_{CP})]^t} + \frac{V_n}{[1+E(R_{CP})]^n}$$

- **Gordon-Shapiro model:** The price of a stock is equal to the present value of all future dividends until infinity, by assuming that the dividend growth rate is constant (designated g). Ditto for  $E(R_{CP})$ .

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{[1+E(R_{CP})]^t} = \frac{D_1}{E(R_{CP}) - g}$$

- **Mododovki model:** The price of a stock is equal to the present value of all future dividends until infinity, by assuming that the dividend increases at a first rate over the first period, at a second rate over the second period, and at a zero rate from the end of the second period.
- **Bates model** is similar to the Irwing-Fisher model. Furthermore, it assumes that during the whole life of the stock, 1) the dividend payout ratio,  $\delta$ , remains constant; 2) dividends increase at a constant rate designated g. So, we have:

$$PER_n = PER_0 \times \left[ \frac{1+E(R_{CP})}{1+g} \right]^n - \delta \sum_{i=0}^{n-1} \left[ \frac{1+E(R_{CP})}{1+g} \right]^i$$

## Examples of the dynamic approach

- Suppose that the last dividend paid by firm F is €6, the dividend growth rate is 6% (0.06), and the shareholders' expected return is 12% (0.12).

- What is the stock-market price according to the Gordon-Shapiro model?

$$V_0 = \frac{D_1}{E(R_{CP}) - g} = \frac{D_0 \times (1 + g)}{E(R_{CP}) - g} = \frac{6 \times (1 + 6\%)}{12\% - 6\%} = 106$$

- What is the stock-market price if the shareholders' expected return becomes 13% (.13)?

$$V_0 = \frac{D_1}{E(R_{CP}) - g} = \frac{D_0 \times (1 + g)}{E(R_{CP}) - g} = \frac{6 \times (1 + 6\%)}{13\% - 6\%} = 90.86 \quad (-14.29\%)$$

- Suppose that the present PER of a start-up firm is 30, the shareholders' expected return is .12 (or 12%), the dividend payout ratio is 30% (or 0.3), and the dividend growth rate over the next 5 years is 0.25 (or 25%).

- What is the firm's PER in five years according to Bates model?

PER<sub>0</sub> = 30, E(R<sub>CP</sub>) = 12%, δ = 30%, g = 25%, and n = 5 years.

$$\begin{aligned} PER_n &= PER_0 \times \left[ \frac{1 + E(R_{CP})}{1 + g} \right]^n - \delta \sum_{i=0}^{n-1} \left[ \frac{1 + E(R_{CP})}{1 + g} \right]^i \\ &= 30 \times \left( \frac{1 + 12\%}{1 + 25\%} \right)^5 - 30\% \times \sum_{i=0}^4 \left( \frac{1 + 12\%}{1 + 25\%} \right)^i = 16.10 \end{aligned}$$

⇒ PER<sub>5</sub> = 16.10 (ME)

