

Why Does It Take So Long?

- Wheeled toys (Mexico Late Classic Period, between 650 and 950 A.D.) but no wheeled vehicles in pre-Columbian Americas
- Wheeled suitcases, Bernard Sadow, 1972, Robert Plath 1991
- Movie subtitles invented in 1920 (Abraham Schomer, *The Chamber Mystery*) but virtually never used again in silent movies
- Desks over exercise bikes—still not done (Mayo Clinic)
(from *New Financial Order*, 2003)

유한책임

Limited Liability

- Limited Liability New York State 1811
- Divide up an enterprise into shares, and no shareholder is liable for more than he or she put in
- Other states were very skeptical
- New York produced many failed corporations, a few spectacular successes

자본을 합친 돈이든 실패하든 책임부담이 없다

모든 투자자들이 위험을 분산시켜 투자에 관심이 더 많아 ➡ 투자환경 개선!

The Corporation

- David Moss points out that a law requiring that all corporations have limited liability was tried as an experiment in New York State in early 19th Century.
- Moss points out that limited liability was not obviously a good idea: it created agency problems for stockholders, who might pursue risky strategies at bondholders' expense. Moreover, in fact unlimited liability hardly ever caused serious problems in practice.
- But, New York experiment was obviously successful, and eventually all states copied it.

Moss' Theory why Limited Liability Corporations were so Successful

- Investor overestimation of miniscule probability of loss beyond initial investment discouraged investment (weighting function)
- Lottery effect: with limited liability, an investment in a corporation was a throwaway item, like a lottery ticket (prospect theory)
- Allowed for investors to hold a highly diversified portfolio (not a concept that framers of corporate law were comfortable with then).

CPI : Consumer Price Index

6 물가지수연동채권

Inflation Indexed Debt

- History shows many examples of nominal debt being wiped out in real terms by high inflation
- Indexed debt first attempted in Massachusetts, 1780, to help finance Revolutionary War
- Shay's rebellion 1786, sparked by apparent unfairness of other nominal contracts (e. g., soldiers' pay) being worthless while indexed debt was not
- Indexed bonds did not appear again in the United States until 1997
- Still today no private indexed debt

* Money = 1 $\frac{1}{2}$

① A store of value $\gamma\pi\pi\pi\pi\pi$

② A unit of account $\gamma\pi\pi\pi\pi\pi$ | **Unidad de Fomento**

③ A medium of transaction $\gamma\pi\pi\pi\pi\pi$

- Chile, 1967
- Valoruf.cl gives this morning's value at \$21,468.70
- In 1977 it was 450 pesos. So, nearly a 50-fold increase in prices. (It started at 100 escudos in 1967, changed currency to pesos in 1975, one peso is a thousand escudos)
- (In US, consumer prices have gone up 22 fold since 1913)

Wikipedia

- The **escudo** was the currency of Chile between 1960 and 1975, divided into 100 *centésimos*. It replaced the (old) peso at a rate of 1 escudo = 1000 pesos and was itself replaced by a new peso, at a rate of 1 peso = 1000 escudos. The symbol E° was used for the escudo.

