# Calculating the effect of employee stock options on diluted EPS

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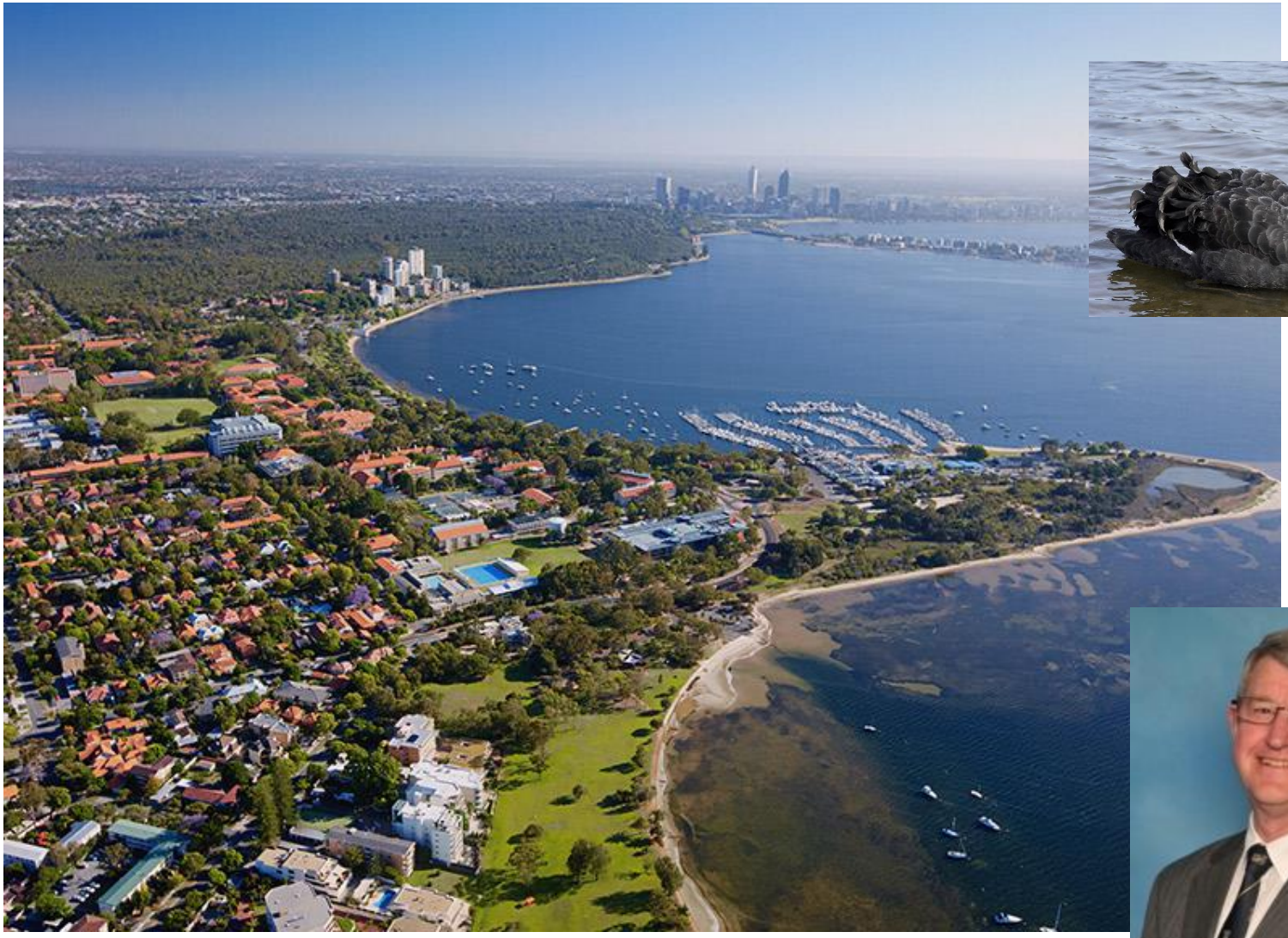



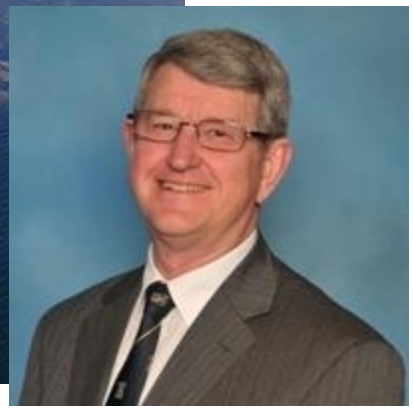

# Diluted Earnings per Share

# Calculating DEPS

# Question?

- What is the best method to use for calculating DEPS when the firm has outstanding ESOs?

