# Fundamental Analysis and Market Prices:
## Detecting when Price Does not Meet Value

## Stephen Penman
**Columbia Business School**
**Columbia University**

## OIV Conference, Bocconi University

# Value and Price

- Price is want you pay, value is what you get
- The risk in investing is the risk of paying too much

*How do we apply fundamental analysis to handle this risk?*

# Some Shockers!

- There is no such thing as intrinsic value!

- You do not have to know the value!

- "What is the Cost of Capital?" – This is a trick question!

- Valuation models are not for valuation!

# Key Points

- Valuation is a matter of accounting
- One uses a valuation model to account for the value in the market price

# Accounting for Value
## Cash Accounting for Value

The standard approach to valuation: DCF valuation

*Value = Present Value of Expected Free Cash Flows*

$$Value_0 = \frac{FCF_1}{1+r} + \frac{FCF_2}{(1+r)^2} + \frac{FCF_3}{(1+r)^3} + \cdots\cdots + \frac{FCF_{T+1}}{(1+r)^T(r-g)}$$

*But  --- what is $r$?*

    *--- what is $g$?*

    *--- does free cash flow capture value added?*

# Cash Accounting
## Free Cash Flows for Starbucks

**Starbucks Corporation (in thousands of dollars, except EPS)**

|  | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Cash from operations | 135,236 | 97,075 | 147,717 | 224,987 | 314,080 |
| Cash investments | 148,436 | 206,591 | 214,707 | 302,179 | 363,719 |
| Free cash flow | (13,200) | (109,516) | (66,990) | (77,192) | (49,639) |
| Earnings | 42,127 | 57,412 | 68,372 | 101,693 | 94,564 |
| Earnings per share (EPS) | 0.55 | 0.70 | 0.78 | 1.12 | 1.02 |

# Cash Accounting
## Free Cash Flows Home Depot and General Electric

**Home Depot Inc.**

|  | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| Cash from operations | 1,055 | 1,894 | 2,439 | 2,977 | 5,942 |
| Cash investment | 1,376 | 2,273 | 2,620 | 3,521 | 3,406 |
| Free cash flow | ( 321) | ( 379) | ( 181) | ( 544) | 2,536 |
| Earnings | 1,160 | 1,614 | 2,320 | 2,581 | 3,044 |
| EPS | 0.80 | 1.10 | 0.73 | 1.11 | 1.30 |

**General Electric Co.**

|  | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| Cash from operations | 30,009 | 39,398 | 34,848 | 36,102 | 36,484 |
| Cash investments | 37,699 | 40,308 | 61,227 | 21,843 | 38,414 |
| Free cash flow | (7,690) | (910) | (26,379) | 14,259 | (1,930) |
| Earnings | 12,735 | 13,684 | 14,118 | 15,002 | 16,593 |
| EPS | 1.29 | 1.38 | 1.42 | 1.50 | 1.60 |

# Let's Get Anchored
## Fundamental Principles

- Understand what you know and don't mix what you know with speculation

- Anchor a valuation on what you know rather than on speculation

- Beware of paying too much for growth

# Anchoring Valuation

**Anchor a valuation on what you know rather than on speculation**

Graham talked of "minimum true value" plus "speculative value"

*Value = Minimum True Value + Speculative Value*

Minimum true value is value that can be accounted for; Speculative value is where our uncertainty lies

*Value = Anchoring Accounting Value + Speculative Value*

# Accrual Accounting for Value
## Balance Sheets and Income Statements

Start with the balance sheet and add value to the balance sheet:

$$Value_0 = Book\ Value_0 + \frac{Earnings_1 - r.BV_0}{1+r} + \frac{Earnings_2 - r.BV_1}{(1+r)(r-g)}$$

$$Earnings - r.BV = Residual\ Earnings$$

1. Anchor on the balance sheet
2. Add value from short term forecasts
3. Add value for the long-term with a growth rate

But --- what is $r$?

       --- what is $g$?

