



Universidad del Desarrollo
Universidad de Excelencia

Finance I

Fall 2012

Session 9:
CAPM

(Capital Asset Pricing Model)



1. Recap

2. Capital Asset Pricing Model

3. Closing

- ▶ **If you can lend and borrow at a risk free rate, the Capital Market Line or Security Market Line represents the optimal combination of the market portfolio and a risk free asset**
- ▶ **The market portfolio doesn't depend on the risk preferences of individuals, only the risk free rate and the Sharpe ratio**
- ▶ **All investors will choose the same risky portfolio (the market portfolio), but they will combine it with the risk free asset in a different proportion**
- ▶ **The cost of opportunity of any asset can be determined by the risk free rate, the market risk premium and beta, where beta is the asset's contribution of risk to the portfolio**

1. Recap

2. Capital Asset Pricing Model

3. Closing

▶ Capital Asset Pricing Model

▶ The required expected return of an asset is determined by its contribution to the non diversifiable risk of the market portfolio

▶ This contribution is represented by beta:

$$\beta = \frac{\text{cov}(\text{asset}, \text{market})}{\text{Var}(\text{market})}$$

- If the beta of an asset is 1 (one), it holds the same level of risk as the market portfolio.
- If the beta of an asset is 0.5 (zero point five), it holds half the level of risk as the market portfolio.

- ▶ We can write the capital market line (or security market line) as:

$$R_a = R_f + \beta_a * (R_m - R_f)$$

- ▶ The difference between the Market portfolio return (R_m) and the risk free return (R_f) is called “Market Risk Premium”
- ▶ If an asset has the same level of risk as the market portfolio, it should have the same risk premium as the market portfolio
 - If it has twice the risk, it should have twice the risk premium
 - If it has half the risk, it should have half the risk premium

- ▶ Please keep in mind that we are talking about risk premium, not expected return...
- ▶ If an asset has twice the risk as the market portfolio, it **SHOULDN'T** have twice the expected return

$$R_a = R_f + \beta_a * (R_m - R_f)$$

1. Recap

2. Portfolio Risk and Return

3. Closing

► Risk and Return:

- Time value of money
- Risk aversion
- Cost of opportunity: Highest available return for the same level of risk

► Portfolios

- Diversifiable risk and non diversifiable risk
- Efficient portfolios
- Adding a risk free asset generates the market security line
- Sharpe ratio
- Market portfolio
- Separation theorem

► CAPM

- Compares market portfolio risk and return with any asset's risk (non diversifiable) and return
- Why do we do that? Why do we demand the same return?
- $\beta = \frac{\text{cov}(\text{asset}, \text{market})}{\text{Var}(\text{market})}$
- Beta higher than one: riskier than the market
- Beta lower than one: less risky than the market
- Positive beta: positive correlation of asset and market
- Negative beta: negative correlation of asset and market
- $R_a = R_f + \beta_a * (R_m - R_f)$
- **Piece of cake... más fácil que la tabla del uno**