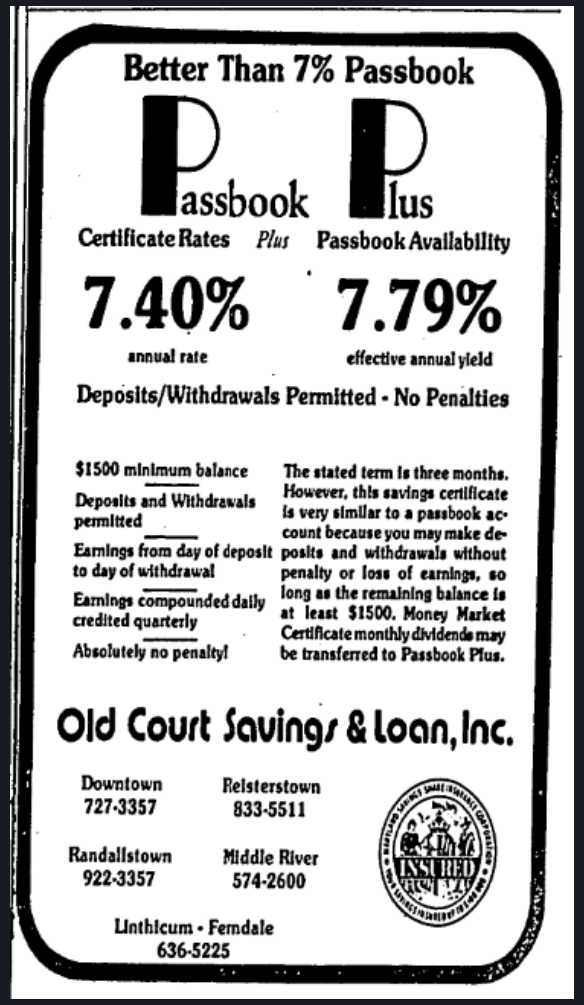
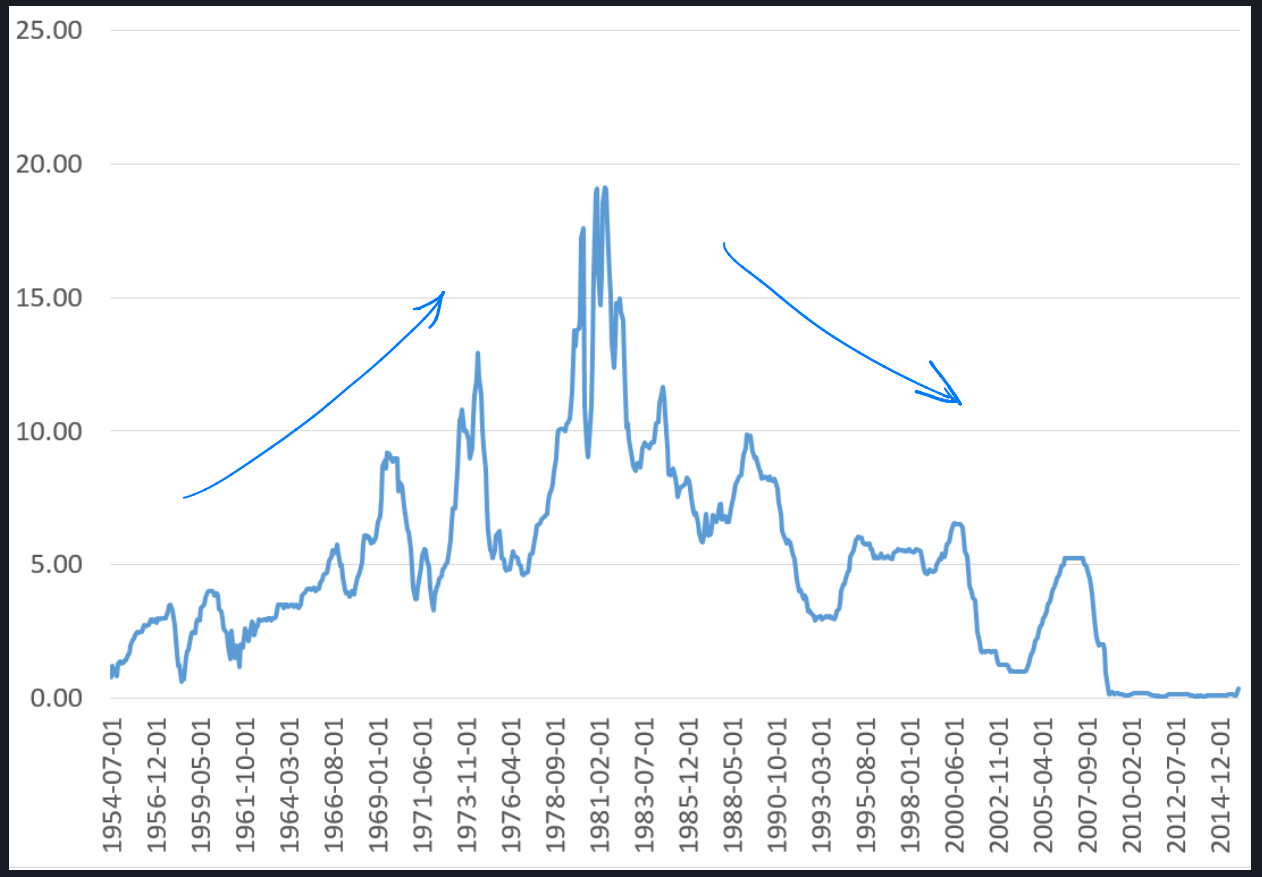