# An Anchored Valuation

*Value = Anchoring Accounting Value*

*+ Speculative Value*

$$Value_0 = Book\ Value_0 + \frac{Earnings_1 - r.BV_0}{1+r} + \frac{Earnings_2 - r.BV_1}{(1+r)^2} + Speculativ\ e\ Value$$

1. Anchor on the balance sheet
2. Add value from short term forecasts
3. Add speculative value from growth?

# Starbucks Corporation
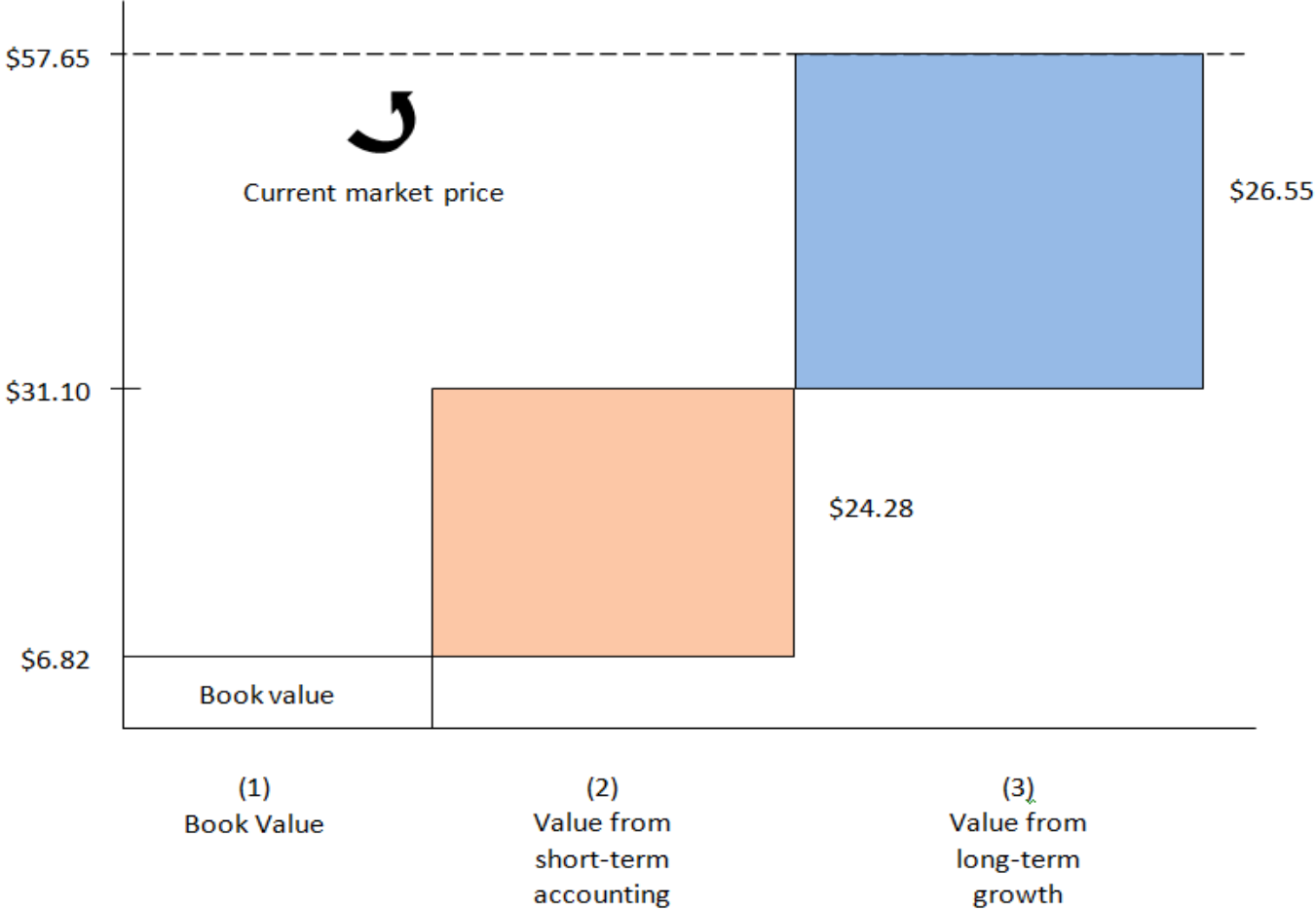## Price = $57.65 on April 5, 2013; Forward P/E = 26.7
## Hurdle rate = 8%