Real Estate Risk Management Devices

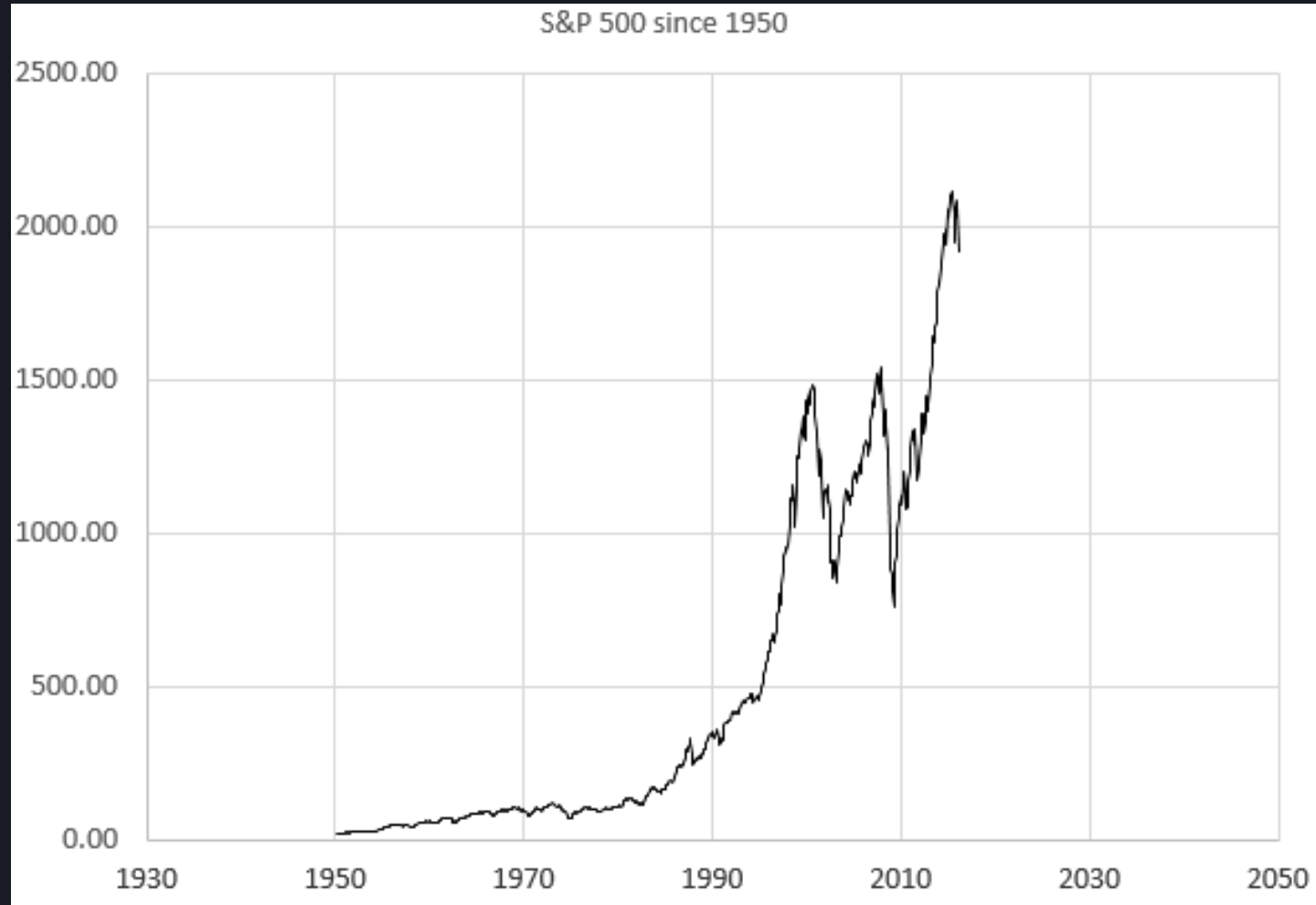
- Value of homes is a major source of risk
- Casualty insurance
- Securitized mortgages
- Home price futures and options 2006, housing.cme.com
- Equity-protected mortgages

