

Financial Markets

HEC Paris – Fall 2025

What we do in this course

- What determines the price of financial securities?
 - Stocks (Part 1)
 - Bonds (Part 2)
 - Derivatives
 - Forwards and Futures (Part 3)
 - Options (Part 4)
- Important for:
 - Market participants (money managers, traders, sales, quants, etc., and individual investors): the “buy side”
 - Issuers of securities (corporations, entrepreneurs, governments, investment bankers): the “sell side”

Part 1: Stocks

Overview

- Today and next class

1. **Stock basics** $\Leftarrow$

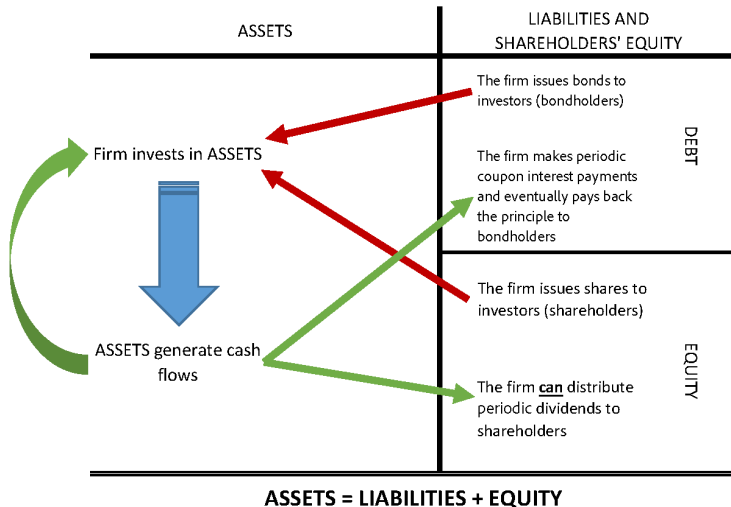
2. Dividend Discount Model

3. Present Value of Growth Opportunities

4. Price-Earnings ratio

5. Market efficiency

Simplified balance sheet of a firm



Financial markets' sizes

- Values in trillion US \$

	GDP	Stocks	Bonds	Derivatives
World	111.3	114.5	120.6	699.5* / 33.2**
USA	30.5	44.7	52.1	
Euro area	16.4	5.6	21.1	
China	18.7	13.2	21.7	
Japan	4.2	6.7	12.1	
Germany	4.3	2.3	4.1	
France	3.2	2.8	5.1	
UK	2.6	2.8	4.4	

* notional value / ** netted

Stockholders' rights

(stockholder = shareholder = equity holder)

1. Ownership rights

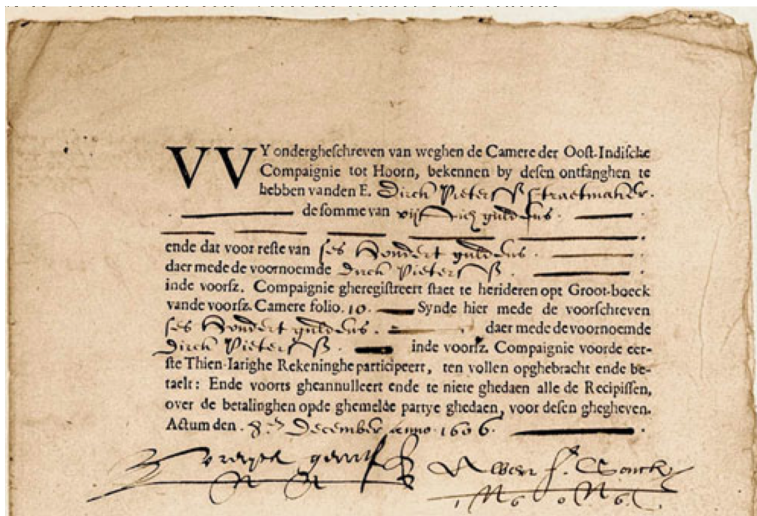
- The firm belongs to stockholders (unless it is bankrupt)
- Stockholders approve the firm's important decisions
- Stockholders hire and fire managers

2. Residual cash-flow rights

- The firm pays suppliers, employees, tax authorities first
... then creditors (banks, bondholders)
... whatever is left can be distributed as dividends to stockholders
- Stockholders have limited liability

Historical Perspective: Dutch East India Company

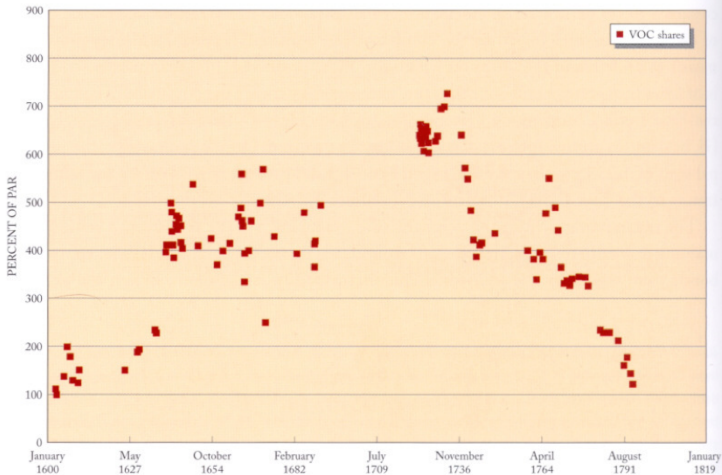
In the modern times the first well-documented stock market activity is for Verenigde Oostindische Compagnie (VOC) shares (1606) that were traded on the Amsterdam Exchange