|                              | 2012A | 2013E | 2014E |
|------------------------------|-------|-------|-------|
| EPS                          |       | 2.16  | 2.62  |
| DPS                          |       | 0.84  |       |
| BPS                          | 6.82  | 8.14  |       |
| Residual earnings (8% charge)|       | 1.614 | 1.969 |

$$Value_0 = \$6.82 + \frac{1.614}{1.08} + \frac{1.969}{1.08 \times 0.08} + Speculative\ Value$$

$$= \$6.82\ +\ 1.49\ +\ 22.79\ \ \ \ \ + Speculative\ Value$$
$$= \$6.82\ +\ \ \ \ \ \ 24.28\ \ \ \ \ \ \ \ \ + Speculative\ Value$$

# Accounting for the Market Price
## Starbucks



$57.65

Current market price

$26.55

$31.10

$24.28

$6.82

Book value

(1)
Book Value

(2)
Value from
short-term
accounting

(3)
Value from
long-term
growth

# A Misconception about Valuation

## There is no such thing as "intrinsic value"!

We are concerned with the intrinsic value of the security and more particularly with the discovery of the discrepancies between intrinsic value and price. We must recognize, however, that intrinsic value is an elusive concept. In general terms it is understood to be that value which is justified by the facts, e.g., the assets, earnings, dividends, definite prospects – as distinct, let us say, from market quotations established by artificial manipulation or distorted by psychological excesses. But it is a great mistake to imagine that intrinsic value is as definite and as determinable as is the market price.

....Benjamin Graham and David Dodd, *Security Analysis*, 1934, p. 17

# Another Misconception About Valuation

## You do not have to know the value!

- Investing is not a game against nature, but against other investors

- The onus is not on the investor to establish the "true" value, but rather to accept or reject the market's valuation

- Challenge the market's speculation:
  - -- What is the market's growth forecast?
  - -- Is the market's growth forecast reasonable?

# Yet Another Misconception About Valuation

## Valuation Models are not for Valuation!

- Valuation models are for playing with mirrors

  -- choose your cost of capital, $r$.

  -- choose your growth rate, $g$.

- Valuation models are for understanding the market price

But --- one must have a good valuation model, a good accounting for value.

# Negotiating with Mr. Market
# What is the Market's Growth Rate?

Infer the market's $g$: reverse engineering

$$Market\ Price = B_0 + \frac{Residual\ Earnings_1}{1+r} + \frac{Residual\ Earnings_2}{(1+r)(r-g)}$$