The Efficient Markets Hypothesis

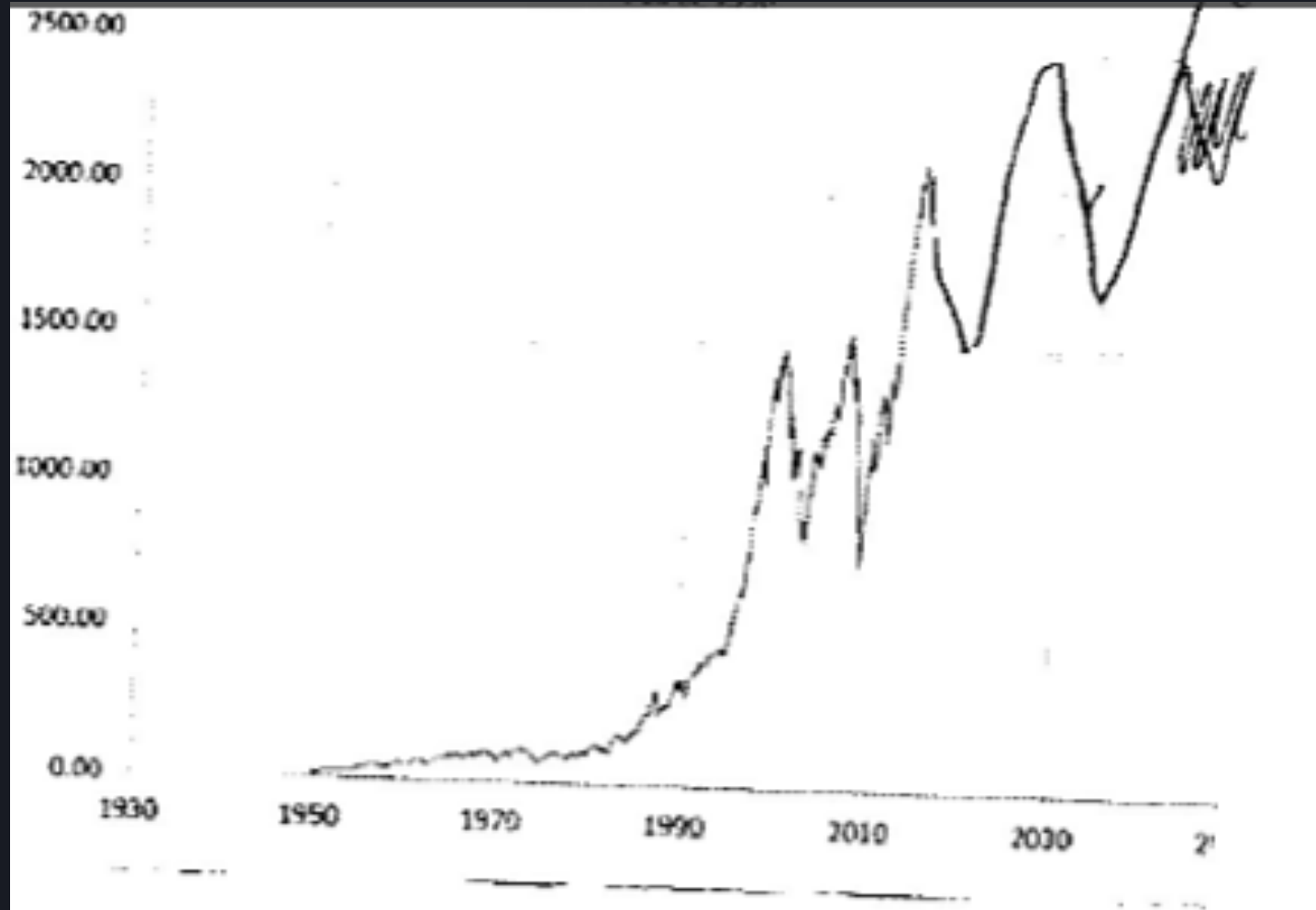
효율적 시장 가설

- History of the Hypothesis
- Reasons to think markets are efficient
- Reasons to doubt markets are efficient
- Technical analysis
- Empirical evidence in literature
- Homework assignment and regressions