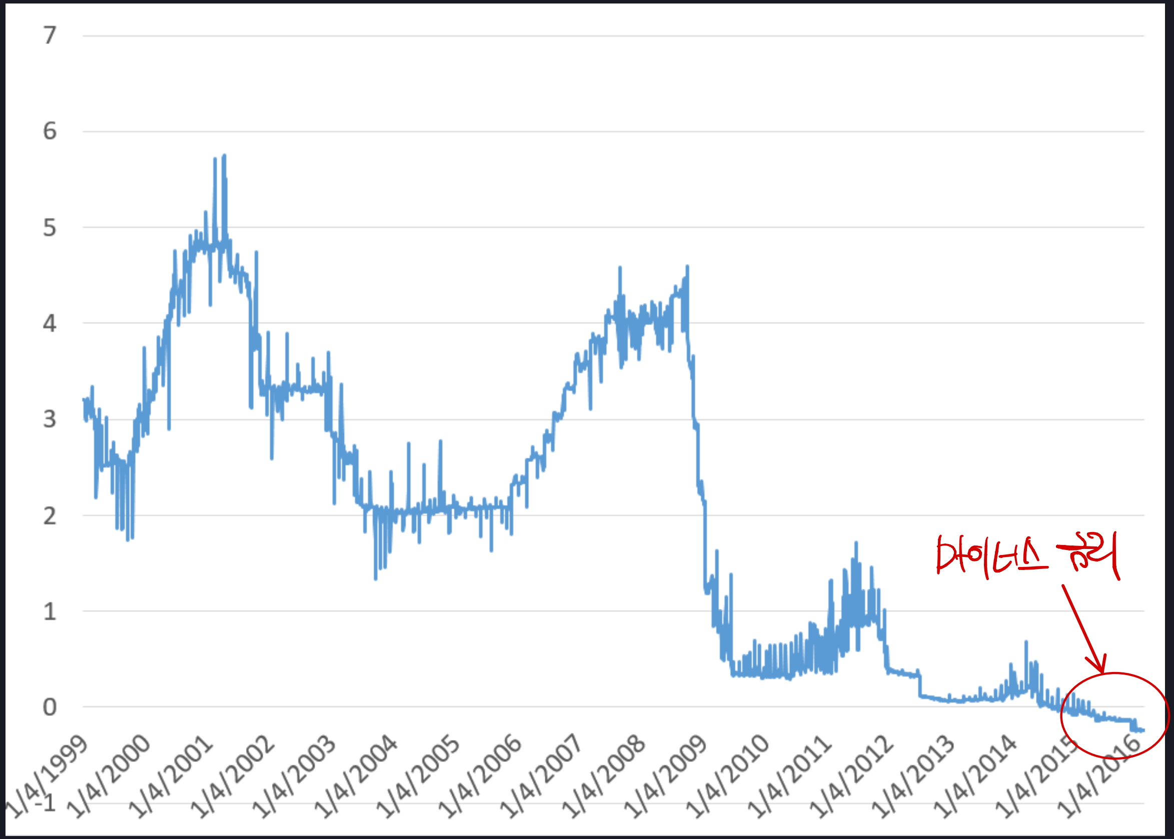
A Passbook Savings Account Ad 1982



