Intermediate Financial Economics
Lecture I: Introduction

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Today's Lecture:

- I. Introduction:
  - A. Review of what we have learned.
  - B. Course outline.
- II. Efficient markets

A. Review

- PV
- Valuation of bonds
- Term structure of interest rates
- Valuation of stocks
- Portfolio theory
- The Capital Asset Pricing Model

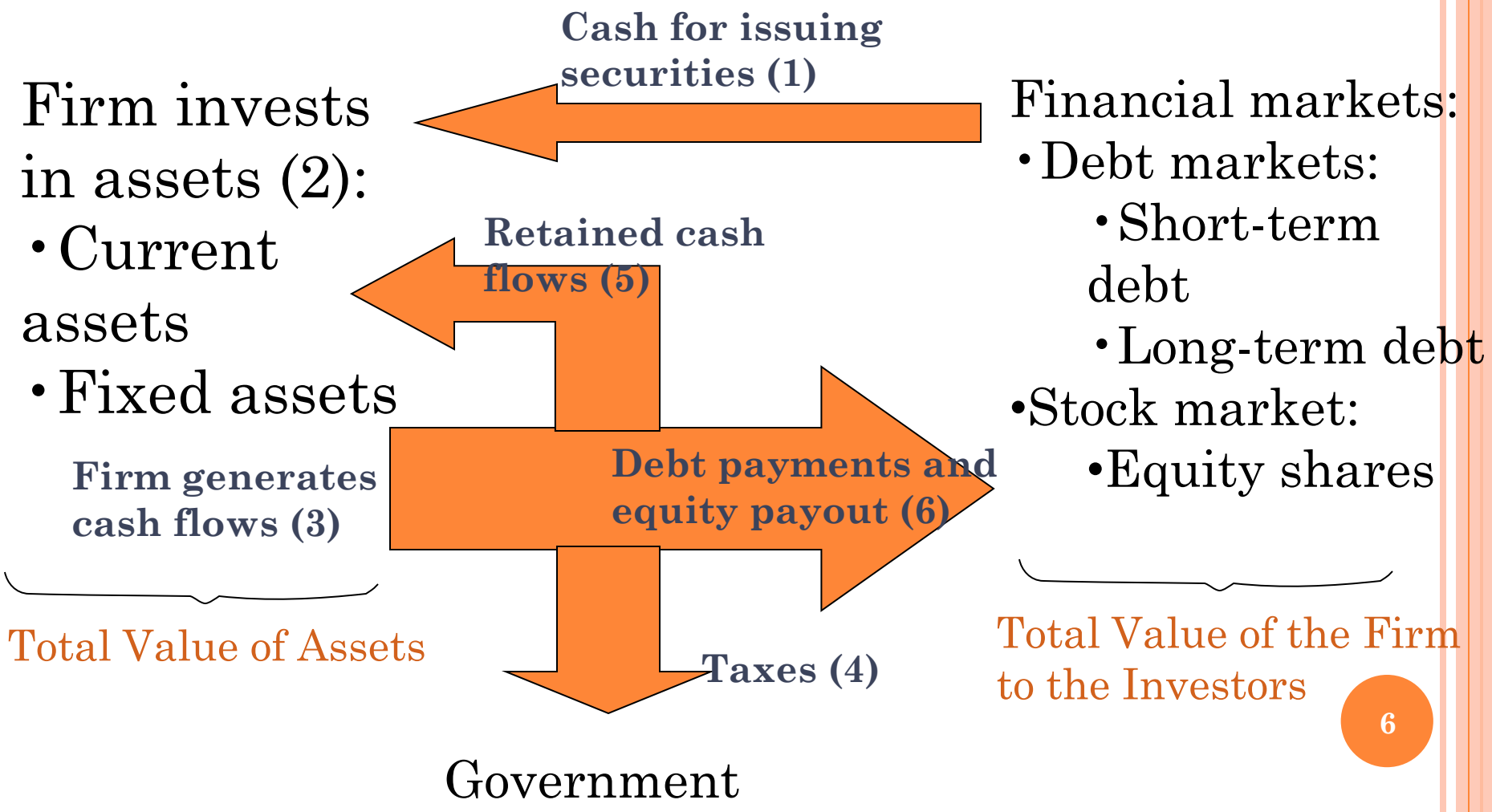
B. Course Outline:

- Asset valuation:
  - Equilibrium consumption-based asset pricing models.
  - Stochastic discount factors.
  - Contingent-claim markets, no arbitrage, and law of one price.
  - Risk neutral probabilities.
  - Application: pricing options and futures, pricing corporate securities.