## Comparison between the three approaches

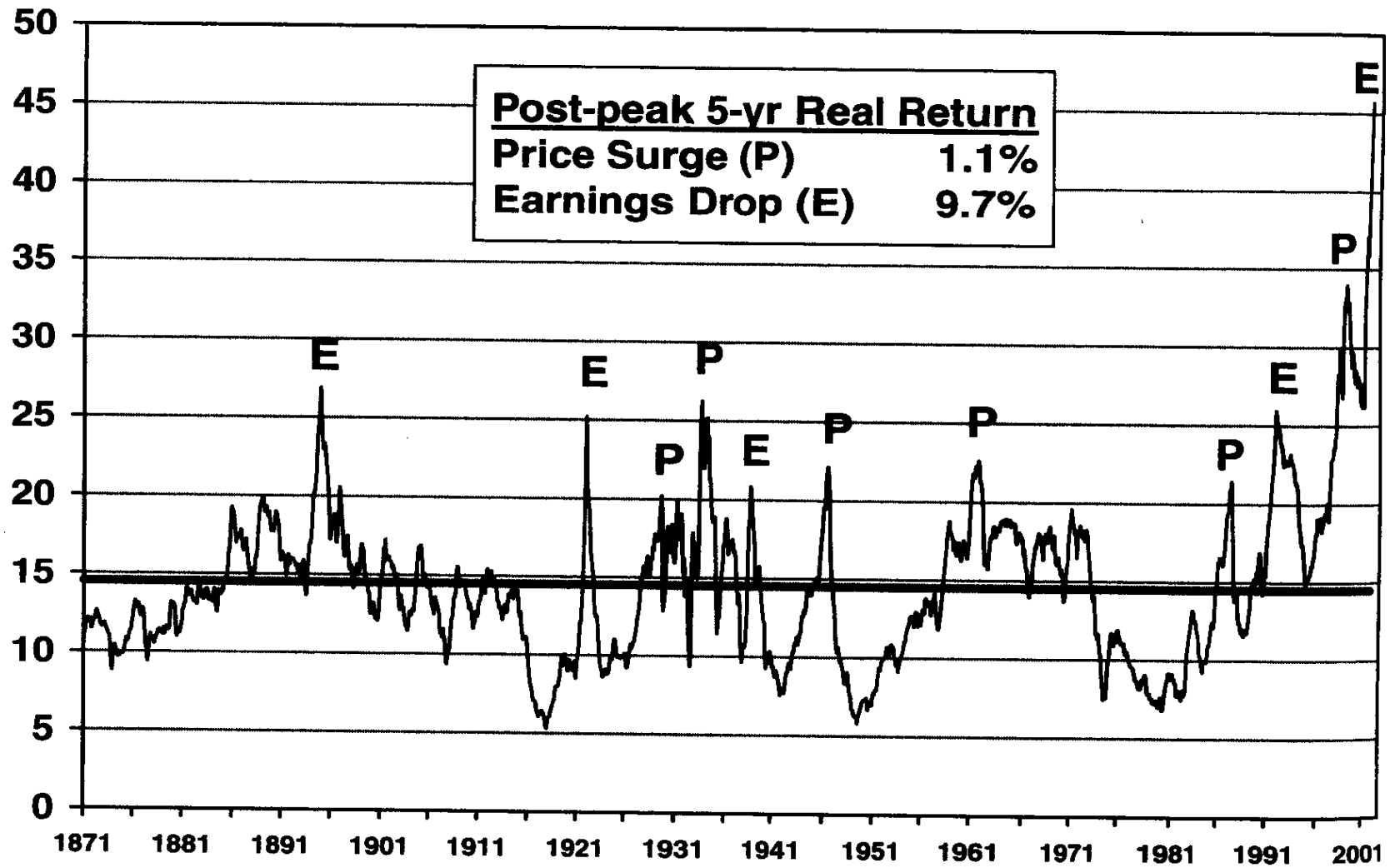
Type of approach	Advantages	Limitations
<b>Wealth or past</b>	<ul style="list-style-type: none"> <li>• Suitable for firms whose activity is related to the notion of patrimony, such as real estate companies and holdings.</li> </ul>	<ul style="list-style-type: none"> <li>• The appreciation of goodwill may be subjective.</li> <li>• Not suitable for service companies.</li> </ul>
<b>Comparative or present</b>	<ul style="list-style-type: none"> <li>• Suitable for all firms on the condition that a similar firm already listed can be found.</li> </ul>	<ul style="list-style-type: none"> <li>• Founded on relative criteria, instead of absolute criteria.</li> <li>• The result is directly related to the circumstances of the stock market.</li> </ul>
<b>Dynamic or future</b>	<ul style="list-style-type: none"> <li>• Suitable for firms which begin to realize earnings.</li> </ul>	<ul style="list-style-type: none"> <li>• Depends directly on the forecast of future dividends, which is not always correct.</li> <li>• Result is very sensitive to the hypothesis on shareholders' expected return.</li> </ul>

