

Relative Valuation

EQUITY VALUATION IN R



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Law of One Price

Relative valuation is based on the **Law of One Price**, i.e., two assets that look the same must have the price

Law of One Price (Example)

Stock	Subject Firm	A	B
Payoff If Economy Does Well	9	10	8
Payoff If Economy Does Poorly	3	4	2
Price	???	7	5

The Subject Firm's Price is \$6

Stock	Subject Firm	A	B	Average
Payoff If Economy Does Well	9	10	8	9
Payoff If Economy Does Poorly	3	4	2	3
Price	???	7	5	6

Identifying Comparables

- Some approaches
 - Firms within same industry classification
 - Competitors
- Filter by risk, growth, and profitability

Let's practice!
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Valuation Multiples

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Price-to-Earnings Ratio

- One of the most common valuation multiples used
- $P/E \text{ Ratio} = \text{Market Price of Stock} / \text{Earnings Per Share (EPS)}$
 - EPS can be historical - i.e., last twelve months (LTM)
 - EPS can be forward-looking - i.e., next twelve months or next fiscal year
- P/E Ratios are not meaningful when the EPS is negative

Price-to-Book Ratio

- Another common valuation multiple
- $P/B \text{ Ratio} = \text{Market Price of Stock} / \text{Book Value Per Share}$
 - Book Value can be historical - i.e., last fiscal quarter's equity
 - Book Value can be forward-looking - i.e., estimates of future book value
- Book Values are usually positive but there are some cases when book values are negative

Implying the Price

Steps in determining the Implied Price

- A set of comparable companies are identified
- The appropriate metric or metrics are determined
- The median or average valuation multiple is selected
- The valuation multiple is applied to the subject firm's metric

Implying the Price

Relative valuation generates an **Implied Price**

- Dependent on valuation of comparable companies

What is the value of a midcap financial firm with BVPS of \$30?

```
finl <- subset(midcap400, gics_sector == "Financials")
finl$p_bv <- ifelse(finl$bvps < 0, NA, finl$price / finl$bvps)
finl <- finl[complete.cases(finl), ]
avg_p_b <- mean(finl$p_bv)
avg_p_b
```

2.688627

```
bvps <- 30
implied_price <- avg_p_b * bvps
implied_price
```

80.65881

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Analyzing Determinants of Multiples

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The Average of Median May Not Always Be Applicable

- Use average or median if firms are very "comparable"
- Approaches to determine comparability:
 - Compare risk, growth, and profitability
 - Relative position historically