Federal Funds Rate: Shortest-Term Interest Rate in U.S.



EONIA (European Over Night Index Average is European Counterpart to Fed Funds (Percent per Annum)



현금 보관은 비용이 든다

Causes of Interest Rates

- Eugen von Böhm-Bawerk: *Capital and Interest*, 1884: technological progress, time preferences, advantages to roundaboutness
- Irving Fisher 1867-1947, wrote *Theory of Interest 1930*

Compound Interest

- If annual rate is r, compounding once per year, balance = $(1+r)^t$ after t years
- If compounded twice per year, balance is $(1+r/2)^{2t}$ after t years
- If compounded n times per year, balance is $(1+r/n)^{nt}$ after t years
- Continuous compounding, balance is e^{rt}

이자주기를 극소로 할 경우,
계단함수가 연속함수형태로 변화함

$$\lim_{n\to\infty}\left(1+\frac{r}{n}\right)^{nt} = e^{rt}$$

Discount Bonds

- No coupon payments, just principal at maturity date (conventionally, $100).
- Initially sold at a discount (less than $100) and price rises through time, creating income.
- Term *T*, Yield to Maturity (YTM) r

$$P = \frac{1}{(1+r)^T}$$

$$P = \frac{1}{(1+r/2)^{2T}}$$

$$\text{YTM}(r) = \sqrt[T]{\frac{\text{Face Value}}{\text{Current Value}}} - 1$$

$$= \sqrt[T]{\frac{1}{P}} - 1$$

Present Discounted Value (PDV)

- PDV of a dollar in one year = $1/(1+r)$
- PDV of a dollar in *n* years = $1/(1+r)^n$
- PDV of a stream of payments $x_1,..,x_n$

$$PDV = \sum_{t=1}^{T} \frac{x_t}{(1+r)^t}$$

Conventional Bonds Carry Coupons

- Conventional Bond Issued at par (100), coupons every six months.
- Term is time to maturity

$P_t =$

$$P_t = c\left(\frac{1}{r} - \frac{1}{(1+r)^T}\frac{1}{r}\right) + \frac{100}{(1+r)^T}$$

$$P_t = \frac{c}{2}\left(\frac{1}{r/2} - \frac{1}{(1+r/2)^{2T}}\frac{1}{r/2}\right) + \frac{100}{(1+r/2)^{2T}}$$

Consol and Annuity Formulas

- Consol pays constant quantity *x* forever
- Growing consol pays $x(1+g)^{(t-1)}$ in *t*
- Annuity pays x from time 1 to T

$$\text{Consol PDV} = x / r$$

$$\text{Growing Consol PDV} = x /(r - g)$$

$$\text{Annuity PDV} = x \frac{1-1/(1+r)^T}{r}$$

Growing Consol Formula

- The Growing Consol formula is from Jacob Bernoulli (1654-1705) professor of mathematics, University of Basle, in his *Positionum Des Seriebus Infinitis*
- (See Goetzmann and Rouwenhorst, Origins of Value, pp 185-6)
- (So, it is short-sighted to attribute this to Myron Gordon and to call this the Gordon Model)