Course Outline

- Corporate finance:
  - Corporate financial decision making:
    - Investment decisions = purchase of real assets
      - Capital budgeting
      - Mergers and acquisitions
    - Financing decisions = sale of financial assets
      - Capital structure: how much debt to borrow
      - Payout policy: how much earnings to reinvest
  - Corporate governance:
    - Agency problems: conflict of interest between shareholders (principals) and managers (agents)

Cash flows between a firm and the financial markets



II. Efficient Markets

- A1. Definition:
- Markets are efficient if and only if a certain set of information is FULLY reflected in prices.
- In efficient markets, you cannot earn extra-normal profits unless you have information beyond what's reflected in asset prices.
- Examples:
  - Stock price reaction to corporate announcements.
  - Housing price reaction to subway plans.

A2. An Example: Lenovo Stock

(i) Setup

- Suppose that its earnings/dividend pattern is 1,2,1,2,..., starting one year from now.
- Discount rate is 10%. Risk-neutral world.
- Assume: prices are *ex* dividend.
- What will be its current price, and the price next year?

(II) Calculating prices

- This year's stock price with future dividends (1,2,1,2,…) beginning from Year 1 is 14.76.
- Next year's stock price with future dividends (2,1,2,1,...) beginning from Year 2 is 15.24.
- So Lenovo stock price alternates between 14.76 and 15.24.
- Note: the return over *any* year is 10%.

Another Way to do this:

- Define p_1 to be the price of 1,2,1,2,...
- Define p_2 to be the price of 2,1,2,1,...
- These prices obey

$$p_0 = \frac{1 + p_1}{1.1} \quad \Rightarrow 1.1p_0 = 1 + p_1$$

$$p_1 = \frac{2 + p_0}{1.1} \quad \Rightarrow 1.1p_1 = 2 + p_0$$

(III) Market Efficiency

- Under the prices computed above, the information that Lenovo dividends are cyclical is fully reflected in its stock price.
- You can't make money trading based on that information.
  - Where "make money" means earn more than a normal return of 10%
- Markets are efficient relative to that information.

(IV) INEFFICIENT MARKETS

1) Definition:

- Markets are inefficient with respect to certain information means:
  - That information is NOT reflected in asset prices
  - OR is reflected incorrectly (markets overreact or underreact)
- In either case there exist profitable information-based trading rules.

2) Back to Lenovo …

- Suppose investors didn't know that Lenovo's dividends are cyclical -- that is, that information isn't already reflected in their stock price.
- For concreteness, suppose that investors only know current (date-0) earnings/dividends -- they immediately forget the past (or they believe that history is irrelevant.)
  - And they assume earnings will be constant perpetuity(either at 1 or 2).
  - For example, if the dividend just paid is 1, they would assume all future dividends to be 1.

- In that case, from the perpetuity formula, the price of the stock would be 10, 20, 10, 20,..., (assuming a 10% discount rate).
- Still efficient!
- but relative to a smaller information set -- one that doesn't include past dividends, so investors can't perceive the cyclical pattern.
- If you have the information that dividends are cyclical, then you can form strategies that are expected to earn abnormal returns.

3) Information-Based Trading Rule

- Suppose you are the only one who knows the cyclical pattern of dividends.
- If the current dividend is 1, you know that the future price will be 20. But everyone else only believes in constant dividends and that the price equals 10.
  - You buy it at 10 now and will sell it for 20 next period.
  - Return: (20 – 10)/10+2/10= 120%>10%.
- If the current dividend is 2 (and the price is 20), you short it at 20 now and will buy it back at 10 next period:
  - Suppose you have to deposit 10 in order to short a stock that's worth 20 (implying a margin requirement of 50%). Suppose the fee is 2. You have to pay the current dividend of 1 too. The return is around (20–10–2–1)/10=70%.
- The information that Lenovo's dividends are cyclical is <u>not reflected</u> in its stock price. Therefore one can make money trading based on that information.
- Markets are <u>inefficient</u> relative to that information.

A3. Efficient Markets: Prices Only React to "Surprises"

- In an efficient market, prices only react to surprises -- the difference between what is reported and what the market expected (i.e. what was already incorporated in asset prices).
- Even a big increase (drop) in earnings can lead to a drop (increase) in security prices, depending on what was expected.
- Example: In July 2012, Apple reported $8.8 billion profits for the second quarter. The figure equals Mongolia's entire economic output for all of Year 2011. Yet Apple's share price had fallen by $30, or around 5% in after-hours trading. See link in the folder Readings on Blackboard for detail.
  - Why? Because investors had expected Apple to do even better. This expectation had already been incorporated in Apple's share price prior to the earnings report.