Historical Perspective: VOC Stock Prices

Price movements for VOC shares (source: The Origins of Value, Goetzmann and Rouwenhorst, 2005, p. 172)

VOC SHARE PRICES, 1602-1796



Apple Inc. Share

Common stock (shares, equity) entitles to pro-rata ownership in the limited-liability corporation:

FBUS17178/AAPL/C01/CUS[C]0006769209/TRNFR[00134537]0194

COMMON STOCK

THIS CERTIFICATE IS TRANSFERABLE
IN THE CITIES OF BOSTON, NEW YORK,
LOS ANGELES OR CHICAGO.

Certificate
Number
FBUS17178



COMMON STOCK

Shares
XXXXXXXXXX
XXXXXXXXXX
XXXXXXXXXX
XXXXXXXXXX
XXXXXXXXXX

APPLE COMPUTER, INC.
INCORPORATED UNDER THE LAWS OF THE STATE OF CALIFORNIA.

THIS CERTIFIES THAT

MARC THOMAS

CUSIP 037833 10 0

SEE REVERSE FOR CERTAIN DEFINITIONS AND
A STATEMENT AS TO THE RIGHTS,
PREFERENCES, PRIVILEGES AND
RESTRICTIONS OF SHARES

is the owner of

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FULLY PAID AND NON-ASSESSABLE SHARES OF THE COMMON STOCK, WITHOUT PAR VALUE, OF
Apple Computer, Inc. transferable on the books of the Corporation by the holder hereof, in person or by duly
authorized attorney, upon surrender of this certificate properly endorsed. This certificate is not valid until
countersigned by the Transfer Agent and registered by the Registrar.

Witness the facsimile seal of the Corporation and the facsimile signatures of its duly authorized officers.


Executive Vice President and
Chief Financial Officer


Secretary



DATED 12-JUN-2003
COUNTERSIGNED AND REGISTERED:
COMPUTERSHARE INVESTOR SERVICES, LLC.
(CHICAGO)
TRANSFER AGENT AND REGISTRAR

By 
AUTHORIZED SIGNATURE

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Apple Inc. Share Prices

The value of a company's shares will depend on how successfully the managers choose and implement the right projects among the many that are available (source www.finance.yahoo.com):



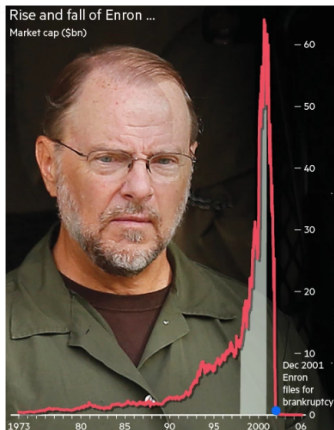
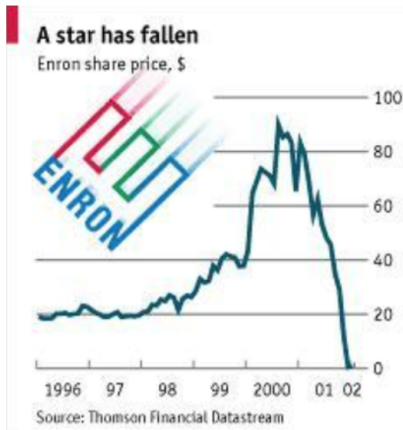
Apple Inc. Stock's Returns

The return to AAPL shares if held since IPO on 1980.12.12 is ... :



Bankruptcy

Stockholders are residual claimholders: If the bankrupt company is liquidated, common stockholders are the last in-line (after bondholders, employees, tax authorities, suppliers) to receive any remaining asset sale proceeds.



Market Capitalization vs. Book Value

- Prices of shares traded in the stock market represent *the market value* of the equity capital that is booked on the balance sheet:
- Book value = equity capital booked on the balance sheet
- Book value of the common shares is determined by accounting rules
- Market capitalization = number of shares $\times$ price of one share $\rightarrow$ what determines how much stock market investors are willing to pay for a stock?

Market Capitalization vs. Book Value

- Example: Apple

Apple Inc. (AAPL)

[☆ Follow](#)[+ View Analysis](#)**247.45** **-1.89 (-0.76%)**

At close: October 16 at 4:00:01 PM EDT

247.48 **+0.03 (+0.01%)**

🕒 Pre-Market: 8:32:33 AM EDT

Previous Close	249.34	Market Cap (intraday)	3.672T
Open	248.27	Beta (5Y Monthly)	1.09
Bid	247.27 x 300	PE Ratio (TTM)	37.61
Ask	260.82 x 100	EPS (TTM)	6.58
Day's Range	245.13 - 249.04	Earnings Date	Oct 30, 2025
52 Week Range	169.21 - 260.10	Forward Dividend & Yield	1.04 (0.42%)
Volume	39,218,197	Ex-Dividend Date	Aug 11, 2025
Avg. Volume	54,379,421	1y Target Est	248.12

- As of 2025.10.17 Apple Inc. has 14.84 billion (14.81 billion in “free-float”) shares outstanding with book value of equity of 65.83 Billion \$ in last quarter’s balance sheet: what was Apple’s *market cap* on that day?