Forward Rates

- Forward rates are interest rates that can be taken in advance using term structure
- J. R. Hicks *Value and Capital* 1939

$$(1+r_2)^2 = (1+r_1)(1+f_2)$$

$$(1+r_k)^k = (1+r_{k-1})^{k-1}(1+f_k)$$

Example of Forward Rates

- Suppose I in 1925 expect to have £100 to invest in 1926, but want the money back by 1927. How can I guarantee the interest rate on the £100 investment today (1925)?
- Buy in 1925 $(1+r_2)^{2/(1+r_1)}$ 2-period discount bonds maturing at £100 in 1927. Cost: $£1/(1+r_1)$
- Short in 1925 one 1-period discount bond maturing at £100 in 1926 Receive: $£1/(1+r_1)$
- I have now locked in the interest rate $1+f=(1+r_2)^2/(1+r_1)$ between 1926 and 1927

Expectations Theory

- Forward rates equal expected spot rates
- Slope of term structure indicates expected future change in interest rates.

Inflation and Interest Rates

- Nominal rate quoted in dollars, real rate quoted market baskets
- Nominal rate usually greater than real rate

$$(1 + r_{money}) = (1 + r_{real})(1 + i)$$

$$r_{money} \cong r_{real} + i$$

실질금리 = 명목금리 − 인플레이션

$r_{real} \simeq r_{money} - i$

Indexed Bonds

- Paul Revere, Massachusetts, 1780
- U. S. Treasury, 1997
- TIPS Treasury Inflation Protection Securities, in 2006 7% of US national debt
- UK Index-Linked Gilts, by 2006, 25% of UK national debt
- France recently issued Euro Index bonds

Leverage and its Discontents

- The start of the 2008-9 world financial crisis had to do with home buyers in U.S. and elsewhere borrowing to buy homes
- China today is a highly leveraged economy, arousing concerns
- Debt leads to bankruptcies, possible world crises

Irving Fisher "The Debt-Deflation Theory of Great Depressions" *Econometrica* 1933

- Deflation redistributes real wealth from debtors to creditors ⇒ 디플레이션 = 화폐가치 상승 = 빚가치↑ = 부의이동: 채무자⇒채권자 = 여유 별로없음!
- Creditors tend to be the more cautious
- (Recent crisis has not been mostly deflationary, but inflation has fallen short of expectations)

John Geanakoplos “The Leverage Cycle” 2009

Leverage dramatically increased in the United States and globally from 1999 to 2006. A bank that in 2006 wanted to buy a AAA-rated mortgage security could borrow 98.4% of the purchase price, using the security as collateral, and pay only 1.6% in cash. The leverage was thus 100 to 1.6, or about 60 to 1. The average leverage in 2006 across all of the US$2.5 trillion of so-called toxic mortgage securities was about 16 to 1, meaning that the buyers paid down only $150 billion and borrowed the other $2.35 trillion. Home buyers could get a mortgage leveraged 35 to 1, with less than a 3% down payment. Security and house prices soared.

- 97%를 대출내서 집구매 가능
- 엄청난 레버리지
- 다들 했다. 왜? 집값은 절대 떨어지지 않으니까!

⇒ 불황이 오면 떨어진다 → 경제 공황

Stock Market Capitalization by Country 2014

Country	% GDP	US$ trillions
United States	151%	26.33
United Kingdom	107%	3.183
Canada	117%	2.094
China	58%	6.004
Russia	21%	0.385
Brazil	36%	0.844
India	76%	1.558
Mexico	37%	0.48

- America is in sale.
- US stock market does not belong to America.

Flow of Funds Accounts 2014

- Table B-101 gave household (incl nonprofit) assets as $98.3 trillion and liabilities of $14.2 trillion and hence net worth of 84.1 trillion
- Of this, corporate equities only $13.9 trillion (mutual funds another $7.8 trillion, pension funds 20.6 trillion)
- Real estate is bigger than holdings of equities, $23.7 trillion

The Corporation

법인

- [1611] A body corporate legally authorized to act as a single individual, an artificial person created by royal charter, prescription, or act of legislature, and having authority to preserve certain rights in perpetual succession. (OED)
- Compare *publicani* of ancient Rome, essentially corporations (though the most prominent were private collecting agencies for taxes)

Shareholder's Democracy
→ 주주투표로 선출

Board of Directors

- In US, Board is commonly chaired by CEO
- But CEO is hired by the Board
- In Germany, firms have two boards of directors. There is the Aufsichtsrat (Supervisory Board) and the Vorstand (Management Board).