My favorite quote

- "In NYSE composite trading, Ford shares closed down $1 at $59.50, reflecting some disappointment that the company didn't exceed expectations by more than it did". - *Wall Street Journal*.

A4. Implications on investment decisions

- In making an investment decision, the only relevant information in identifying mispriced securities is that which isn't already fully reflected in asset prices.
- Unless you think you have information that's not already reflected in asset prices, you should conclude that assets are priced right.
  - In that case you have no basis to make a choice.

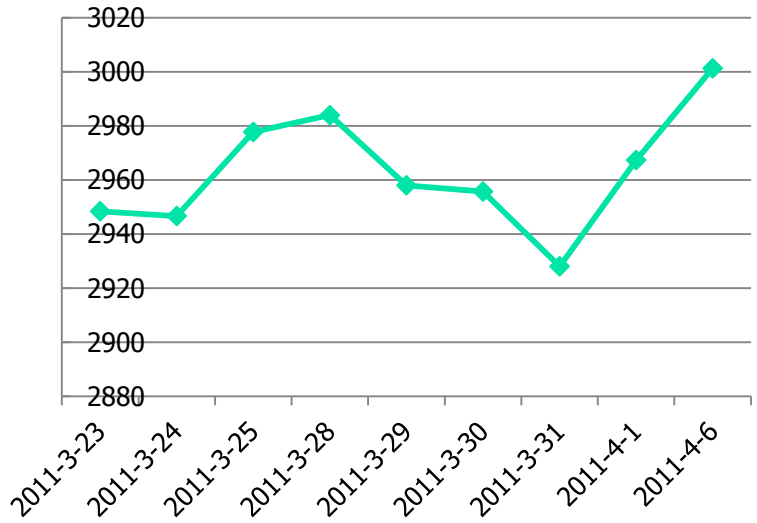
- If you disagree with the market price, but don't have superior information, that's because the market has more information than you do.

- Can't trade profitably in that case.

(II) EXAMPLES

1) Case Study:

- China's central bank raised the base interest rate by 0.25% on April 5, 2011, which was a holiday.
- Increasing interest rate is usually bad news to the stock market, because of the perceived lack of liquidity caused by tightening monetary policy.
- But the Shanghai Stock Index rose on the next trading day.
- The degree of rate increase might have fallen short of investors expectations.
- Investors might have temporarily felt more confident because they didn't expect that another rate hike would occur soon.



2) The question of market efficiency comes up all the time in business …

- "Let's postpone our financing: interest rates are dropping; we'll do better in 6 months"
- "Shanghai Composite Index will reach 6000 -- let's load up."
- "Shanghai Composite Index will reach 6000 – let's get out while we can."
- "Buy apartments in suburban Beijing: a subway line will be built nearby, so the price will go up."

Summary

- Capital market efficiency: prices fully reflect present values of future cash flows based on some information.
- Implication: if markets are efficient with respect to some information.
- And if you have only that information, you cannot trade profitably.
- If market is inefficient with respect to information that you have, then you can trade profitably.

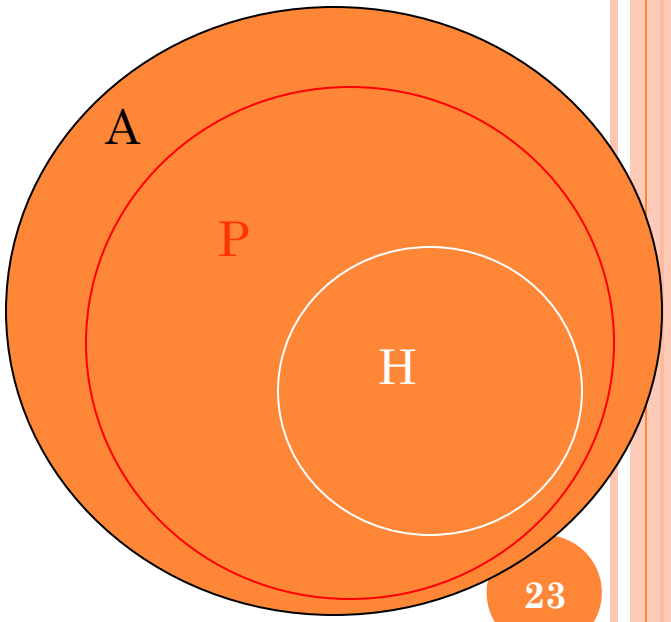
B1. Three Forms of Efficiency

- Weak-form: market is efficient with respect to *past information*
- Semistrong-form: market is efficient with respect to all public information
- Strong-form: market is efficient with respect to all information
  - Not likely!