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Valuing a stock

Example A stock is selling today for $P_0 = €100$. The analysts expect that the company will pay a dividend of $D_1 = €5$ in exactly one year. You expect to sell the stock right after the dividend payment in one year at a price of $P_1 = €110$.

Question 1 What is your expected holding period return?

$$\begin{aligned}\text{Expected } HPR &= \frac{\text{expected profit}}{\text{initial investment}} \\ &= \underbrace{\frac{\mathbb{E}[\tilde{D}_1]}{P_0}}_{\text{dividend yield}} + \underbrace{\frac{\mathbb{E}[\tilde{P}_1] - P_0}{P_0}}_{\text{cap. gain (or loss)}} = 0.05 + 0.1 = 15\%\end{aligned}$$

Note that: a) Expected HPR has two components: capital gain (or loss) + dividend yield
b) Neither is guaranteed! Your **realized** return may be different from your **expected** return

Question 2 Should you buy this stock?

Cannot answer, as it depends on the riskiness of the stock: need to compare this expected HPR to the required rate of return.

Valuing a stock

Quick review from **Financial Economics**:

In the **Capital Asset Pricing Model (CAPM)**, the expected return is given by

$$k = r_f + \beta(\mathbb{E}[\tilde{R}_M] - r_f)$$

r_f : risk-free rate

β : systematic risk of the investment = part of the risk that cannot be eliminated by holding a diversified portfolio

$\mathbb{E}[\tilde{R}_M] - r_f$: equity risk premium = expected excess return on the market portfolio (remember “excess return” means return minus risk-free rate)

NB: there exist other asset pricing models besides CAPM that we could use to determine k (see *upper level finance classes*)

Valuing a stock

Suppose the risk-free rate is 3%, the stock has a beta of 1.4, and the expected excess return on the market is 10%

Question 3 Should you buy this stock?

Question 4 What is the fair value V_0 (for Value as of date $t=0$) of the stock (i.e., the stock price such that the expected return is as given by the CAPM)?

Some Limitations of CAPM Model

- CAPM relies on several key assumptions:
 - Frictionless markets and “perfect” information
 - Investors are rational and care about financial payoffs only
 - Can you think of more?
- Moreover, accurate measurement of CAPM quantities (e.g., β) is not easy in practice
- While easy and intuitive, CAPM assumptions (needed for the theoretical derivation) are unlikely to hold in real life.
- Example: Suppose that investors not only care about financial payoffs but also about ESG criteria
 - ESG =Environmental, Social, and Governance

Example: CAPM and ESG

- Consider a 1-year investment in two stocks S (“Solar Energy”) and O (“Oil Producer”), each with (hypothetical) $\beta = 1$, an expected dividend in year 1 of $\mathbb{E}[\tilde{D}_1] = \text{€}2.5$, and an expected price $\mathbb{E}[\tilde{P}_1] = \text{€}10$.
- Assume an expected equity market return of $\mathbb{E}[\tilde{R}_M] = 25\%$ and a risk-free rate $r_f = 2\%$. **Use CAPM to determine price at $t=0$!**

- Now, suppose the actual price of *Solar* is higher than the price of *Oil*, i.e.,
 $P_0^{Solar} = 11\text{€} > P_0^{Oil} = 9\text{€}$
- **How to make sense of it?**

Example: CAPM and ESG (Ctd.)

- Price difference could be due to ESG preferences:
 - Investors value *Solar* above fundamental value, because it's "green"
 - Investors value *Oil* below fundamental value because it's "brown"
- Suppose that on top of the regular dividend $\mathbb{E}[\tilde{D}_1]$ investors derive "emotional dividend" $\mathbb{E}[D^{emo,Solar}]$ from holding the green *Solar* stock and $\mathbb{E}[D^{emo,Oil}]$ from holding the brown *Oil* stock.
- The CAPM with this additional (emotional) dividend would imply

$$P_0^{Solar} = 11\text{€} = \frac{\mathbb{E}[\tilde{D}_1 + D^{emo,S}] + \mathbb{E}[\tilde{P}_1]}{1 + k} = \frac{12.5\text{€} + \mathbb{E}[D^{emo,S}]}{1.25}$$

- We calculate: $\mathbb{E}[D^{emo,S}] = 1.25\text{€}$. How to calculate $\mathbb{E}[D^{emo,O}]$?
- Answer $\mathbb{E}[D^{emo,O}] = -1.25\text{€}$

Example: CAPM and ESG (Ctd.)

- The introduction of a theoretical/hypothetical “emotional” dividend is a way to account for investors’ ESG preferences when the effects of such preferences cannot be directly measured
 - Alternatively: One could account for ESG preferences via the discount rate k . Left as optional exercise.
- Calculate the dividend yield: $\frac{\mathbb{E}[\tilde{D}_1]}{P_0(S)} = \frac{2.5\text{€}}{11\text{€}} \approx 23\% < \frac{\mathbb{E}[\tilde{D}_1]}{P_0(O)} = \frac{2.5\text{€}}{9\text{€}} \approx 28\%$
- “Dirty”, “sin”, or “brown” stocks often have higher dividend yield.
Example: while S&P500’s dividend yield is 1.17% (Nasdaq’s 1.23%) **British American Tobacco**’s dividend yield is $\approx 6.6\%$
- Calculate the expected holding period return, $\frac{\mathbb{E}[\tilde{D}_1 + \tilde{P}_1^{Solar}]}{P_0^{Solar}}$ and $\frac{\mathbb{E}[\tilde{D}_1 + \tilde{P}_1^{Oil}]}{P_0^{Oil}}$ for both stocks? Which stock has higher EHPR?
- Key takeaway: Investor ESG preferences challenge key assumptions of CAPM model. However, CAPM model can be modified to accommodate investor ESG preferences. How to do such modelling in the best way is still subject to debate.

