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## 4. Application of Fair Value Measurement & Are Securities Markets Efficient?

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### Part I: Fair value measurement

- Explain the definition of fair value
- Understand the key concepts and steps associated with the measurement of fair value

### Part II: Are securities market efficient?

- Understand the conditions for the market to be (in)efficient
- Be aware of the evidence of market inefficiency
- Be able to identify implications of market inefficiency for financial reporting

### Part I: Fair value measurement

#### Current value accounting measurement

- Different value perspectives
  - 1) Current Cost (entry price)
  - 2) Fair value (exit price)
  - 3) Value-in-use (discounted future cash flows)
- *Entry and exit prices are market prices (not reporting entity-specific)*
  - 1) Market selling price and market buying price of an item
- *Value-in-use is a reporting entity-specific value*
  - 1) Specific to the company that uses the item
  - 2) Discounted future cash flows from the continuing use of the item

#### AASB 13 Fair value measurement

- Fair value definition (para 9)
  - “The price that would be received to sell an asset (or paid to transfer a liability) in an orderly transaction between market participants at the measurement date.”
  - This is sometimes referred to as an ‘exit price’
- The exit price concept is based on current expectations about the sale or transfer price *from the perspective of market participants*
- Fair value is a *market-based measurement* and as such not affected by factors specific to a particular company
- If available, an *observable market price* in an *active market* is the *best evidence of fair value*
- But what if
  - there is more than one market price
  - the market is illiquid
  - there are no recent prices
  - there is no market for the specific item to be measured ?

#### 4 steps to make a fair value measurement

1. What is the particular asset being measured?
2. What is the appropriate measurement valuation premise? (*highest and best use*)
3. What is the *principal (or most advantageous)* market for the asset?
4. What is the appropriate valuation technique for the measurement of the asset?

#### 1. Determine the asset to be measured

- What is the location of the asset?
- What is condition of the asset?
- Is the asset a stand-alone or is it a group of assets?

Premise: Market participants will be taking these factors into consideration when determining how they would price the asset

## 2. Determine the highest and best use

- Fair value is measured by considering the highest and best use of an asset:
  - “The use of a non-financial asset by market participants that would maximise the value of the asset or the group of assets and liabilities (e.g. a business) within which the asset would be used.”
- The highest and best use is *from the perspective of the market participants, not the reporting entity.*
  - The reporting entity’s current or intended use of the asset/liability does not matter

## Market Participants

- Market participants are:
  - Independent of reporting entity (at arm's length)
  - Knowledgeable about the asset/liability
  - Able and willing to enter into a transaction for the asset/liability
  - “A large manufacturer of iron and steel” vs. “BHP Billiton Ltd”
- *Knowledgeable, willing parties in an arm’s length transaction*

## Arguments for & against current use (highest and best use)

- For the *valuation objective*, the primary interest is in expected future cash flows from the current use of an asset. Therefore the highest use by a market participant raises may not be the relevance information for the valuation objective.
- However it may provide decision useful information for the *efficient contracting objective* as it provides a measure of the opportunity cost of the current use of the assets an alerts to users to alternate uses of assets and holds management to account.

## Highest and Best use: in-combination vs. stand-alone

- Highest and best use (*from a market participant view*)
  - *In-combination* (used with a group of assets to maximize value, i.e., 1+1>2)
  - *Stand-alone* (not in combination with other assets)
- **In-combination valuation premise:**
  - FV is determined under this premise where market participants would *obtain maximum benefit* principally through using the asset in combination with other assets and liabilities as a group.
- **Stand-alone valuation premise:**
  - FV is determined under this premise where market participants would *obtain maximum benefit* principally through using the asset on a stand-alone basis

## 3. Determine the principal or most advantageous market

- FV measurement assumes that the transaction takes place in the principal market or in the absence of a principal market, the most advantageous market.
- *Principal market:* the market with the greatest volume and level of activity.
- *Most advantageous market:* the market that would maximise the amount received after deducting *transaction and transport costs*.

#### 4. Determine the appropriate valuation technique

Three possible valuation techniques exist:

1. **Market approach** – uses prices generated by market transactions
2. **Cost approach** – determines the value that reflects current replacement cost
  - The cost approach reflects the amount that would be required currently to replace the service capacity of an asset (often referred to as *current replacement cost*).
  - This approach assumes that *a market participant buyer would not pay more for an asset than the amount for which it could replace the service capacity of that asset*.
  - The cost approach is typically used to value assets when replacement costs (pricing information) are readily available.
3. **Income approach** – converts future cash flows to a single amount (present value)
  - The income approach is applied using the *discounted cash flow method*, which requires
    - (1) estimating future cash flows for a certain discrete projection period;
    - (2) estimating the terminal value, if appropriate;
    - (3) discounting future cash flows at a rate of return that considers the risk of the cash flows.
  - Income approaches are used when *observable inputs are not available*.