# Who cares?

- Pervasive use of EPS/DEPS/PE Ratio
  - Only accounting metric quoted by AFR and Google Finance
  - Analysts forecast DEPS (Marquardt and Wiedman 2005)

# Current IAS 33 requirement

- Treasury stock method

$$D = n_o - \frac{n_o X}{P}$$

# Treasury stock method

- by rearranging

$$D = \frac{n_o}{P}\left(P - X\right)$$

# Prior literature

- Core, Guay & Kothari (2002)

$$D = \frac{n_o F}{P}$$

# Prior literature

- Landsman, Peasnell, Pope & Yeh (2006)
  - within the Ohlson (1995) framework ESOs should be treated as a liability carried at fair value

# This research

- Again use Ohlson (1995) framework
- adapted for ESOs by Hess & Lüders(2001)

# Alternative method for DEPS

- Derive the following formula

$$\frac{\Delta S_t}{n_s} = \frac{x_t - d_t - \Delta O_t}{n_s}$$

# Compared to

- Core et al.
  - value of firm is simple linear function of earnings
  - Does not resolve differences between cash- & equity-settled options
- Landsman et al.
  - ESOs represent a liability
  - similar treatment at a DEPS level

# Three methods

| | Earnings adjustment | Treasury stock | Treasury option |
|---|---|---|---|
| ***Adjusts*** | Earnings | No. of shares | No. of shares |
| ***Based on*** | Changes in fair value | Intrinsic value | Fair value |
| ***Future services*** | No adjustment | Adjust for unamortised expense | No adjustment |

# Applying the three methods

- Simple example

| | |
|---|---|
| No. of shareholders | 10 |
| Cash asset | 100 |
| Return on cash deposit | 10% |

# Example 3: over 2 periods

| | Y1 | Y2 |
|---|---|---|
| Interest received | 10,00 | 11,21 |
| Income from services | 2,08 | 1,91 |
| IFRS 2 expense | (1,74) | (1,74) |
| Net income | 10,35 | 11,38 |

# Example 3: over 2 periods

| **DEPS** | | |
|---|---|---|
| Earnings adjustment method | 1,00 | 1,10 |
| Treasury stock method | 1,02 | 1,10 |
| Treasury option method | 1,00 | 1,10 |
| | | |
| Share price | 11,00 | 12,10 |
| Option value | 1,91 | 2,10 |

# Example 4: uncertainty

| | Y1 | Y2(1) | Y2(2) | E(Y2) |
|---|---|---|---|---|
| Interest received | 10,00 | (18,79) | 41,21 | 11,21 |
| Income from services | 2,08 | 1,91 | 1,91 | 1,91 |
| IFRS 2 expense | (1,74) | (1,74) | (1,74) | (1,74) |
| Net income | 10,35 | (18,62) | 41,38 | 11,38 |

# Example 4: uncertainty

| EPS | Y1 | Y2(1) | Y2(2) | E(Y2) |
|---|---|---|---|---|
| EAM | 0,964 | (1,444) | 3,636 | 1,096 |
| TSM | 1,017 | (1,862) | 3,893 | 1,016 |
| TOM | 0,997 | (1,862) | 3,893 | 1,016 |
| Share price | 10,96 | 9,52 | 14,60 | 12,06 |
| Δ | 0,964 | (1,444) | 3,636 | 1,096 |

# Which is the best method?

- earnings adjustment method
  - best captures change in wealth
- treasury option method
  - best indicator of future earnings
- treasury stock method
  - least useful of three

# Practical consequences

- Test EAM using 5 ASX companies:
  - CSL
  - Afterpay
  - Reece
  - Xero
  - carsales.com
- For the last 5 years

# Practical consequences

- Estimate the EAM adjustment by:

$$CB - OB - OGRT + OEXR + OFOR$$

# EAM results

| Firm | Year | EAM / π | EAM vs DEPS |
|---|---|---|---|
| CSL | 2018 | 2.09% | 1.76% |
| Afterpay | 2017 – 2021 | 259 – 2,627% | 294 – 2,502% |
| Reece | 2021, 2020 | 1.13%, 0.01% | 0.66%, 0.01(h) |
| Xero | 2017 – 2021 | 1.20 – 1,408% | 1.75 – 1,628% |
| carsales | 2017 – 2021 | 0.68 – 2.79% | 0.8(h) – 2.59% |

# EAM results

- Conclusions from test sample
  - IAS 33 significantly understates the dilution
  - Can have very large EAM adjustments
    - Significant DEPS volatility
    - If P:E ratio large
  - EAM DEPS can be higher than basic EPS

# Implications for standard setting

- Align cash- and equity-settled ESOs
- TOM would be a simple change
- Not necessary to adjust exercise price
- Need to clarify the distinction between debt and equity

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