Dividend Discount Model (DDM)

- Problem with the previous HPR formula: how do we determine $\mathbb{E}(\tilde{P}_1)$?
- follow same logic: $\mathbb{E}(\tilde{P}_1) = \frac{\mathbb{E}(\tilde{D}_2) + \mathbb{E}(\tilde{P}_2)}{1+k} \rightarrow V_0 = \frac{\mathbb{E}(\tilde{D}_1)}{1+k} + \frac{\mathbb{E}(\tilde{D}_2) + \mathbb{E}(\tilde{P}_2)}{(1+k)^2}$
- and again, and again, indefinitely:

$$V_0 = \frac{\mathbb{E}(\tilde{D}_1)}{1+k} + \frac{\mathbb{E}(\tilde{D}_2)}{(1+k)^2} + \cdots + \frac{\mathbb{E}(\tilde{D}_T)}{(1+k)^T} + \cdots$$

- This is the **Dividend Discount Model (DDM)**
- The **fundamental value** V_0 of a stock does not depend on your holding period (e.g., whether you hold it for 1 year, 2 years, or forever)
- To calculate V_0 using **DDM** you need to specify a scenario for the dividend schedule

Constant Growth Dividend Discount Model (CGDDM)

- Simplest scenario: dividends grow at a constant rate g
- The DDM becomes

$$V_0 = \frac{(1+g)D_0}{1+k} + \frac{(1+g)^2 D_0}{(1+k)^2} + \dots + \frac{(1+g)^T D_0}{(1+k)^T} + \dots$$

- And if $k > g$, using the annuity formula with infinite horizon

$$V_0 = \frac{D_1}{k - g} = \frac{(1+g)D_0}{k - g}$$

The DDM with a constant growth rate of dividends (g) is called **Gordon's Model**

- $g \geq k$ cannot happen. **Why?**

The Constant Growth Dividend Discount Model

- A quick proof:

$$V_0 = \frac{D_1}{1+k} + \frac{D_1(1+g)}{(1+k)^2} + \frac{D_1(1+g)^2}{(1+k)^3} + \dots \quad (1)$$

$$\frac{1+k}{1+g} \times V_0 = \frac{1+k}{1+g} \times \left(\frac{D_1}{1+k} + \frac{D_1(1+g)}{(1+k)^2} + \frac{D_1(1+g)^2}{(1+k)^3} + \dots \right)$$

$$\frac{1+k}{1+g} \times V_0 = \frac{D_1}{1+g} + \frac{D_1}{1+k} + \frac{D_1(1+g)}{(1+k)^2} + \frac{D_1(1+g)^2}{(1+k)^3} + \dots \quad (2)$$

- subtract (1) from (2):

$$\frac{1+k}{1+g} \times V_0 - V_0 = \frac{D_1}{1+g}$$

$$\frac{k-g}{1+g} \times V_0 = \frac{D_1}{1+g}$$

$$V_0 = \frac{D_1}{k-g}$$

Example

Hi5 Inc. has just paid an annual dividend of €2.5 per share. You expect the dividend to grow at 5% per year indefinitely. Given its riskiness, you require an expected return of 12% on this stock.

Q1 What is the value of Hi5's stock?

Q2 The company is financed with 1 million shares outstanding. What is the market capitalization of Hi5?

Q3 An investor offers to sell Hi5 stock at €30/share. What might be going on?

DDM: life cycle considerations

Many firms do not pay dividends: Tesla Netflix

Question 1 What is the value of their equity?

The assumption of constant growth rate of dividends is not appropriate for these stocks. They have positive value because the investors expect that they will eventually pay dividends at some point in the future. As a result we need to consider different scenarios of dividend schedules for these stocks → Multi-Stage Growth DDM.

Suppose that the dividends will be zero until date t_d , at which point in time the company will initiate dividends. Then, the DDM becomes:

$$V_0 = \frac{0}{1+k} + \frac{0}{(1+k)^2} + \dots + \frac{0}{(1+k)^{t_d-1}} + \frac{D_{t_d}}{(1+k)^{t_d}} + \frac{D_{t_d+1}}{(1+k)^{t_d+1}} + \frac{D_{t_d+2}}{(1+k)^{t_d+2}} + \dots$$

[See also the Problem 2 in problem set on stocks.]

Multi-stage growth DDM

Let's go a step further: you expect the dividends to go through different stages

- During early stages of their lives, companies tend to grow very fast. As their product matures, the growth slows down

ABC has just paid a dividend of €2. The dividends are expected to grow at a rate of 30%/year for the next three years and then, to settle to the industry average rate of 5% per year forever. The stock's required rate of return k is 18% per year.

[Let's drop $\mathbb{E}(\cdot)$, the expectations operator, to simplify the writing:]

Question 1 What is today's stock price? [Hint: At what t can we apply the Gordon's formula?