Note the direction of implication

- Strong-form implies semi-strong form,
- Semi-strong form implies weak-form
- But not vice-versa

- A: all available information
- P: public information
- H: historical/past information



B2. Technical vs. Fundamental Analysis

- **(i) Technical analysis:** trading based on price patterns; it is essentially the making and interpreting of stock charts.
- The Dow Theory:
  - Primary trend
  - Secondary (intermediate) trend
  - Minor trend
- Resistance levels and support levels: price levels above which it is difficult for stock prices to rise, and below which it is unlikely for them to fall.
  - Pure market psychology

B2. Technical vs. Fundamental Analysis

- **(ii) Fundamental analysis**: trading based on researching the company
  - Attempts to identify fundamental value
    - Earnings and dividend prospects, future interest rates, risk evaluation of a firm
  - Presumption: price fluctuates around fundamental value – you can trade profitably based on the discrepancy.
- Good firms with good prospects do not necessarily bring high rewards. It is more important to find firms that are better than everyone else's estimate. So poorly-run firms can be of great value too, depending on how the market values them.

B3. Implications of Market Efficiency

- If markets are weakly efficient, then technical analysis doesn't work.
- If markets are semi-strongly efficient, then fundamental analysis cannot work.
  - Contrast: price fluctuates around fundamental value vs. price equals fundamental value
- If markets are strongly efficient, then insider trading doesn't work.

Inside Information

- Secret information that will influence the firm's stock price movement.
- Insider-trading gives the insider a huge and unfair advantage in trading and is banned by the SEC.
- Known trials that involved insider trading:
  - Martha Stewart had sold her nearly 4,000 shares of ImClone one day before the company announced the FDA would deny approval to its cancer drug.
  - Huang Guangyu, a Chinese entrepreneur who owns the Chinese equivalent of Bestbuy, went to jail for alleged insider trading.

C. Empirical Evidence of Market Efficiency

- **C1. Supporting Evidence**
- C1. (i). Weak-form Efficiency
- Implies that stock prices follow a *random walk*.

$P_{tomorrow} = P_{today}$+expected return +random error

- The random error is an IID random variable that has a zero mean.
- It could be positive or negative in an unpredictable way.
- It is also unrelated to the random component in other periods.

Testing Weak-Form Efficiency : Serial Correlation Tests

- Serial Correlation: the correlation between the current return on a security and the return on the same security over a later period.
  - If S.C. is positive, a higher-than-average return today is likely to be followed by higher-than-average returns tomorrow=>>continuation (also called momentum).
  - If S.C. is negative, a higher-than-average return today is likely to be followed by lower-than-average returns tomorrow=>>reversal.
  - What is the S.C. of a random walk?
- Serial correlation tests: investigate whether historical stock prices exhibit zero serial correlation.

Serial Correlation Tests

- Studies have found positive correlation in short or intermediate horizon and negative correlation in long horizon.
- However, most of the reported serial correlation coefficients are small relative to estimation errors.
- Statistical significance is not economic significance.
  - Although there were statistically strong patterns of short-run momentum and intermediate-run return reversal, profitable strategies couldn't be dependably formed to earn above-average risk adjusted returns.
- Therefore the results generally are not considered as strong evidence against weak form efficiency.

C1.(II). Evidence Supporting Semistrong-Form Efficiency: Mutual Funds

- Do not outperform the market, even without considering management charges.
- Managers who do outperform for a while don't continue to do so.
- supports semistrong-form efficiency.