감독이사회

경영 이사회

For-Profit vs. Non-Profit

영리 비영리

- For-profit corporation is owned by shareholders, equal claim after debts paid, subject to corporate profits tax
- Non-profit is not owned, self-perpetuating directors. Not subject to corporate profits tax
- For-Profit exists to benefit shareholders, non-profit does not
- So, for-profit has a price per share, non-profit does not
- Ideally, for-profit has value only because the company is dedicated to advancing the shareholder, either through dividends or through share repurchase

Meaning of Shares and Market Cap

- My ownership of company equals my shares divided by total shares
- Splits (분할) are essentially meaningless
- If the company pays a dividend, the value of the share should go down by the amount of the dividend per (배당금) share. → "배당락"
- Ex dividend date : 배당기준일
- If the company does something to increase the value of the company without increasing the number of shares, my shares gain value
- It is all in the ratio, total value of company divided by total number of shares. If you affect numerator and denominator equally, then there is no effect on price per share

* 주식 보유의 기본적 사유 : 배당금 → 단, 의무는 아님...

* 배당금 누락이 없고 정기적 증가가 주주신뢰에 중요

Common vs. Preferred Stock

보통주 우선주

- Common stock: dividend is at discretion of firm, subject to legal restrictions
- Preferred stock: Specified dividend does not have to be paid, but firm cannot pay dividend on common stock unless all past preferred stock dividends are paid
- Corporate bonds: Firm is contractually obligated to pay coupons and there is a maturity date when principal must be paid

회사채

- US bought preferred shares in corporations to bail them out (GM bought back all its govt. preferred shares in 2010, $2.1 billion, govt. still has common)

→ 2008 금융위기 때 GM 우선주를 구매하여 구제
(우선주를 산 이유? 대주주처럼 행동하기 싫어서...)

Equity = Common stock → 보통주의 특징임!

The Basic Corporate Charter Says All Common Shareholders Treated Equally

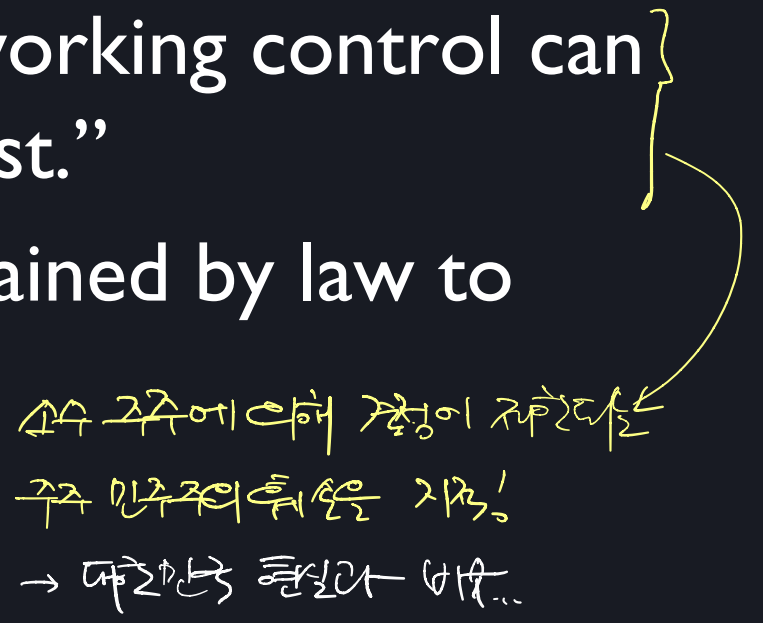
- Charter does not say that the firm ever has to raise debt, Board (and officers they appoint) decides
- Charter does not say that the firm ever has to pay dividends, Board decides
- Charter does not say the firm ever has to repurchase shares, Board decides
- Charter does not say that the firm ever has to issue warrants, convertible debt, anything else
- But, the shareholders elect the board!!