## Historical yardsticks for valuing the equity market (1)

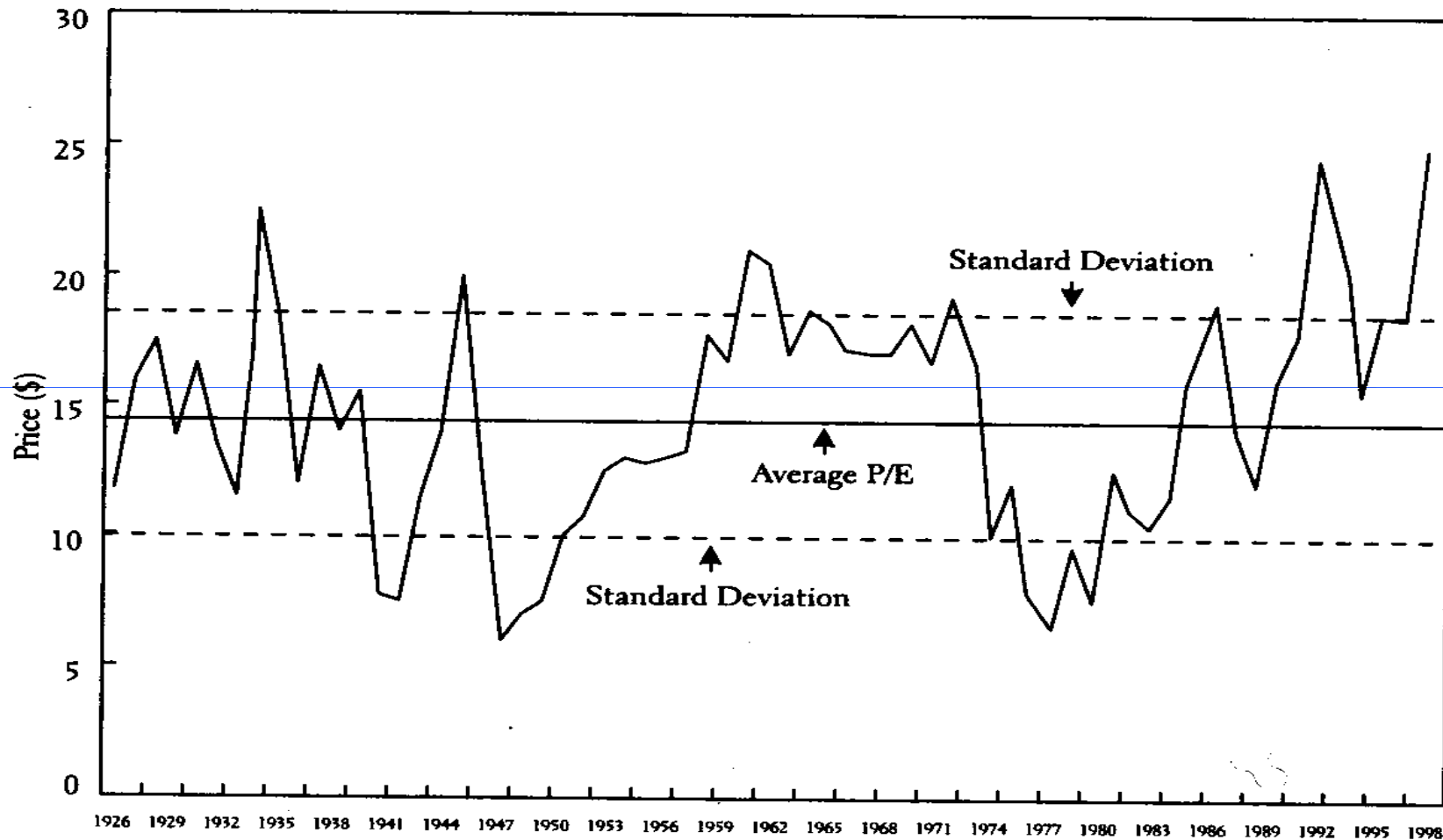
- Yardsticks used to evaluate whether stock prices are overvalued or undervalued:
  - Most of them measure the market value of the shares outstanding relative to economic **fundamentals** such as earnings, dividends, book value, or some **economic aggregate**, such as GDP (gross domestic product) or total replacement cost of the capital stock.
  - Stock prices often are said to be “too high” if they exceed the average value over time.
  - ✍ Yet such a comparison begs the question: have the historical valuation measures been consistent with the return shareholders should expect from equities? As indicated previously, on average, stocks have been undervalued through history. Therefore, higher valuation could be justified as investors recognize the superior returns on stocks and bid their prices up relative to earnings or dividends.
- The most basic and fundamental yardstick for valuing stocks is the **PER**.
  - If investors believe that earnings growth is going to accelerate, they will pay a higher price relative to current earnings than if they expect earnings to stagnate or decline.
  - As shown in Figure 6-2, **the market PER moved into all-time high ground in 2001**, reaching a level twice its **historical average value of 14.5 since 1870**. However, peaks in the PER are not always bad omens for investors. a) If a sharp drop in earnings causes the PER to rise, real returns following these rises have averaged 9.7% annually over the subsequent 5 years. In fact, sharp declines in earnings have always been temporary, and earnings as well as stocks prices have rebounded subsequently. b) When surges in stock prices cause the PER to rise, 5-year future real returns have averaged only 1.1%. Surging stock prices often reflect undue optimism about future earnings growth. When expected earnings growth is not realized, stock prices fall, and returns suffer.