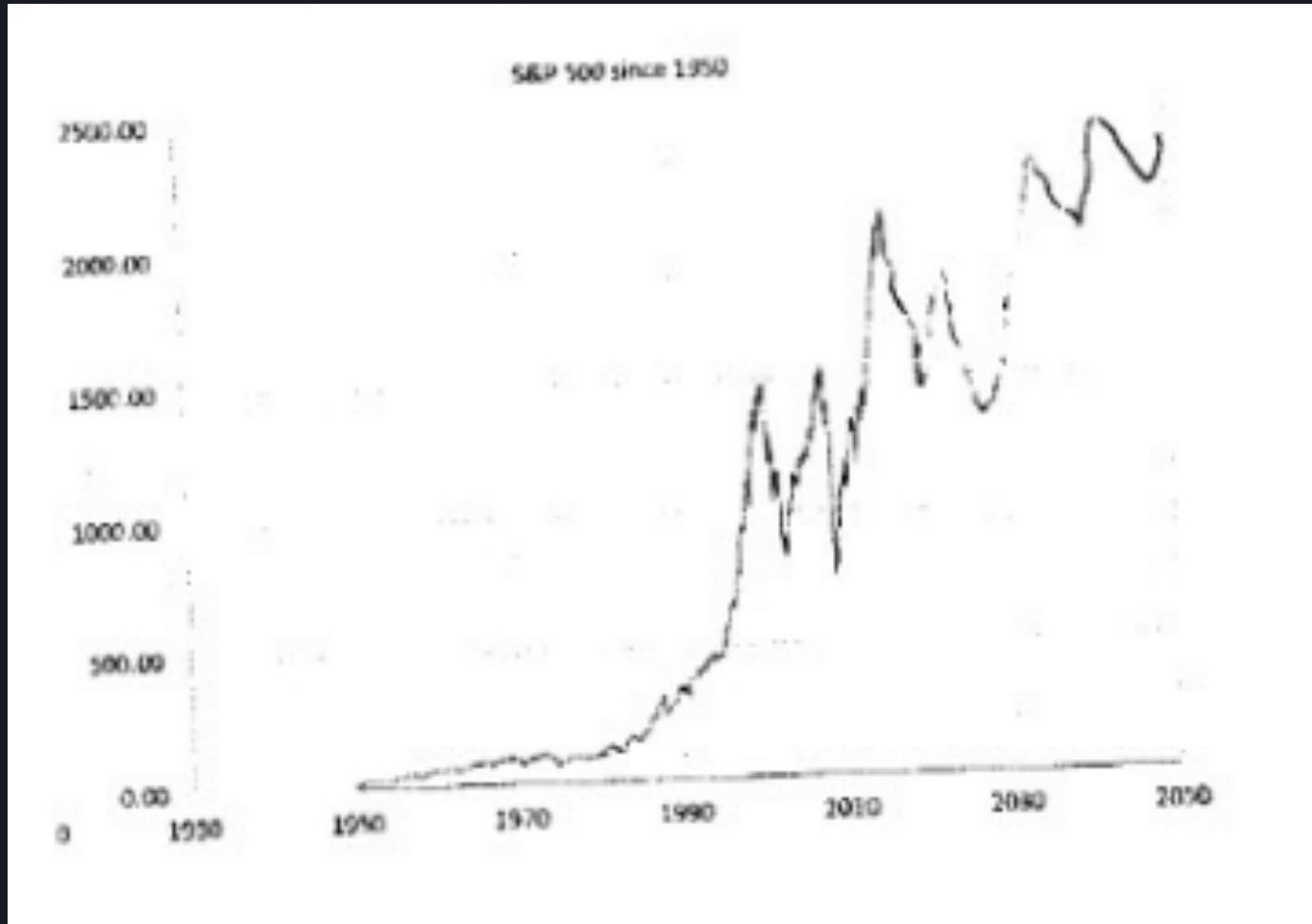
Dinner Experiment Friday



Student Forecast Example I



Student Forecast Example 2



Random Walk Hypothesis

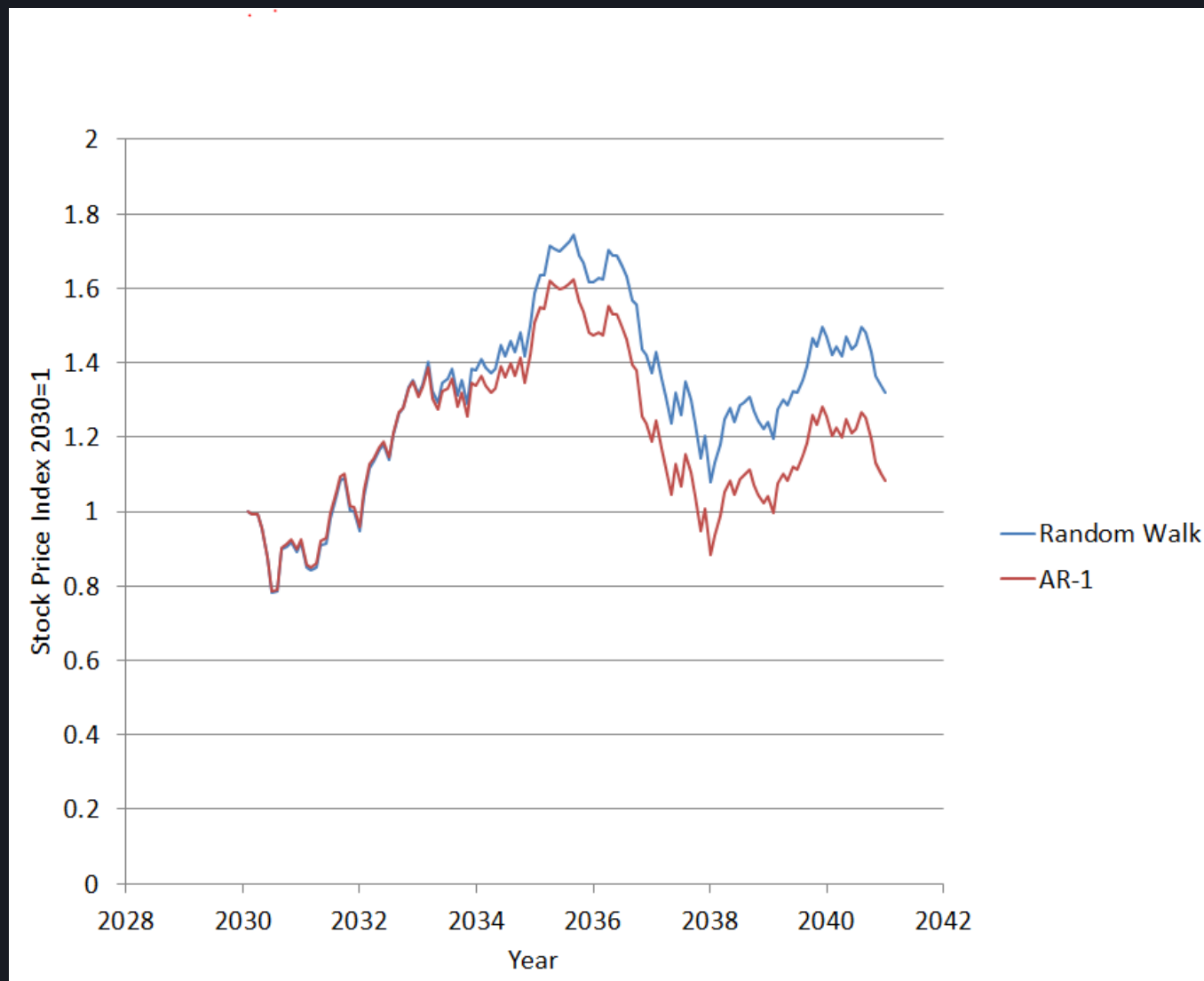
- Karl Pearson, *Nature*, 72:294, July 27, 1905. Aug 10, 1905, walk of drunk
- Burton Malkiel, *A Random Walk Down Wall Street*, 1973.