Gordon's formula doesn't apply as of $t=0$, because growth rate isn't constant, but it does apply as of $t = 3$ as g settles to industry avg. of 5%:

$$P_3 = \frac{1.05 \times D_3}{k - 0.05} = 35.50\text{€}$$

Now we can calculate price as of $t=0$:

$$P_0 = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \frac{D_3 + P_3}{(1+k)^3} = \frac{2 \times 1.3}{1.18} + \frac{2 \times 1.3^2}{1.18^2} + \frac{2 \times 1.3^3 + 35.50}{1.18^3} = 28.90\text{€}$$

Applying What We Have Learned

The simple models that we have learned can be used to gain intuition on the stock market developments.

Two examples from **Prof. Johan HOMBERT's Blog**:

- **Were stock prices too high before Covid-19?**
- **Did the stock market over-react to Covid-19?**

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Present Value of Growth Opportunities

- Growth opportunities arise if the company retains some of its earnings and invests them in new projects
- The **retention ratio** or **plowback ratio** (b) is the proportion of earnings per share (EPS, or E_t) that is reinvested in new projects
- The **dividend payout ratio** ($1 - b$) is the proportion of earnings per share paid out as dividend (i.e., $D_t = E_t \times (1 - b)$)
- If new projects have returns on investment (or returns on equity) of **ROE^{new project}**, then the growth rate of the company's earnings is:

$$g = b \times \text{ROE}^{\text{new project}}$$

Why? If assets in place in year t generate E_t forever, then earnings at $t + 1$:

$$E_{t+1} = E_t + b \times E_t \times \text{ROE}^{\text{new project}}$$

⇒ Earnings' growth rate:

$$g = \frac{E_{t+1} - E_t}{E_t} = b \times \text{ROE}^{\text{new project}}$$

- NB: E_t reflects economic earnings, i.e., net of any effects of the depreciation of assets (cf., **Financial Economics** class, Chapter 1)

Present Value of Growth Opportunities

- We can decompose the firm's stock price P_0 into two components

$$P_0 = P_0^{\text{no growth}} + PVGO_0$$

- $P_0^{\text{no growth}}$ is the price that would prevail if the company were to distribute all its earnings (after maintaining existing assets) and would not grow ($b = 0 \Rightarrow g = 0$):

$$P_0^{\text{no growth}} = \frac{E_1}{k}$$

- $PVGO_0$ is the **Present Value of Growth Opportunities** as of date $t = 0$: it is the difference between the actual value of the stock as of $t=0$ and its hypothetical value (as of $t=0$) under the scenario that the firm distributed all of its earnings (after maintaining its assets in place) and as a result did not grow (since no new investment is being made).

Example to illustrate: $P_0 = \frac{(1-b)E_1}{k-b \times ROE}$

FatCat Co. has expected earnings per share of $E_1 = \text{€}4$. Its required rate of return is 10% per annum.

Q1 If FatCat pays out all earnings as dividends forever, what is its fundamental value? per share

Now, suppose FatCat's management undertakes new projects generating returns on investment of 16%/year, after increasing its retention ratio from 0 to 25%

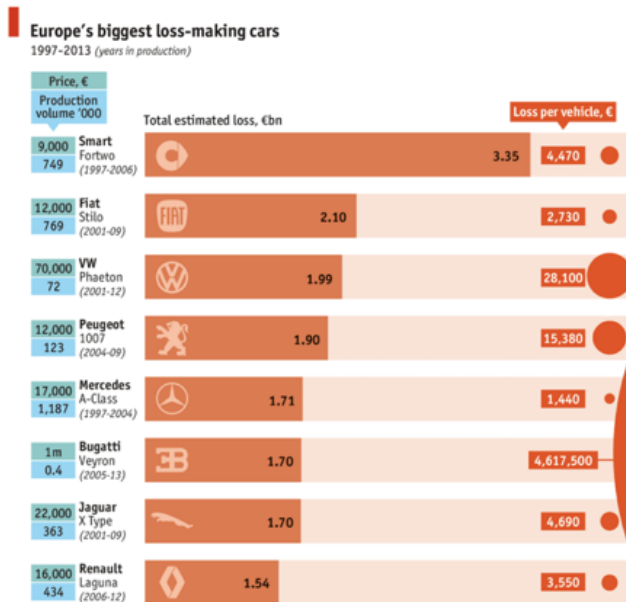
Q2 What is FatCat's new dividend payout ratio?

Q3 What is FatCat's growth rate? per year

Q4 What is FatCat stock's new fundamental value and PVGO?

Can PVGO be negative?

Bad capital budgeting decisions can generate $PVGO_0 < 0$



Example

Motsla is majority-owned by the state. The CEO appointed by the government invests in politically visible but economically irrelevant projects with $ROE = 5\%$ per year. Investors require a rate return of $k = 14\%$ per year. In one year from now, Motsla will pay $D_1 = 2$ €/share out of earnings $E_1 = 5$ €/share.

Q1 What must be the stock price of Motsla?