이사회 결정이죠!

⇒ 보통주는 투표할 권리를 갖는다! (정말???)

Berle and Means

- Adolf A. Berle Jr., and Gardiner C. Means, *The Modern Corporation and Private Property*, 1933
- Separation of ownership and control
- "ownership is so widely scattered that working control can be maintained with but a minority interest."
- The "quasi-public corporation" is constrained by law to serve other interests.



Regulatory Efforts to Improve Voting for Corporate Control

- 1935 SEC under authority of Securities Exchange Act of 1934 established rules for proxy contests. Outside parties may solicit proxies but must register with SEC
- 1956 Amendments made proxy contests very difficult: required registration of all proxy communications
- 1992 Relaxed 1956 amendments, resulting in many more proxy contests

Classes of Shares

- Berkshire Hathaway, A Class have voting rights (close to $200,000 per share), B do not (Listed NYSE)
- New York Times, Class A has less voting rights than Class B, which allows descendants of Adolph Ochs still to control (not publicly traded)
- Facebook: Mark Zuckerberg owns 28% of its shares but 57% of its voting shares (2012)

* 회사의 자금 조달 방법

① Retained Earning (이익잉여금), ② Loan (대출) & Bond (채권), ③ Issue Shares (신주발행)

How Do Corporations Raise Money?

- In principle, whenever a company wants to raise new money, say to build a factory, it could issue new shares
- This *dilutes* existing shareholders, since they now own a smaller fraction (지분율) of the company, but, offsetting that, it creates new earning power for the company ⇒ 주주지분 희석, 그러나 회사입장에서는 이익창출 가능
- Shareholders at a meeting could ideally vote on whether they think the prospective profits are worth the dilution, and prospective purchasers of the issue could ponder whether they feel the diluted shares are worth purchasing

Why Do they Call It Equity

- Equity means *equal* share. Term goes back only to 1904, originates in US (OED)

c. (See quot. 1966.) orig. *U.S.*

Thesaurus »
Categories »

1904 E. S. Meade in *Polit. Sci. Q.* Mar. 50 Its preferred stock is quoted at..prices which indicate a general conviction that the equity in the company is worth little.

1928 *New Statesman* 28 July (Finance Suppl.) p. vi, Out of the combined issued capital of £16,629,000 the public put up 93 per cent. of the cash required, but received only 21.8 per cent. of the equity—that is the balance of profits remaining after the fixed dividends have been paid on the Preferred capital.

1930 *Times* 11 Feb. (Financial Rev.) p. iii/2 It was widely imagined that more money was to be made in high pressure equities than in anæmic mortgages.

1966 A. Gilpin *Dict. Econ. Terms* (1967) 72 *Equities*, the ordinary shares of a limited company. They carry the right to the residue of a company's assets after it has paid all its creditors, and share in the distribution of profits, if any, after interest has been paid to preference share-holders and debenture holders each year.

Stuart Myers Pecking Order Theory

자금조달 순서

- Firms really don't like to issue new shares, because public gives them a bad price, mistrusting management, and it is costly and difficult to issue shares
- Stewart Myers, "The Capital Structure Puzzle, J. Fin. 39:575-92, 1984 proposes "pecking order" theory: firms like to raise money through retained earnings first, through borrowing second, equity only as last resort

* 칼 막스의 지적: 주식시장은 도박판이다
사람 차익에만 관심을 갖는다

Myers Continued

- He says most firms (as of 1984) had not done a single equity offering in the last twenty years, and did not contemplate doing one
- 1973-82 62% of capital expenditures came from retained earnings, only 6% from net equity issuance, rest from net borrowing