Random Walk & AR-1 Models

- Random Walk: $x_t = x_{t-1} + \varepsilon_t$
- First-order autoregressive (AR-1) Model: $x_t = 100 + \rho (x_{t-1} - 100) + \varepsilon_t$ Mean reverting (to 100), $-1 < \rho < 1$
- Random walk as approximate implication of unpredictability of returns
- Similarity of both random walk and AR-1 to actual stock prices

Comparison of AR-1 (mean 1, rho=.9 per year) with Random Walk



Intuition of Efficiency

- Reuter's pigeons and the telegraph
- Beepers & the internet
- Must be hard to get rich

Charles A. Conant “Wall Street and the Country” 1904

III

THE FUNCTION OF THE STOCK AND PRODUCE EXCHANGES

ONE of the most persistent of the hallucinations which prevail among people otherwise apparently lucid and well informed is the conception that operations on stock and produce exchanges are pure gambling. A moment's reflection, (it would seem,) might convince such persons that a function which occupies so important a place in the mechanism of modern business must be a useful and necessary part of

tion afforded by public quotations on the stock and produce exchanges were wiped from the slate of human knowledge. How would the average man, how even would a man with the intelligence and foresight of a Pierpont Morgan, determine how new capital should be invested? He would have no guide except the most isolated facts gathered here and there at great trouble and expense. A greater misdirection of capital and energy would result

Textbook Version, Fabozzi et al 2002

- “Publicly available, relevant information about the issuers will lead to correct pricing of freely traded securities in properly functioning markets.” p. 32.
- (For Fabozzi et al., it is a *hypothesis*, and they invoke it as a motivation that is behind much regulation.)

Textbook Version Today, Another Example

As one of the “seven most important ideas in finance”:

“Security prices accurately reflect available information, and respond rapidly to new information as soon as it becomes available” Richard Brealey, Stewart Myers, and Franklin Allen, *Principles of Corporate Finance*, 1984, second edition

시장가치 모든 정보를 이미 반영하고 있고, \Rightarrow 효율적 시장 가설의 핵심!
새로운 정보 역시 즉시 반영된다

\rightarrow 시장을 아는 것은 정말 어려운가...

공분산 전문지식이나 정보나 많은 사람들도

1. 시장과 회사에 대한 가치관

\rightarrow 공분산 없이도 시장가치를 아는 방법은 4가지 있다

Brealey & Myers continued

- “Don’t misunderstand the efficient-market idea. It doesn’t say that there are no taxes or costs; it doesn’t say that there aren’t some clever people and some stupid ones. It merely implies that competition in capital markets is very tough—there are no money machines, and security prices reflect the true underlying value of assets.” 1984, p. 784

↓
나도 이 부분에서 효율적 시장가치가 흐름이 있다고 생각했습니다.
시장과 싸워서 이기는 것만으로도 굉장한 노력이다
이것은 단순히 받아들이고 이를 극복하는 4인도 '행위적인 전략'이 필요하다는

2008年 금융위기: 금융시장에서의 실패...

2008 Edition of Brealey, Myers and Franklin Allen

- Much more research is needed before we have a full understanding of why asset prices sometimes get so out of line with what appears to be their discounted future payoffs.

Harry Roberts, 1967

- Weak form efficiency: prices incorporate information about past prices
- ~~A~~ Semi-strong form: incorporate all publicly available information
- Strong form: all information, including inside information

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
- Low P/E does not mean that the stock is a “bargain,” it only means that earnings are rationally forecasted to decrease in future
- Efficient markets denies that any rule works

Reasons to Think Markets Ought to Be Efficient

- Marginal investor determines prices
- Smart money dominates trading
- Survival of fittest

Saturday's NYTimes

How Much of Your Nest Egg to Put Into Stocks? All of It

Retiring

By DAVID A. LEVINE FEB. 12, 2016



Gorka Sampedro

LET'S say you were persuaded by my argument in last week's Retiring column — contrary to the advice offered by most financial experts — that you should not reduce your exposure to the stock market as you grow older. Or you're at least willing to listen to this contrarian advice.

But now what? Whatever your age, how much of your investments should be in equities? Should it be 30 percent? 60 percent? 90

percent?

No less an authority than Warren E. Buffett has stated that 90 percent is the right answer. That's a level of investment in stocks that many investors, not just older ones, find dangerously uncomfortable, particularly when the stock market is as volatile as it has been lately. Yet Mr. Buffett, the most renowned investor of our time, established a trust for his wife that puts 10 percent of his bequest in short-term government bonds with the remainder invested in a broad-based stock index fund.