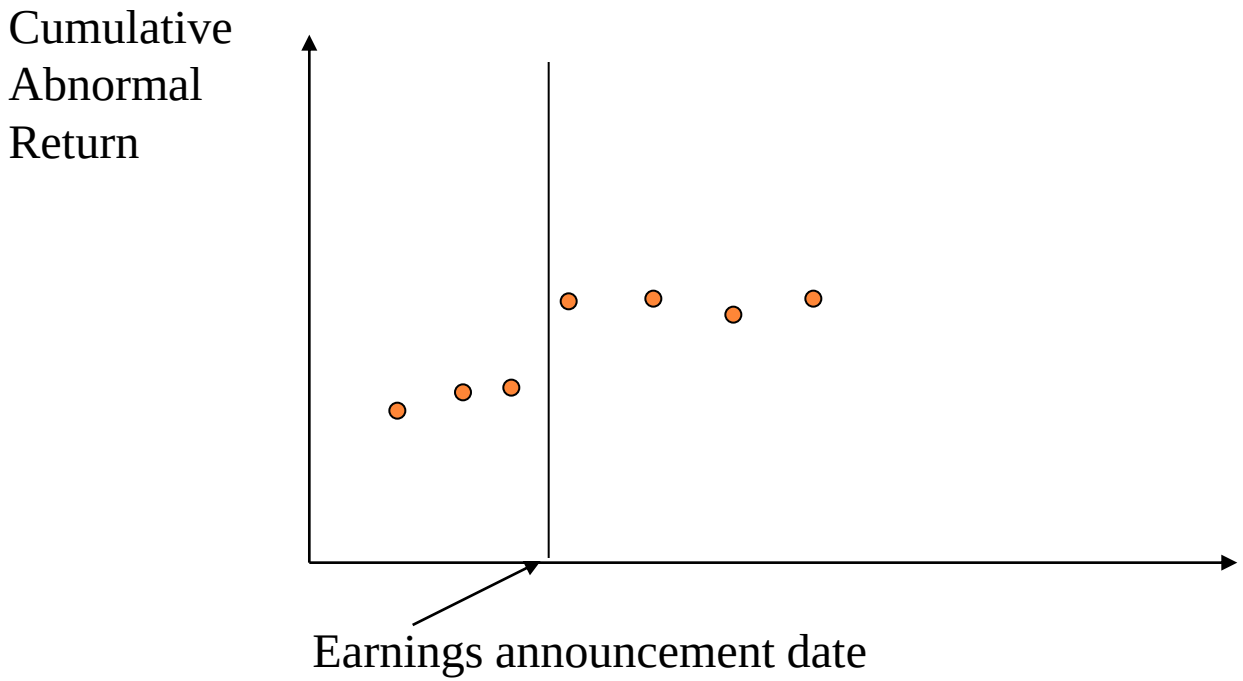
C1.(iii). Evidence Supporting Semistrong-Form Efficiency: Event studies

- consider pattern of returns surrounding information event -- that is clearly publicly known
- should affect stock prices on the date of release
- Or maybe before (if insiders trade based on their information)
- In an efficient market, there should be no systematic effect after the release date.

Event Studies: Abnormal Returns

- Abnormal returns: $AR=r_t - (a+br_{Mt})$
  - Which can be considered as the realized error term from the single index (factor) model:
  - $r_t=a+br_{Mt}+e_t$
- Cumulative abnormal returns (CAR):
  - Cumulative sum of abnormal returns over a time period.
  - Measure the cumulative effect on prices of an event.

Event Studies Cont.



- Suppose the event is announcement of an earnings increase
- Good news is fully incorporated into the stock price by the announcement day.
- No significant changes in CAR afterwards.

Examples of Event Studies

- Earning surprises.
- Stock splits.
- Dividend actions.
- Mergers.
- New exchange listings.
- IPOs.
- Event studies mostly support semistrong-form efficiency.

C2. Evidence against market efficiency

- Crashes:
  - On October 19, 1987, NYSE dropped almost 25 percent on a Monday following a weekend during which little surprising news was released.
  - A drop of this magnitude without apparent reasons is inconsistent with market efficiency.
- Market anomalies:
  - Size.
  - Post earnings-announcement drift.
  - Value v.s. growth.
- Recommended reading:

The efficient market hypothesis and its critics by Malkiel - Journal of Economic Perspectives, 2003.

D. Summary

- **D1. A Paradox?**
- If investors think financial markets are inefficient, they'll look for mispriced securities.
- The resulting trades will eliminate the inefficiency.
- If investors think financial markets are efficient, they won't bother looking for mispriced securities.
- So there's no reason to assume that mispricing will be eliminated.
- So… If markets are inefficient, they are efficient
- And if they are efficient, they are inefficient
- …
- See a WSJ op-ed article.

D2. So, are financial markets efficient or not?

- Pricing irregularities and predictable patterns can appear over time and even persist for short periods.
- However, they are unlikely to persist too long and will not provide dependable ways to generate extraordinary returns.
- So market efficiency, like other equilibrium concepts, can be viewed as a long-run tendency. Once the markets are deviated from market efficiency, economic forces will always pull them back to equilibrium.
- "If any $100 bills are lying around the stock exchanges of the world, they will not be there for long."