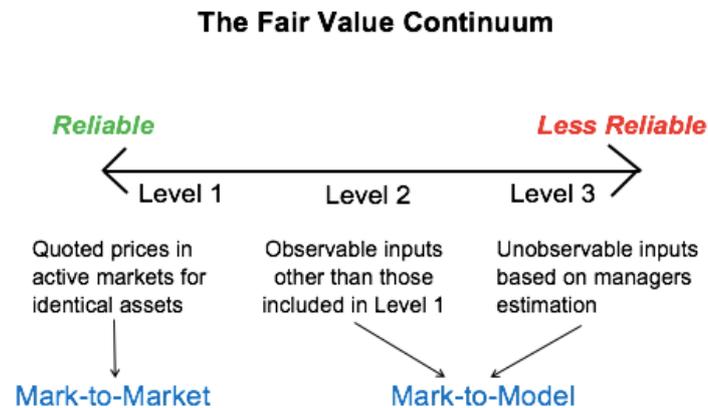
#### Inputs used in valuation techniques

- **Prioritising Inputs:**
  - When applying a technique the use of *observable inputs needs to be maximised and unobservable inputs minimised*
  - Observable inputs are developed using market data, such as publicly available information.
  - Unobservable inputs are those where market data is not available and rely on managers estimation.

#### Fair value hierarchy –prioritizing inputs

- **Level 1** – quoted prices in active markets for identical assets or liabilities
- “*Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at the measurement date*”
  - A market is not active if there are few recent transactions or price quotes vary substantially over time.
  - Level 1 inputs must be for identical items – for buildings, items may be similar, but will not be identical.
- **Level 2** – observable inputs not included in level 1 (e.g. quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active)
  - “*Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.*”
  - Included within this definition are:
    - Quoted prices for *similar assets* in active markets.
    - Quoted prices for identical items in *inactive markets*
    - Inputs *other than quoted prices that are directly observable* (for example interest rates)
- **Level 3** – unobservable inputs developed using best information available (e.g. entity’s own data)

- Includes *unobservable* inputs.
- Used for situations in which there is little, if any, market activity for the asset or liability.
- *Only can be used if observable market inputs are unavailable.*
  - Example: Own estimation of the firm's future cash flows and cost of capital (income approach valuation)



## Part II: Are securities market efficient?

Fama: “The market price at any time instantly reflects all available information in the market”.

- Random walk: day-to-day stock prices movement (i.e., stock returns) are impossible to predict
- “*You can't beat the market*”
- “*You get what you pay for*” (CAPM)

### Conditions necessary for market efficiency

- All investors are utility maximizers
- Rational expectations
  - All investors use “[Bayes rule](#)” to update (form) old (new) belief at the arrival of new information

*Obviously not correct, but errors assumed to be mean zero random*

### Evidence of Market inefficiency

1. *The CAPM (Beta) cannot explain average realized returns.*
  - Other characteristics of firms and information appear to be associated with realized returns. These factors appear to be associated with behavioral biases
2. *Stock markets are too volatile*
  - Stock prices move way too much relative to fundamentals

### **You get what you pay for? Is Beta dead?**

- CAPM implies beta is the only risk measure to explain stock returns
  - Higher  $\beta \Rightarrow$  higher risk  $\Rightarrow$  higher return
- Empirical results are weak
  - Weak results threaten CAPM and its underlying efficient market theory
- Other variables that explain returns:

- Value firms (low Market to Book) outperform growth firms (high MtB)
- Small firms outperform large firms
- Past returns predict future returns (i.e., momentum) in stock prices: short-term trends (6-12 months) continue

You can't beat the market? Value stocks outperform growth stocks

- *Value investment strategy: Long cheap and short expensive*

You can't beat the market? Small firms outperform large firms

- *Size investment strategy: Long small cap and short large cap*

Random walk?

- Past returns predict future returns
  - Head and shoulders pattern

Market inefficiency? Is the market doing what it is supposed to do?

- The market is really efficient but we are measuring the abnormal returns incorrectly
- What if CAPM is wrong?
  - Beta is insufficient to characterize risk
  - as a result we observe many cases where abnormal profits (as determined by CAPM) can be earned from public information

Remedy: Fama-French Three-Factor Model



#### The Three-Factor Model

$$E(R_{it}) - R_{Ft} = b_j[E(R_{Mt}) - R_{Ft}] + s_j E(SMB_t) + h_j E(HML_t)$$

The regression used to test the model is,

$$R_{it} - R_{Ft} = a_j + b_j(R_{Mt} - R_{Ft}) + s_j SMB_t + h_j HML_t + e_{it}$$

**SMB** (i.e., small minus big) is the return to a portfolio of small cap stocks less the return to a portfolio of large cap stocks

**HML** (i.e., high minus low) is the return to a portfolio of stocks with high ratios of book-to-market values less the return to a portfolio of low book-to-market value stocks

Excess market volatility

- Excess volatility
  - Shiller (1981) market movement greater than expected aggregate dividends
- Bubbles