**FIGURE 6-2**

**Historical P-E Ratios Based on Last 12 Months Reported Earnings, 1871–2001**

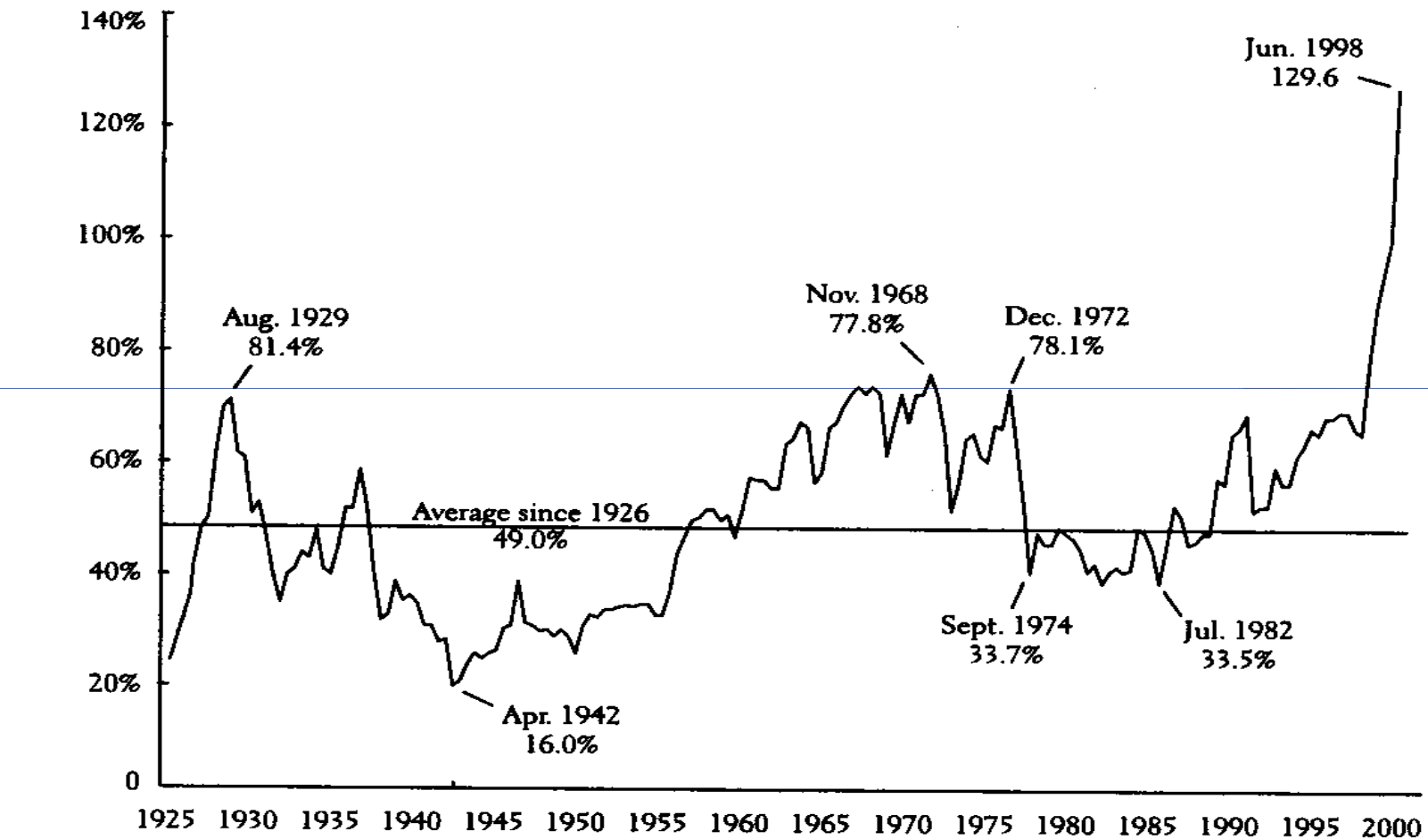


## The Price of \$1.00 of Earnings (S&P 500)\* (The Price-Earnings Multiple)



\*The solid line is the average since 1926. The dashed lines above and below represent a range of one standard deviation above and below the average.

## U.S. Stock Market as Percent of U.S. Total Output (Gross Domestic Product)



Source: The Leuthold Group.

