

Follow up for important
concepts

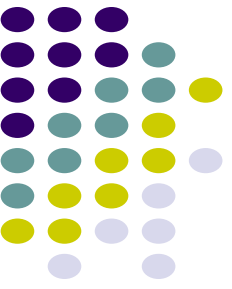
Approach to this class

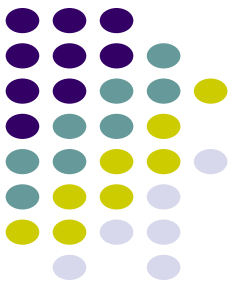
Bottom-line:

Know what and how

Perfection:

Know why and be able to explain to people





Wrap up our discussion of CF

PCF & FCF:

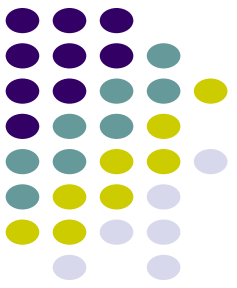
We're separating the investing and financing decisions and value the project/company as if fully equity financed

Reason:

Simplicity. Multiple discount rates might be involved.

Separation of the financing decision and the investment decision.

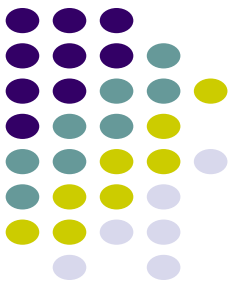
Q: in such case, should we use r_E as discount rate?



Wrap up our discussion of CF

PCF & FCF: how to transfer from what should be the discount rate?

1. Look at the specific cash flow
2. Treat the company/project as a whole



Look at the specific cash flow

Trick:

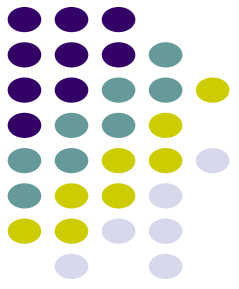
NPV from the company's financial = 0:

Regardless of what interest rate we use for pricing the security issuance,

Financed amount = DCF (Future Payment)

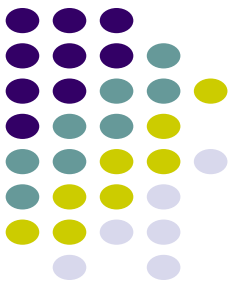
Why? Assume fair market, complete competition

Two important points when looking at the specific cash flow



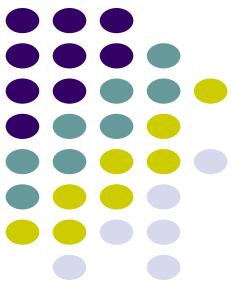
- Discount rate to project cash flow \neq discount rate to the specific financing cash flow
- Initial funded value = $PV(\text{future cash flows})$

Example of why PCF interest payment is irrelevant



Example:

- Suppose a project requires an investment of 1000, and will generate perpetual cash flow of 200.
- The discount rate appropriate for the cash flow is assumed to be 10%.
- The project is partially financed by *perpetual debt*.
- Risk-free rate is 5%.
- Debt raised is 200, and the interest rate is 5%.
- Assume that the expected perpetual cash flow of 200, though risky, will always exceed 10, the bond is correctly priced.



Financial Items

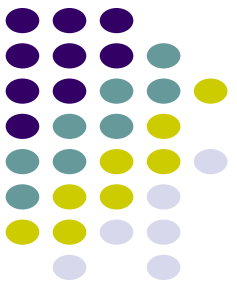
Try it!

Should we deduct the interest payment of 10 to calculate the project cash flow?

Can you work out the equity investors' value gain (NPV) from the project?

- An **immediate problem** of doing so is that the cash flow of 200 and the cash (out)flow of 10 **do not have the same risk**.
- The discount rate for the former is 10%, but that for the latter should be 5%.
- Thus, even if we subtract interest payment, it should be discounted at 5%.
- Thus, the NPV of the project is:

$$\text{NPV} = (200/10\%) - (10/5\%) - (1000-200)$$



Financial Items

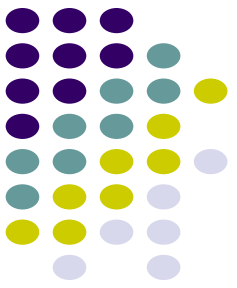
Try it!

- Note that since 200 of the initial cost is financed with debt, the firm only need to invest another $1000 - 200$ of the shareholders' equity.

$$\text{NPV} = (200/10\%) - (10/5\%) - (1000 - 200)$$

$$\text{NPV} = (200/10\%) - 1000.$$

- This is the NPV calculated ignoring the financial items.
- NPV of financial transaction is zero in a frictionless world.
- This is the foundation of designing **“project cash flow” as the additional cash flow assuming the project was completely equity financed.**



Treat the company/project as a whole

Our two principles:

- Discount rate should match the cash flow

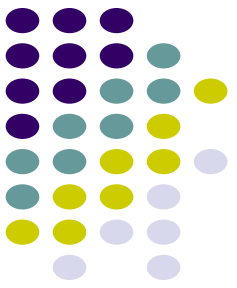
- PCF calculate the cash flow assuming the project is fully equity financed

However, we should not use the cost of equity as the discount rate

As is illustrated in the previous example

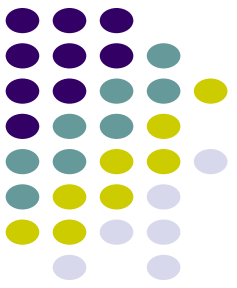
What discount rate?

Opportunity cost



When considering an investment, the investor should use the opportunity cost of putting their money to work elsewhere as an appropriate discount rate.

Remember how we derived PV function

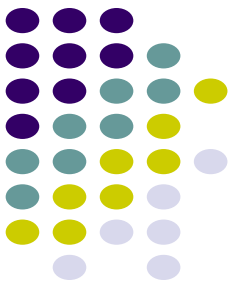


Opportunity cost for financial assets

Financial investment (CAPM):

Rate of return that the investor could earn in the marketplace on an investment of comparable size and risk.

What is the opportunity cost of a company's money?



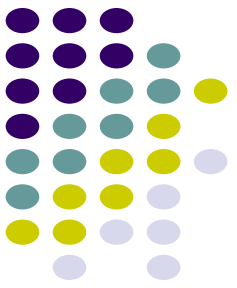
Retain the money and invest

Vs

Distribute back to investors

In this sense, the cost of capital for a project = WACC

Key logic: investor could have invested in other investments



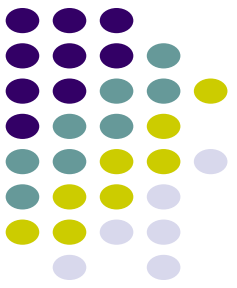
Example

Apple has a 1-year cash investment opportunity that gives Apple
8% risk free return

US 1-year rate: 4.267%

Should Apple invest in this?

No! Apple's WACC = 11.28%

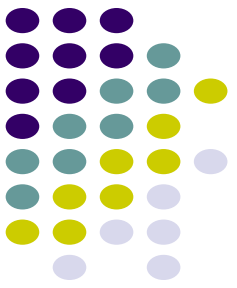


Does this apply to every company investment?

Following this logic, a company should never hold any cash outside of its projects

The above analysis is in the frictionless world

In reality, companies might engage in investments with less than WACC return



Timing of the cash flow

CAPEX Investment?

Change in net working capital?

Sales?

Change in net working capital:

- Happens at the beginning of the year

- Calculated from the difference between beginning and end of the year balance