Fama & French criticism of Myers JFE 2005

- But Fama and French point out that even 1973-82, 67% of firms issued some equity (Myers referred to net equity at 6%), up to 86% for 1993 to 2002 → 주가가 좋지않아 신주발행에 제약이 있었던...
- Equity issues include issues of stock to employees via options and grants → 공모가 아닌 옵션이나 워런트형태로 발행되니 주의할 것!

stock option

warrant (신주인수권)

Dilution

- If the company gives away new shares, my shares become worth less; that is dilution
- They *do* give away shares
- If the company sells new shares at market price, that generally does not lower the value of my shares because the company has the money
- If the company issues a stock dividend at 5%, then that lowers the value of my original shares by factor 1/1.05, but I am not worse off since I have an additional .05/1.05 of value in the new shares

Dilution ⇔ Share Repurchase

Share Repurchase

- The opposite comes when a firm buys its own shares on the market.
- The value of the firm should go down by the amount they spent.
- I as a shareholder, however, now own a larger share of the company.
- If the firm repurchases shares instead of paying dividends, then my shares do not lose value, the company loses value but I have a bigger share in it.

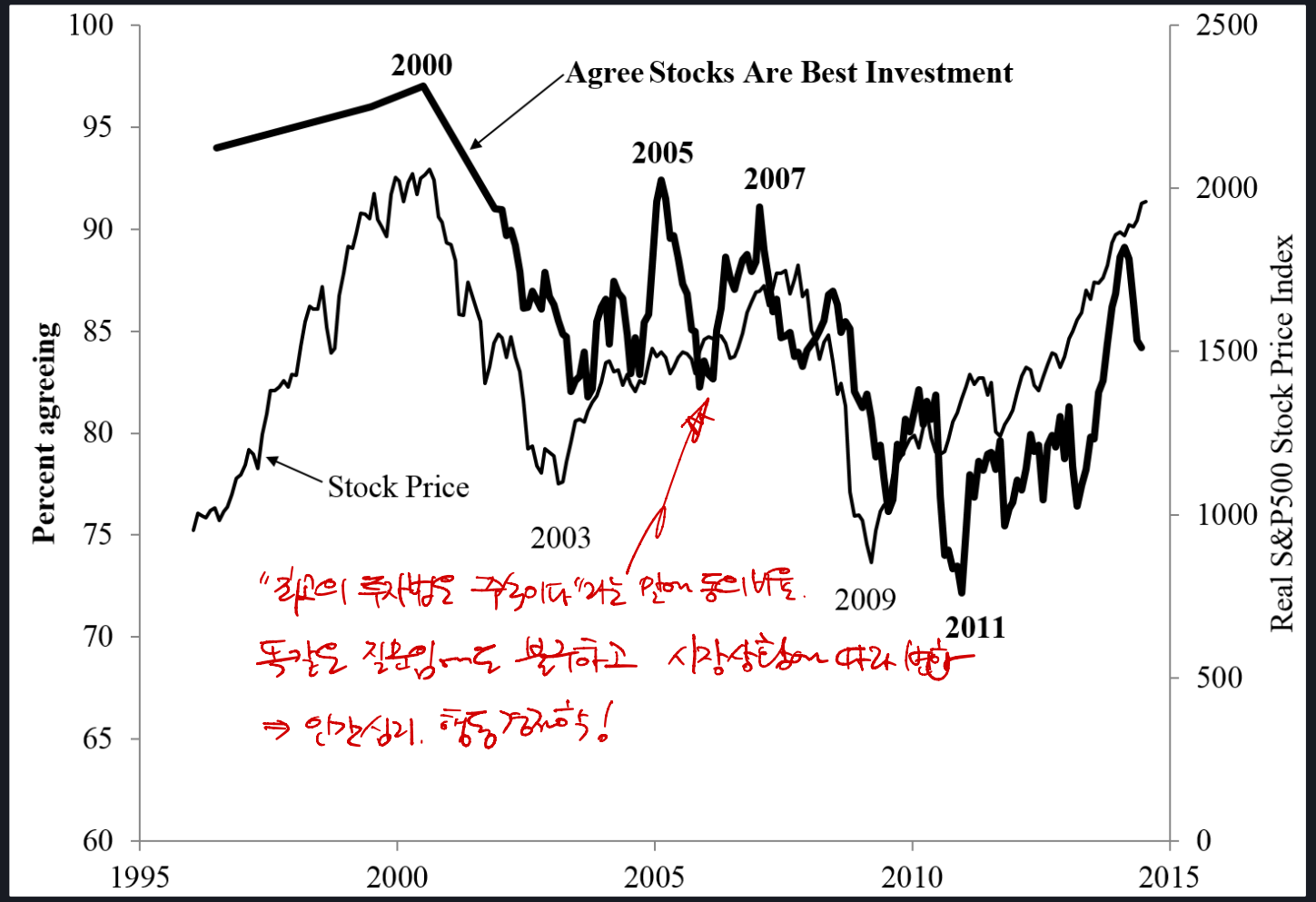
Reasons for Share Repurchase

- Tax break for investors (obsolete in sense that tax rate on cap gains=that on dividends, but cap gains tax can be postponed).
- Firms' unwillingness to cut dividends, uncertainty that current earnings will continue.
- Price pop after a repurchase. Buybacks taken as a signal. But price pops are fading.
- Now investors sometimes view repurchase as a sign that firm is "old economy." NASDAQ firms less likely to repurchase shares, as if they think value is too high.

Price as PDV of Expected Dividends

- If earnings equal dividends and if dividends grow at long-run rate g, then by growing consol model $P=E/(r-g)$, $P/E=1/(r-g)$. (Gordon Model)