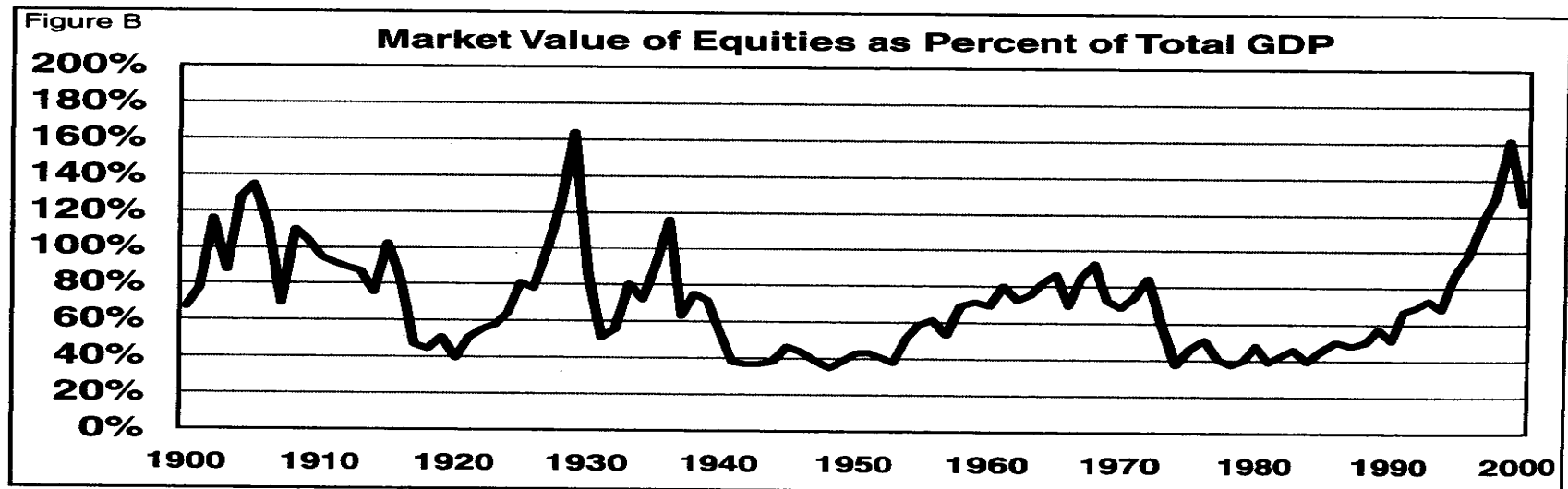
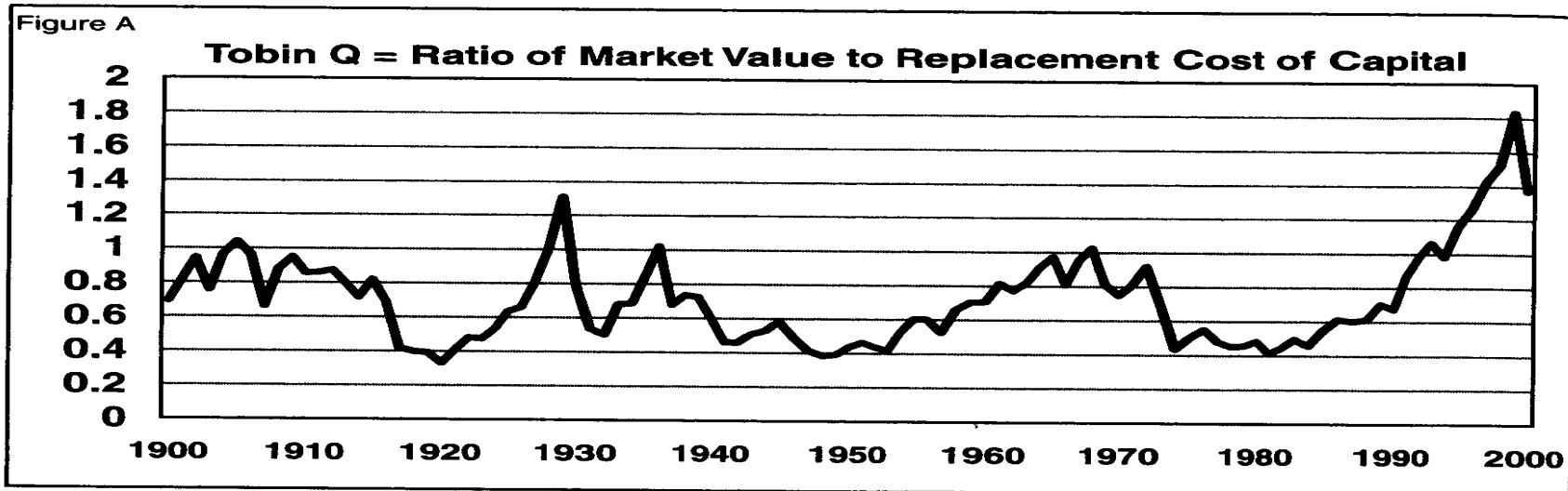


## Historical yardsticks for valuing the equity market (2)

- James Tobin developed a theory that indicated that the “equilibrium” or “correct” market price of a firm should equal its book value adjusted for inflation.
    - Tobin designated the ratio of the market value to the replacement cost with the letter Q and indicated that its ratio should be unity if the stock market were properly valued or at its “equilibrium” level. As shown in Figure 6-3a, **Tobin’s Q** has fluctuated between a high of 1.83 in 1999 and a low of 0.33 in 1920, with the average being 0.72.
    - However, book value is a construct of the past, while market value derives from prospective earnings and looks to the future. Prospective earnings more accurately establish the basis of stock valuation than the historical costs at which the firms purchased their assets.
  - GDP is a more familiar benchmark to compare with aggregate market value of equity than is book value.
    - The ratio of the value of equity to GDP can be superior or inferior to 1 (cf. Figure 6-3b). In fact, a) equity valuation is a balance sheet item, while GDP is an annual flow; b) equity capital is only a part of total capital and values only publicly traded firms.
    - The ratio of market capitalization to GDP differs among countries (cf. Table 6-2).
- ✍ What do these valuation measures show?
- They send the same message: relative to economic fundamentals, the level of the stock market reached in 2000 was extremely high, and in the past, these valuations have been followed by lower stock returns.
  - The question is: can the market continue its upward movement thanks to the “new economy”, or will history reassert itself and bring stock prices downward?