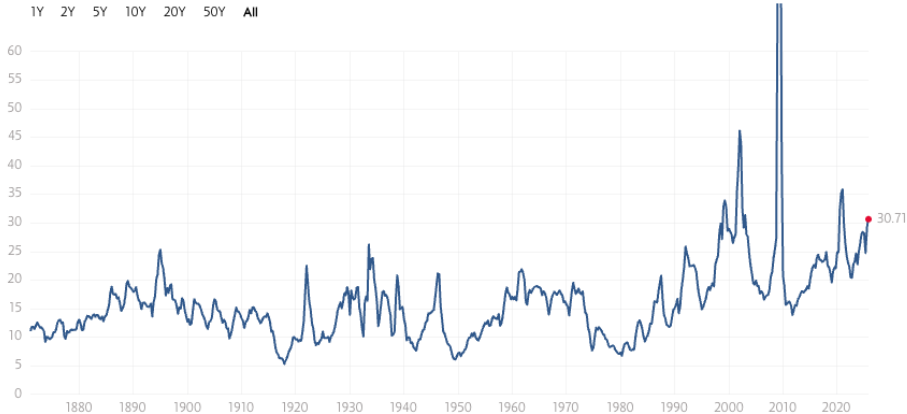
Q2 What is the present value of growth opportunities (PVGO) of Motsla?

Q3 What should be the first thing that a politically independent management do to increase the value to Motsla's shareholders?

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S&P500 Index P/E ratio



Historical P/E Ratio Average 16.18 (Median 15.06)

Price-Earnings ratio

- The **price-earnings ratio** P/E is a commonly used financial indicator:
 - which company has the highest P/E : **Amazon**, **Apple** or **Meta**?
 - **Trailing P/E ratio for S&P500 (based on past 12 months' earnings)**
- So, should we use the “trailing” or the “forward” PE Ratio?
- When in such doubt, we should go back to our theory models (they exist to provide guidance & intuition), i.e., in this instance to go back to our simple CGDDM and ask what happens if g goes up (holding all else constant)?

$$\boxed{\frac{P_0}{E_1} = \frac{1 - b}{k - g}}$$

- Alternatively, all else equal, larger P_0/E_1 ratios could mean higher $PVGO_0$:

$$\boxed{\frac{P_0}{E_1} = \frac{1}{k} \times \left[1 + \frac{PVGO_0}{P_0^{\text{no growth}}} \right]}$$

Why? because:

$$P_0 = P_0^{\text{no growth}} + PVGO_0 = P_0^{\text{no growth}} \left[1 + \frac{PVGO_0}{P_0^{\text{no growth}}} \right] = \frac{E_1}{k} \left[1 + \frac{PVGO_0}{P_0^{\text{no growth}}} \right]$$

Investors are too bearish about the US stock market

S&P 500 still likely to hit record territory next year, even after a correction

EDWARD YARDENI

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Most of the drop in the S&P 500's valuation multiple so far this year has been attributable to eight mega-cap stocks — Alphabet, Amazon, Apple, Meta, Microsoft, Netflix, Nvidia, and Tesla. Currently, they account for 23 per cent of the market capitalisation of the index. Their collective forward PE ratio soared during the first year of the pandemic to about 35.0, and stayed around there last year. It is now down to 25.

Over this same period, the ratio of the price to forecast earnings of the S&P 500 has fallen from 21.5 to 17.5. That reflects the drop in the S&P 500 index as well as the increase in the expected earnings per share of its constituents.

That's right — while investors are reducing the valuation multiple they are willing to pay for consensus earnings, analysts have been raising those very same earnings projections! To some extent, the downward re-rating of the forward PE ratio makes sense since it tends to be inversely correlated with inflation and bond yields, both of which are rising. But it also indicates that investors are much more concerned than industry analysts are that tighter financial conditions will cause a recession.

Practical use of P/E ratio

Another method to value a stock: the “comparables approach”

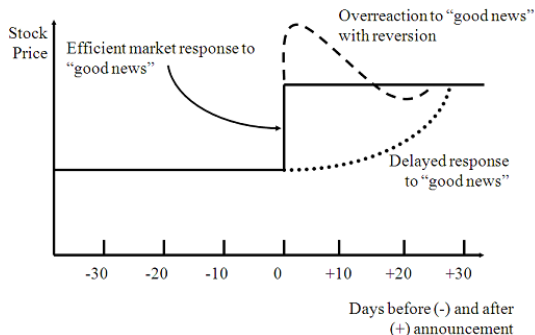
- You observe P/E for listed company A and want to value the stock of unlisted company B in the same industry $\Rightarrow (\text{P/E of A}) \times (\text{Earnings of B})$
- What are the underlying assumptions of the comparables approach?

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Informational efficiency

- Definition (Fama (1970)): A market is **informationally efficient** if all publicly available information is instantaneously reflected in security prices
- Example: Stock price reaction to good news



- If the market is informationally efficient, it is **impossible to predict future returns** based on currently-available public information.

Why may financial markets be informationally efficient?

1. “Wisdom of the crowd”

Even if no single investor knows perfectly the fundamental value of a stock (because future dividends are not known for sure), the market aggregates information disseminated among many investors

2. Sophisticated investors

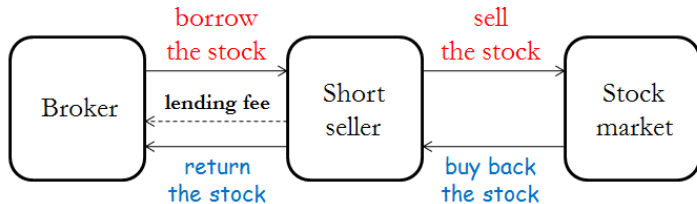
If the price is too low, sophisticated investors will buy the stock, pushing the price up

Conversely, if the price is too high, sophisticated investors will sell the stock, pushing the price down (what if not all such sophisticated investors own the stock?)