- So, efficient markets theory purports to explain why P/E varies across stocks in terms of r and g
- Low P/E does not mean that the stock is a "bargain," it only means that earnings are rationally forecasted to decrease in future (low g) or that risk is high (high r)
- Efficient markets denies that any rule works other than simple diversification
- Value investing says invest in low P/E

Evidence of Feedback Mechanism: Results of Individual Investor Survey: Stocks are the Best Investment



Why Do Firms Pay Dividends?

- Even when there was a strong tax advantage to capital gains, firms paid dividend → 세금의 불이익이 큼에도 불구, 배당을 지급. 왜?
- Hersch Shefrin and Meir Statman: Self-control theory of dividends. (analogy to Christmas clubs, overwithholding) Rule of thumb spending rule.
- Prospect theory interpretation: framing matters. Dividends framed as income.
- University endowments once required high-yield investments to provide income

Dividend Signalling

신호이론

회사가 스스로의 재무상태를 공시하려는 의도

ex. 배당이 "0"일 경우, 재정상의 곤란가 의심 → 적자를 봐도 배당을 한다

- By raising dividends, firm shows it can court bankruptcy.
- Battacharya, Hakansson, Ross
- Problem: alternative signaling methods are cheaper tax-wise

cf. 하버드 전학장 — 4년 대학 교육은 신호탐지보단, 능력을 위한 것.

무엇을 증명?

① 입학하기 좋은 수준의 스마트함

② 4년을 버릴 수 있는 성실함.

Lintner Model of Dividends

- $DIV_t - DIV_{t-1} = \rho(\tau \times EPS_t - DIV_{t-1})$
- ρ=adjustment rate, $0< \rho<1$
- τ=target ratio, $0< \tau<1$

$$DIV_t = \rho\tau\sum_{k=0}^{\infty}(1-\rho)^k EPS_{t-k}$$

목표배당 (Target Payout Ratio)가 있음 이에 맞춰 순차적으로 증가

General Public Utilities Corp

- President Kuhn proposed to substitute stock dividends for cash dividends, and offered to sell the stock dividend for any stockholder for minimal transaction cost. (ca. 1968)
- Direct saving to shareholder: $4 million a year
- Intense negative shareholder reaction

↑ 주주를 위한 더 좋은 제안을 했지만 강한 거부.
CAPM이 잘 맞지 않고 행동경제학이 필요한 이유.
모든 경제주체가 이성적이며 합리적으로 행동하지는 않는다.