But even Mr. Buffett's advice may be too conservative.

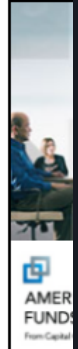
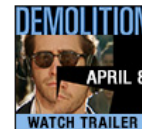
Email

Share

Tweet

Save

More



Behavioral Finance: The Role of Psychology

이런 거시경제에서 설명할 수 있는
비합리성에 대한 "심리" 요소

I. Prospect theory 전망 이론

II. Overconfidence 과잉 자신

III. Cognitive dissonance 인지 부조화

IV. Mental Compartments 정신 구획

V. Attention anomalies 주의 분산
(참고)

VI. Anchoring 정착 효과

VII. Representativeness heuristic
대표성 오류 짐작하기

VIII. Disjunction effect 분리 효과

IX. Magical thinking 마신

X. Quasi magical thinking

XI. Culture 문화

XII. Antisocial personality
disorder 반사회적 성격 장애

From *Theory of Moral Sentiments*, Adam Smith, 1759 to Behavioral Economics

- Adam Smith: people have a desire for praise 사람은 칭찬받고 싶어함
- But don't enjoy being praised for something they did not do 그러나 하지 않은 것을 인정을 받으면 X
- As people mature, if they mature successfully, the desire for praise morphs into a desire for praiseworthiness
- Mathematicians

↳ 수학자들은 누가 알아주지 않는 연구를 하지만
그리고 그 수학자의 인물이 가치를 알기만 역할을 하죠

I. Prospect Theory

전망 이론

Prospect Theory

사람들은 향락을 예상치 못하게
손실을 통증하기 더 두려워 함

심리학자

- Kahneman and Tversky, *Econometrica* 1979
- Two elements, value function and weighting function
- Elements replace utility function and probabilities in expected utility theory which has dominated economic thought → 행위성은 설명하는 효용이론은 다름. 사람들의 비행위성을 설명.

- ① 기준 의존성 Reference dependency ⇒ 기준값(기준점)에 따라 가치 변화
- ② 민감도 제하성 Diminishing sensitivity ⇒ 이익, 손실의 크기가 커질수록 변화 민감도 감소
- ③ 손실 회피성 Loss aversion ⇒ 같은 크기라도 이익의 효용보다 손실의 비효용이 더 큼 (가변) (손실)

Prospect Theory Value Function

① Gain/Loss 모두 증감함수는
민감하다. 그러나 증감폭은 증감하는 정도에
비례하여 작아진다. (큰 이익/손실이 난다)

② Gain보다 Loss에 가치 민감도가
더 높다. (손실은 복利的을 아님)