Short selling

- A short sale is the sale of a security you don't own (already described in the **Financial Economics** class):

In red: short seller's actions to initiate the short position



In blue: short seller's actions to close the short position

Short selling

Tesla short-sellers sitting on profits of \$1.2bn

Shannon Bond in San Francisco and Robin Wigglesworth in New York AUGUST 19, 2018

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Short-sellers are sitting on profits of more than \$1bn since Elon Musk tweeted his intention to take Tesla private.

While the buyout plan was pitched by Mr Musk on August 7 as a way to defuse short-sellers' ability to "attack the company", less than 4 per cent of the [short positions](#) have been closed since his tweet.

While shares in the electric car maker initially jumped higher, they quickly reversed course and, at the close of trading on Friday, were 19 per cent below their level before the tweet. The mark-to-market value of the short positions is up \$1.2bn over that period, according to S3 Partners, a financial analytics company.

[Tesla's stock](#) has become a battleground for short-sellers and those who believe in Mr Musk's vision of reshaping cars and energy. According to S3, \$11.2bn worth of its shares, or more than a quarter of the company's free float, is out on loan to investors betting that its share price will decline, making it the most heavily shorted company on the US market.

Short selling

Tesla Inc [+ Add to myFT](#)

Tesla short-sellers take further hit in battle with Elon Musk

Bears' losses balloon to \$9bn this year after carmaker's shares surge again on Monday



Elon Musk, co-founder and chief executive of Tesla, whose share price rose 55 per cent in January after it reported a profit for the fourth quarter © Bloomberg

Richard Henderson in New York FEBRUARY 3 2020



Investors betting against Tesla were still reeling from their worst monthly losses in January when they got hit again on Monday, as shares in the electric carmaker surged 20 per cent in a single day.

On top of the record dollar loss of \$5.8bn in January, short-sellers lost a further \$3.2bn as the extraordinary share price rally accelerated on the first day's trading of the new month.

Short selling bans

“The emergency order temporarily banning short selling of financial stocks will restore equilibrium to markets” (Christopher Cox, SEC Chairman, 19 September 2008, SEC News Release 2008–211).

“Knowing what we know now, I believe on balance the commission would not do it again. The costs (of the short-selling ban on financials) appear to outweigh the benefits.” (Christopher Cox, telephone interview to Reuters, 31 December 2008).

Short-Selling Bans Around the World: Evidence from the 2007–09 Crisis

ALESSANDRO BEBER and MARCO PAGANO*

ABSTRACT

Most regulators around the world reacted to the 2007–09 crisis by imposing bans on short selling. These were imposed and lifted at different dates in different countries, often targeted different sets of stocks, and featured varying degrees of stringency. We exploit this variation in short-sales regimes to identify their effects on liquidity, price discovery, and stock prices. Using panel and matching techniques, we find that bans (i) were detrimental for liquidity, especially for stocks with small capitalization and no listed options; (ii) slowed price discovery, especially in bear markets, and (iii) failed to support prices, except possibly for U.S. financial stocks.

Informational efficiency – Examples

Is market efficiency contradicted in the following situations?

- Q1 Through the introduction of a complex computer program analyzing past stock price changes, a brokerage firm is able to predict price movements well enough to earn a consistent 3% profit, adjusted for risk, above normal market return.

- Q2 Crook Inc. was facing a lawsuit brought forward by disgruntled clients. The result of the lawsuit has just become public this morning before markets open and the company is liable of a €100 million fine. The stock price of Crook Inc. goes up by 10% today.

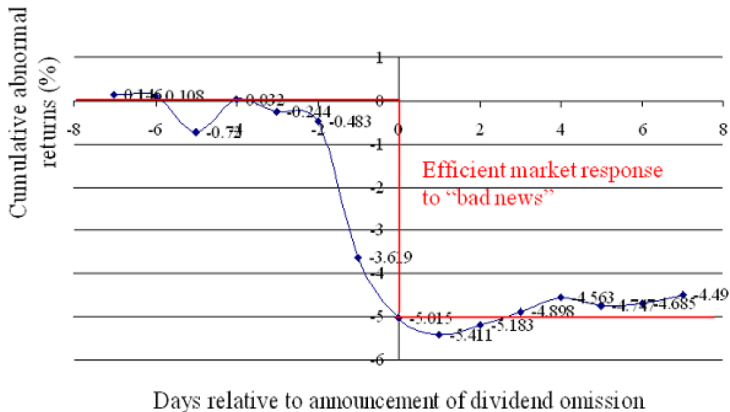
- Q3 On average, investors in the stock market this year are expected to earn positive returns on their investment. Some will earn considerably more than others.

Testing for informational efficiency

- Are financial markets informationally efficient?
- Profs. Eugene Fama and Robert Shiller were awarded the Nobel Prize in 2013 for studying this question. . . and coming up with opposite answers!