**FIGURE 6-3**

**Market Value, Replacement Cost, and GDP**



**TABLE 6-2**

Summary Market Statistics for Various Countries (Market Value/GDP, P-E Ratio, Dividend Yield, December 2001)

<b>Statistic</b>	<b>U.S.</b>	<b>Japan</b>	<b>Germany</b>	<b>Britain</b>	<b>Hong Kong</b>	<b>Switzerland</b>	<b>Italy</b>
<b>MV/GDP*</b>	117%	68%	82%	185%	382%	366%	70%
<b>P-E**</b>	29.9	64.4	52.2	33.3	15.1	16.2	17.1
<b>Div. Yld.**</b>	1.81%	0.84%	3.14%	2.91%	2.81%	1.27%	2.08%

\* Data for Market Value/GDP for December 31, 2000.

\*\*P-E and Dividend Yield based on last 12 months of earnings and dividends.

# Stock price growth from 2017 onwards

For the next decade, the rate of growth per annum of stock price is made up of 4 building blocks: (according to Fortune 2017)

- \* The dividend yield, which is today a slim 2.5%;
- \* The real growth in earnings per share (EPS): current best assumption is 1.5% adjusted for inflation (since firms are issuing new shares and make acquisitions)
- \* The rate of inflation, predicted at 1.5%; and
- \* The expected change in PER (at 24 it is expected to shrink and shares to take a beating).

Bottom line: with NO PER change, the expected return on equities amounts to 5.5% a year. But for a typical portfolio (namely with a 60/40 stock-bond mix and yield of 2.2% on the 40% bond segment), the expected return comes to 4.2%, far from the historical average of 7.6% for that asset mix. Caveat emptor: today`s financial markets are stretched.

# New concept of total payout

Our illustration is using recent data from the bank Morgan Stanley: The traditional payout is indeed: dividend per share times number of shares, namely  $0.55 \times 1,953 = 1,074$  bil.

But now you`ve to add the market shares repurchased by the bank, namely 2,125 bil.

So the total payed out of quarterly earnings becomes:  
 $3,1999/5,672 = .56$  or 56 %.

Notice that if, say, all repurchased shares are used to fund the executives stock options, the accounting picture is distorted: the cost of executive options should appear as a cost before net earnings, which would then be much lower. In addition, under pressure of active shareholders, firms are sometimes using debt (the interest on borrowing is tax deductible) to fund the repurchase of shares and hence increase the total payout ratio. This strategy is dangerous since the debt/equity ratio may increase significantly in the previous case and bank covenant be broken.

## Summary

- To determine stock (market) price, three approaches can be used: the wealth or patrimony approach, the comparative approach and the dynamic approach.
- Historical yardsticks are used to evaluate whether stock prices are over- or undervalued. They include micro yardsticks (the PER) as well as macro ones such as Tobin's Q and market value relative to GDP. Stocks prices are said to be “too high” if they exceed the average value over time.
- Over the last 20 years, reductions in inflation, the increased stability of the overall economy, the sharp drop in transactions costs, as well as a low capital gains tax, are factors that point out to a higher level of stock valuation. However, these factors that boost stock prices make it less likely that stocks will be able to achieve their historical long-run returns. From PER of 15, stocks easily should achieve the 7% historical real return. But from PER in the low 20s, which are observed nowadays, future real returns on stocks could be 1% to 2% lower.
- Stocks in 2017 and onwards may not match the impressive returns of the past, but in a balanced portfolio they will still significantly outperform bonds over the long run.
- While firms are using the total payout ratio (dividends + share repurchases as a percentage of earnings) to increase total returns to shareholders, stock repurchases may be detrimental when financed by debt (borrowing).
- Practice is available