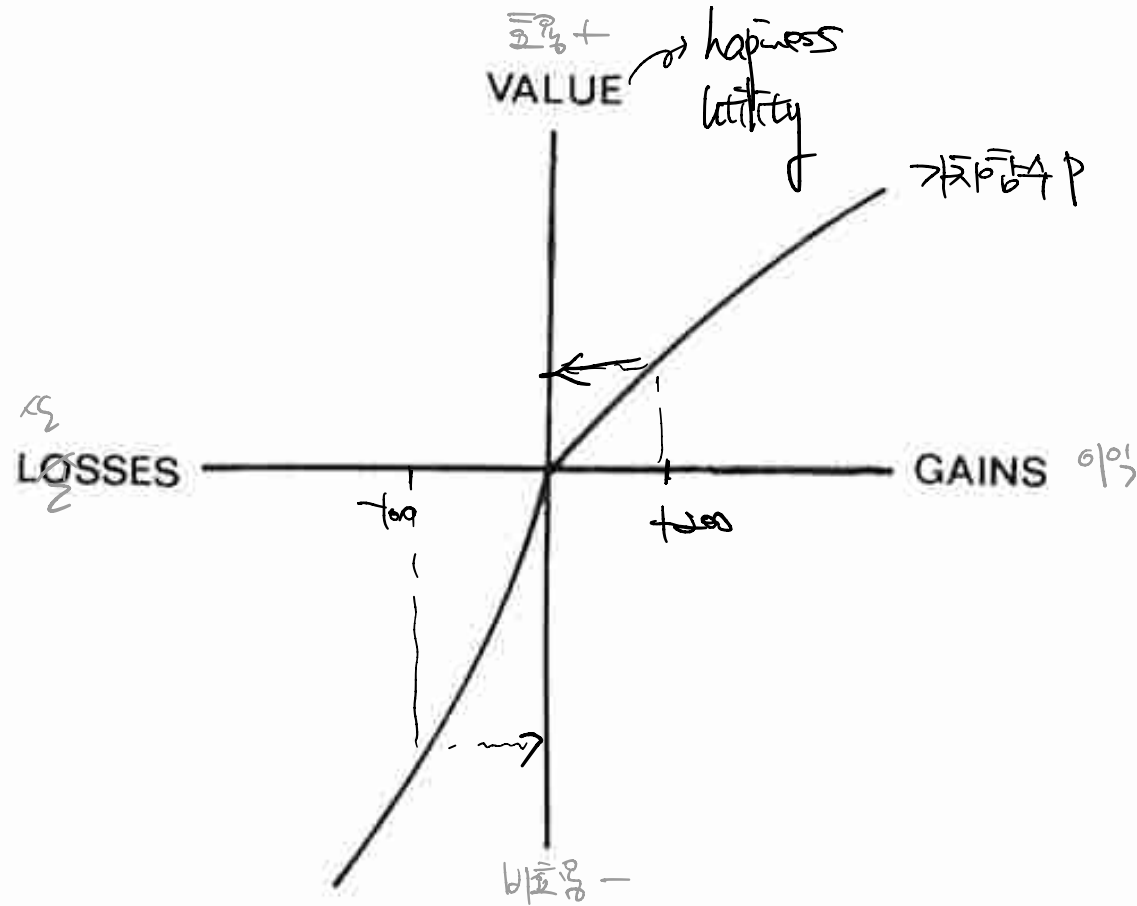


FIGURE 3.—A hypothetical value function.

Prospect Theory Weighting Function

저는 손실, 확정한 이익~ 집중한다

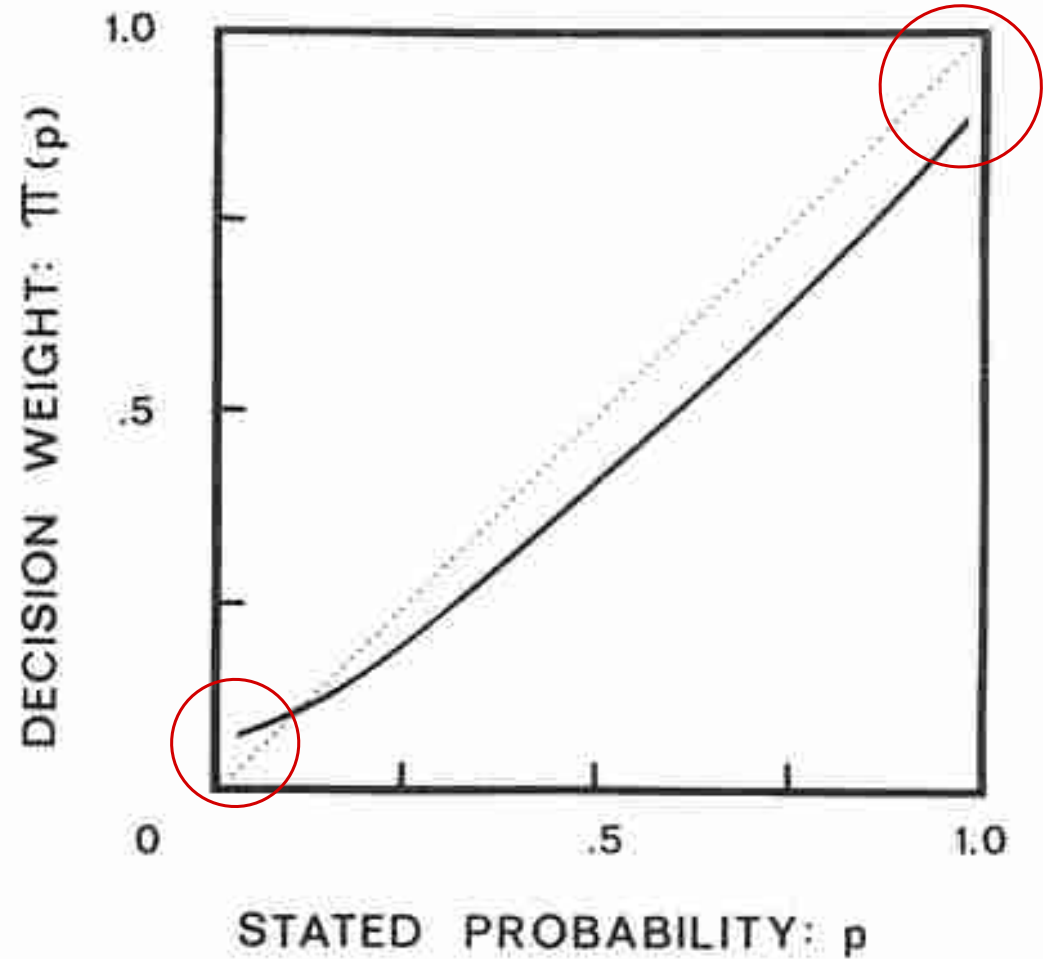


FIGURE 4.—A hypothetical weighting function.