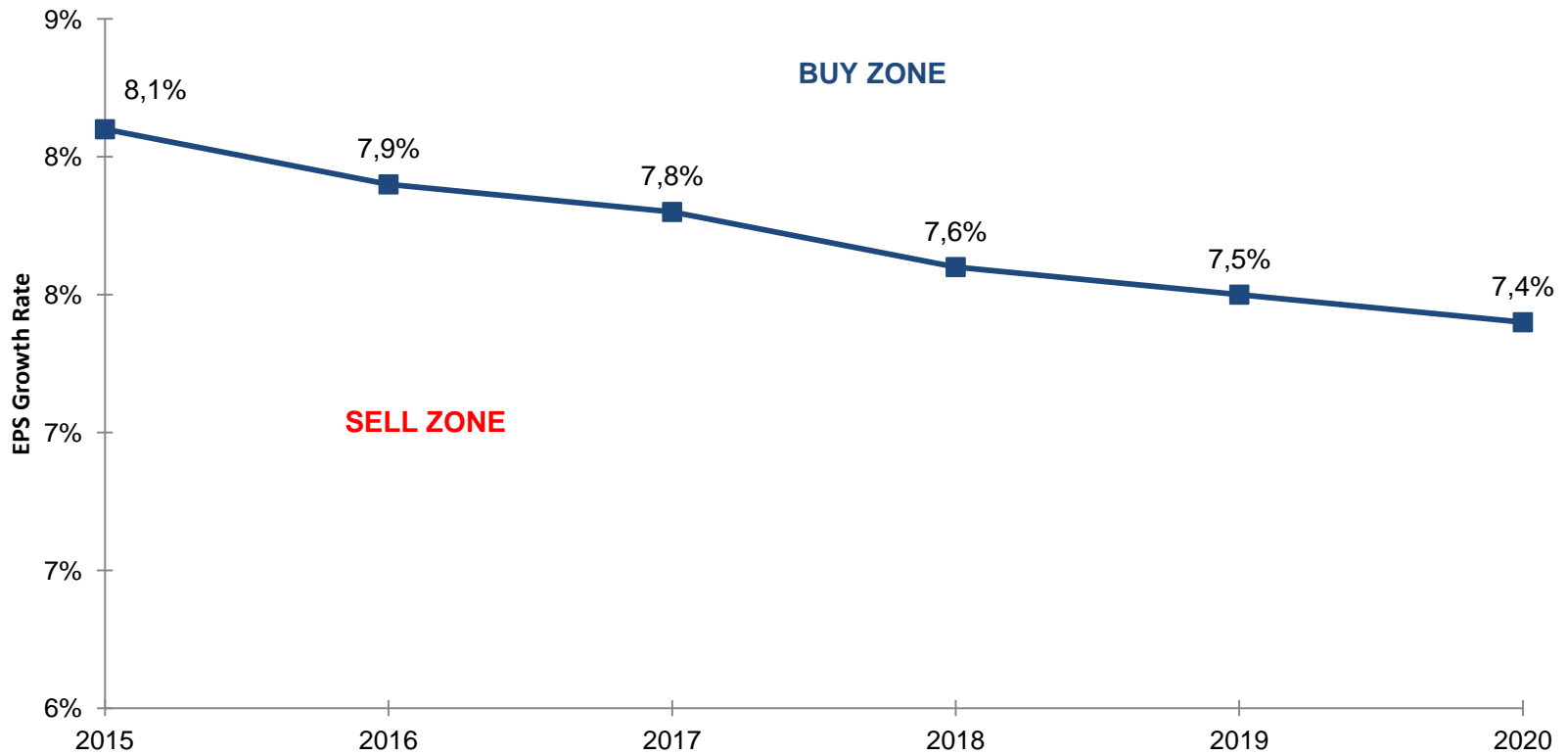Setting Price = \$57.65 for Starbucks: $g$ = 4.30%

**_Beware of Paying Too Much for Growth_**

# The Market's EPS Growth Path
## Starbucks

**Starbucks**

# Another Misconception About Valuation

## We do not know the cost of capital!

- What is the market risk premium?

   3.5% - 9.2%?

- What is the risk-free rate?

   U.S long-term rate?

- What is the beta?

   Standard error if 0.3?

   Stationary?

   *Are we playing with mirrors?*

# Finessing Our Uncertainty About the Cost of Capital

## Invest with a Margin of Safety

- A higher required return implies a higher implied growth rate

- BUY if implied growth looks reasonable for a high required return

- Run away if the implied growth rates seems a stretch for a middling required return

# Example

## Starbucks

| Required return, $r$ | Growth rate, $g$ |
|:---:|:---:|
| 7% | 3.1% |
| 8% | 4.3% |
| 9% | 5.5% |
| 10% | 6.7% |

If you have a high hurdle rate, then you need to see more growth to reward you for the higher risk

# Going the Other Way
## Inferring the Expected Return
### Starbucks

What is my expected return from buying growth?

| Growth Rate, $g$ | Expected return |
| --- | --- |
| 0.0% | 3.7% |
| 3.0% | 7.0% |
| 4.3% | 8.0% |
| 5.0% | 8.7% |
| 6.0% | 9.7% |

Note: the expected return is not the required return.

*Can you get a reasonable return with a margin of safety?*

# Accounting for Value

- Account for value using a model based on accrual accounting, not cash accounting
- Use valuation models appropriately: to challenge the market price
- Don't speculate about the cost of capital
- Beware of paying too much for growth, for growth is risky

*The risk in investing is the risk of paying too much for growth*

# Are You Still Shocked?

- There is no such thing as intrinsic value!

- You do not have to know the value!

- "What is the Cost of Capital?" – This is a trick question: You do not have to know the cost of capital!

- Valuation models are not for valuation!

# Accounting for Value