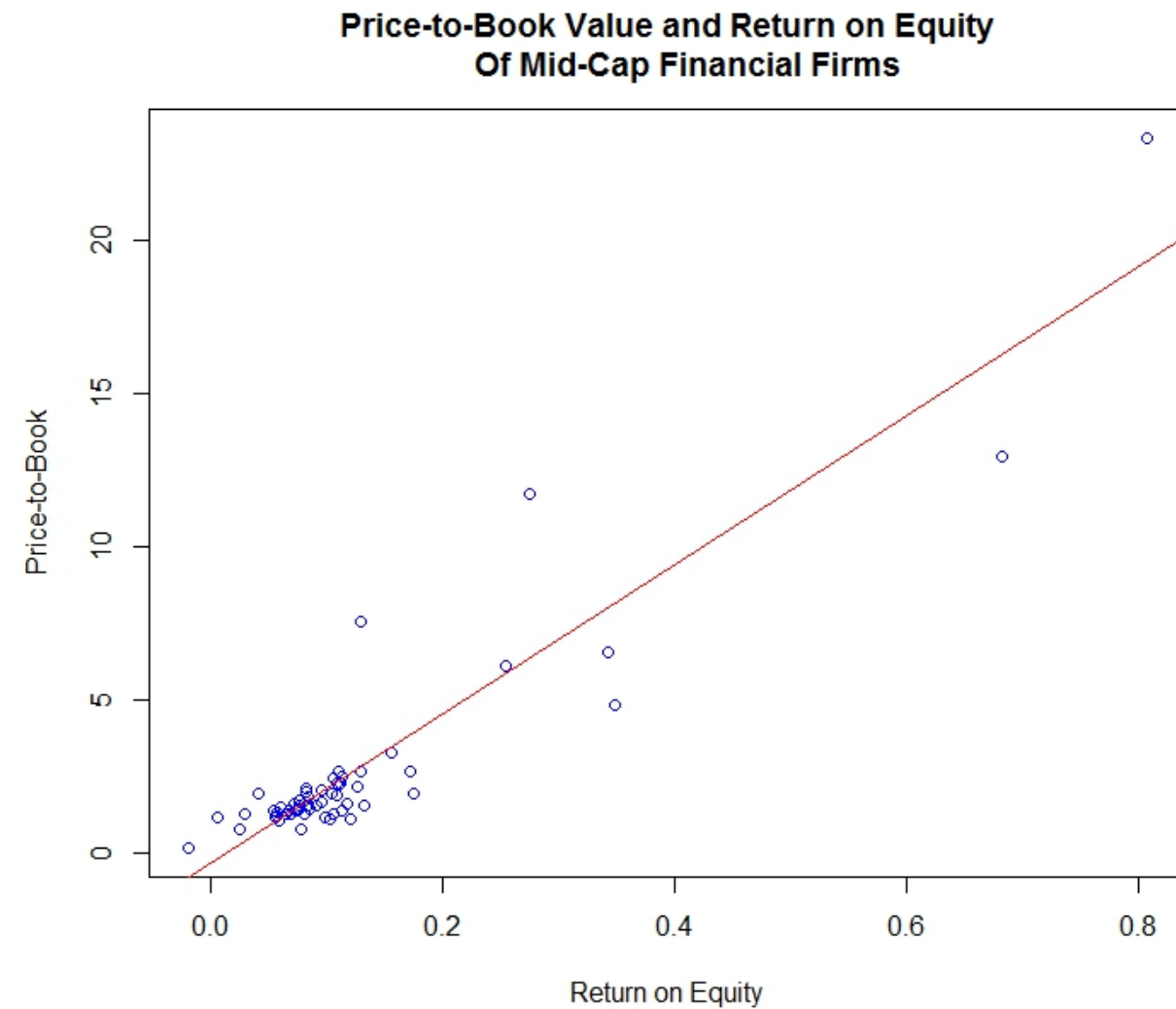
Regression-Based Approach

- We can also use regression analysis to help us determine what the appropriate multiple is for our subject firm
- P/B vs. ROE. P/E vs. 5-Year EPS Growth, or multiple regression
- Less subjective to arrive at the appropriate valuation multiple

Example Using P/B vs. ROE

```
finl <- subset(midcap400, gics_sector == "Financials")
finl$roe <- finl$ltm_eps / finl$bvps
finl$p_bv <- ifelse(finl$bvps < 0, NA, finl$price / finl$bvps)
finl <- finl[complete.cases(finl), ]
```

Example Using P/B vs. ROE



$$P/B = -0.365 + 24.37 * ROE$$

$$R - squared = 0.8462$$

Example Using P/B vs. ROE

```
reg <- lm(p_bv ~ roe, data = finl)
a <- summary(reg)$coeff[1]
a
```

```
-0.3654199
```

```
b <- summary(reg)$coeff[2]
b
```

```
24.37047
```

Assume an ROE of 10% and BVPS of \$30, what is the **Implied Price**?

```
# Implied Price-to-Book  
roe <- 0.10  
implied_p_b <- a + b * roe  
implied_p_b
```

```
2.071627
```

```
# Implied Price  
bvps <- 30  
implied_price <- implied_p_b * bvps  
implied_price
```

```
62.14881
```

Let's practice!
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