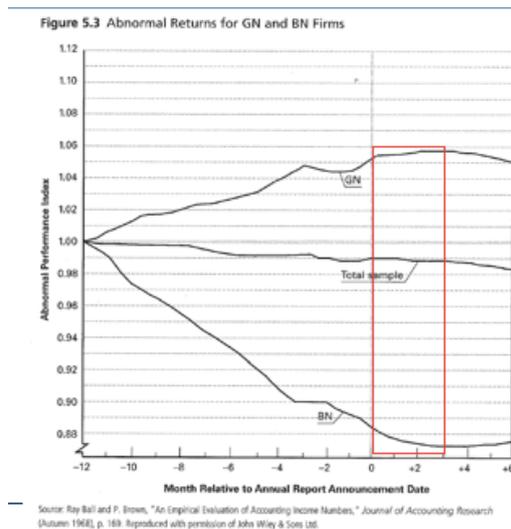
Evidence of Market inefficiency: accounting information

- Two big market anomalies relate specifically to accounting information:
  - (a) the “post-earnings announcement drift”
    - Post-earnings announcement drift
      - Recall Ball & Brown (1968)

- Occurs when abnormal share returns drift upwards or downwards for some time following GN or BN in earnings
  - Incorrect modeling?
  - Investors underestimate information content in current earnings?

**(b) the “accruals anomaly”**

- Net Income = Operating Cash Flows + Accruals
- Accruals tend to reverse through time and therefore less likely to persist than cash flows
- “Investors do not understand the components of reported earnings; the average investor is misled by accruals and accounting method changes” (Sloan, 1996)
- It appears markets fail to “see through” the accruals as should occur in an efficient market
- Firms with a high-level of accruals subsequently have negative abnormal returns which occur when the market is surprised that earnings do not persist.



Market Inefficiency

- Widespread anomalies is inconsistent with the efficient market hypothesis
  - Bad models, data mining, and results by chance
  - Alternatively, invalid theory
- Anomalies give rise to behavioral economics
- Evidence of both over- and under-reaction to events

Three conditions for market to be inefficient:

1. Investors exhibit information processing biases that cause them to over- and under-react
2. Individual investors’ biases in processing information must be correlated across investors so that they are not averaged out
3. Limited arbitrage: Existence of rational investors should not be sufficient to make markets efficient

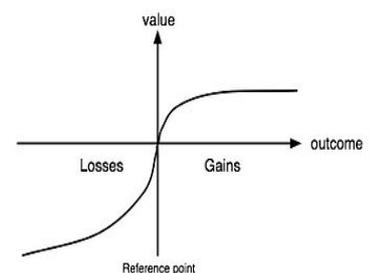
**Condition #1: Theories of Information Biases**

- Human information processing biases
  - Information processing biases are generally relative to the *Bayes rule* for updating our priors on the basis of new information

- Two biases are central to behavioral finance theories
  - Representativeness bias (rely too much on news)
    - People judge by similarity to familiar types, *without regard to base rate probabilities*
    - People over-infer the properties of the underlying distribution on the basis of sample information
  - Conservatism bias (rely too much on prior)
    - Conservatism bias: Investors are slow to update their beliefs
      - i.e., they underweight sample information which contributes to investor under-reaction to news
    - Conservatism bias implies investor under-reaction to new information
    - Conservatism bias can generate
      - The *post-earnings announcement drift*, i.e., the tendency of stock prices to drift in the direction of earnings news for three months following an earnings announcement
  - Other biases: Over confidence and self-attribution bias
    - Investor overconfidence
      - Overconfident investors place too much faith in their ability to process information
      - Investors overreact to their private information about the company's future prospects
    - Self-attribution bias
      - Overreact to public information that confirms an investor's private information (attribute gains to ability)
      - Underreact to public signals that disconfirm an investor's private information (attribute losses to bad luck)

### Prospect Theory

- Proposed by two psychologists: *Daniel Kahneman* and *Amos Tversky* in 1970s
- Gambles/Investments are evaluated relative to a reference point
- Decision maker analyzes “gain” and “loss” differently
- Incremental value of a loss is larger than that of a gain
- *Loss avoidance*



### Example of risk aversion vs. risk seeking

- Initial investment: \$300. Consider a choice between:
  - a sure gain of \$100
  - a 50% chance to gain \$200, a 50% chance to gain \$0.
- Initial investment: \$300. Consider a choice between:
  - a sure loss of \$100
  - a 50% chance to lose \$200, a 50% chance to lose \$0.

- Case 1: 72% chose option 1, 28% chose option 2.
- Case 2: 36% chose option 1, 64% chose option 2.

⇒ A reversal in Choice!

- Problem framed as a gain: decision maker is risk averse.

- Problem framed as a loss: decision maker is risk seeking.
- Individuals treat gains differently from losses – so they cash out winners too quickly (risk aversion) and hold onto losses too long waiting for a turnaround (risk seeking)

**Condition #2: Biases must be correlated**

- In addition to exhibiting information-processing biases, the *biases* must be correlated across investors so that they *are not averaged out*
  - People share similar biases
  - Experimental psychology literature confirms systematic biases among people

**Condition #3: Limited Arbitrage**

- EMH: arbitrage can correct mispricing
  - Market participants with incentives to gather, process, and trade on information will arbitrage away systematic mispricing of securities caused by investors' information processing biases
- Behavioral economics assumes arbitrage is limited. Why?
  - Trading and holding costs (brokerage, costs of short selling);
  - Information costs: Information acquisition, analysis and monitoring
  - Limited capital