Evidence in favor: Market reaction to news

Stock prices around days of bad news (announcement of dividend omission)



Evidence in favor: Market reaction to news

Stock prices around minutes of CNBC news

422

J.A. Busse, T. Clifton Green / Journal of Financial Economics 65 (2002) 415–437

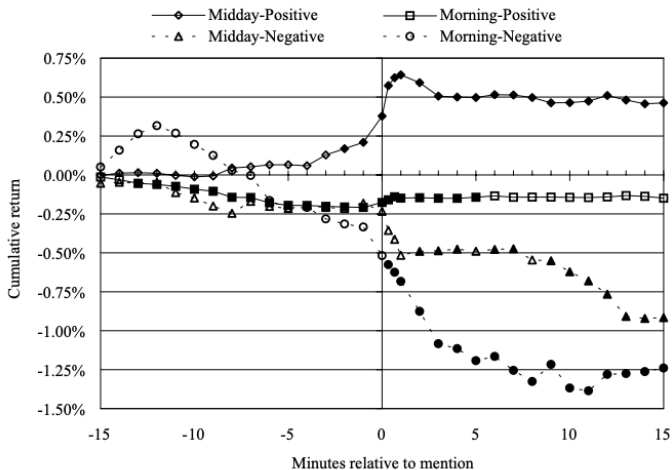
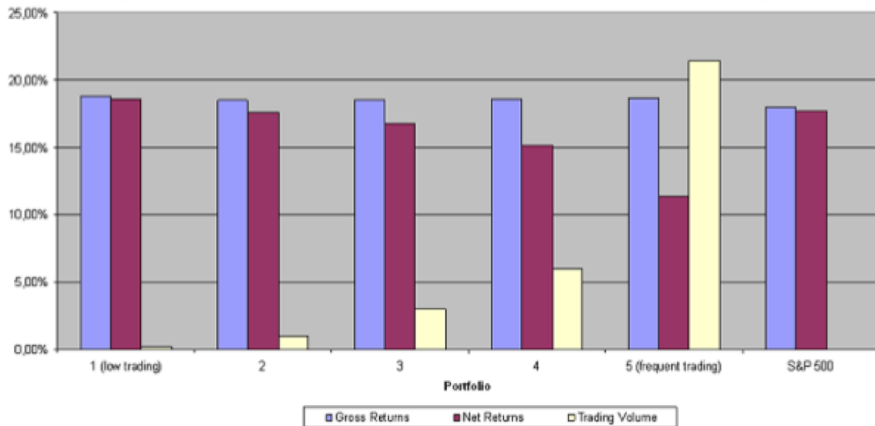


Fig. 1. Stock price reaction to CNBC reports. The figure shows the reaction of stock prices to on-air stock reports during the Morning Call and Midday Call segments on CNBC. The chart plots cumulative returns

Evidence in favor: Day trading

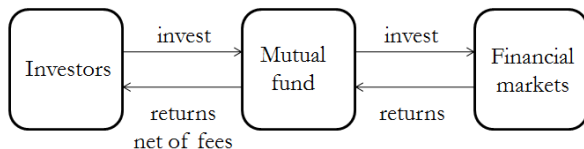
On average, individual traders cannot beat the market:

INDIVIDUAL INVESTORS PERFORMANCE & TRADING FREQUENCY (source: Barber and Odean, Journal of Finance, 2000)



Evidence in favor: Performance of mutual funds

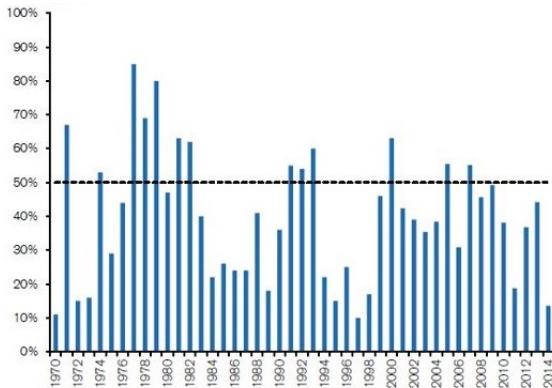
- What is a mutual fund?



- If the market is efficient, then no matter what public information mutual fund managers rely on to pick stocks, they cannot generate superior expected returns (adjusted for risk)

Evidence in favor: Performance of mutual funds

- % of equity mutual funds beating the market



Source: John C. Bogle (1970-1999) and "SPIVA® U.S. Scorecard: Year End 2014," S&P Dow Jones Indices Research (2000-2014).
Note: U.S. general equity funds (1970-1999) and U.S. large capitalization equity funds (2000-2014).

Evidence in favor: Performance of mutual funds

- Maybe only some mutual fund managers are skilled?
- A few star fund managers have consistently outperformed the market: e.g., Fidelity's Magellan Fund managed by Peter Lynch beat the market in 11 years out of 13!
- How to distinguish skill from luck? → Skill is persistent, luck is not. However...
- **Example:** Assume 1,000 fund managers invest in the stock market for a 10-year period. In any given year, each manager has a probability of 50% of outperforming the market. **What is the probability that (at least) one of them outperforms the market 10 years in a row?**
 - = $1 - \text{proba none of them outperform the market 10 years in a row}$
 - = $1 - (\text{proba a given fund doesn't outperform the market 10 years in a row})^{1,000}$
 - = $1 - (1 - \text{proba a given fund outperforms the market 10 years in a row})^{1,000}$
 - = $1 - \left(1 - (\text{proba a given fund outperforms the market a given year})^{10}\right)^{1,000}$
 - = $1 - (1 - 0.5^{10})^{1,000}$
 - = 62%