II. Overconfidence

과잉행신

Wishful Thinking Bias

- People exaggerate probability that their team will win.
- People exaggerate probability that the candidate they favor will win.

⇒ 경쟁팀이 지는 것을 더 쉽게 예상하게 됨

⇒ 심리적 왜곡? Prospect theory에 따라 손실로 인해 심리적 ↑

Overconfidence in friends and leaders

- Every central bank head is thought to be a genius, at least for awhile
- Overconfidence in your fellow students

Overconfidence in people

- Managers are thought to be great geniuses, then are terrible
- Rakesh Khurana, HBS, *The Search for Charismatic CEO*
- Nassim Taleb, *Fooled By Randomness*
- Irving Fisher in The Stock Market Panic of 1929 still insists that the bull market was justified

III. Cognitive Dissonance

인지 부조화

자신의 신념이 틀렸다는 것을 알게 되었을 때
/ 긍정적은 생각, 감동

Cognitive Dissonance

- Mental conflict that occurs when one learns one's beliefs are wrong, avoidance behavior

- Ads for recently purchased cars
- Disposition effect

자본 회
 (구차구차하다 시 무시
 오자아자 자본
 ⇒ 틀리게 되면 이득 무시하고
 잊어버림

Will Goetzmann and Nadav Peles

Cognitive Dissonance and Mutual Fund Investors

- Found that even badly performing mutual funds retain some investors
- Hypothesize they hang on because they suffer cognitive dissonance since they chose the fund
- Did a survey and found that these investors remember the past performance of the fund wrong

IV. Mental Compartments

정신 구획

- Shefrin & Thaler: Compartments: current wage, asset, and future
- Shefrin & Statman: Investors have a “safe” part of their portfolio that they will not risk, and a “risky” part of their portfolio that they can have fun with
- Option salespeople use these tactics: buy a put option on a single stock

V. Attention Anomalies

주의(25) 이상

- Attention is fundamental aspect of human intelligence and its limits
- Social basis for attention
- Inability to account for one's attention
- “No arbitrage assumption” of financial theory: No ten-dollar bills lying around. Does not require everyone is paying attention

VI. Anchoring

정착 효과

- Kahneman & Tversky wheel of fortune experiment
- Subjects unaware of their own anchoring behavior
- Examples: stock prices anchored to past values, or to other stock prices in same country. Do splits to keep at \$30
- CSW Inc. to be changed to CSW.com?

VII. Representativeness Heuristic

대표성 오류 (대표성 편향)

- People judge by similarity to familiar types, without regard to base rate probabilities (sensitive, artistic woman, sculptress or bank teller)
- Tendency to see patterns in what is really random walk
- Stock price manipulators try to create patterns to fool investors. Short a stock and create a head & shoulders

VIII. Disjunction Effect

— 분리 효과 —

- Inability to make a decision that is contingent on future information
- Shafir & Tversky: People who took one of Samuelson's lunch colleague bet (flip a coin: heads you win \$200, tails you lose \$100) were asked if they would take another. Most took the second bet whether or not they won the first. But most would not take second bet before outcome of first was known
- Reaction of stock market to news, Make stock strategies to trade on news

IX. Magical Thinking

- B. F. Skinner 1948, fed hungry pigeons mechanically at 15-second intervals. Pigeons developed superstitions
- Stock market responses to events may have similar origins

스킨너는 먹이가 떨어지는 것을 보고 미신을 강화했다
사람들도 똑같이 할까?

X. Quasi-Magical Thinking

- Newcomb's Paradox (named after William Newcomb of Livermore Labs by Robert Nozick, 1969, reformulated by Shafir & Tversky): Subject plays a game with a computer, and is told that the consumer can predict from his behavior what he will do. Two boxes appear on computer screen. Subject is told that computer knows pretty well whether subject will choose box A or both box A and B. Computer puts \$1000 in box A, and \$1,000,000 in box B if it thinks subject will choose box B alone, otherwise puts nothing in box B.

Quasi Magical Thinking II

- Ellen Langer: People bet more on coin not yet tossed.
- People pay more for lottery ticket in which they choose the number

XI Culture and Social Contagion

사회적 전염/확산

- Social cognition, collective memory
- Durkheim, 1897, suicide rates differ across countries for no more reason than different cultural themes
- A global culture in today's world

From *Irrational Exuberance*

- Moral anchors for the market in the form of human stories
- 1929 is still remembered, and with associations of moral
- Narrative psychology: Robert Abelson, Jerome Bruner
- Identity, ego involvement heightens effect of stories

성인 남성의 3% 정도가 이런 성향을 보임

XII Antisocial Personality Disorder (sociopathy, Diagnostic and Statistical Manual 5)

- Identity: egocentric, self-esteem from personal gain
- Self-direction: absence of prosocial internal standards
- Lack of empathy, incapacity for intimacy
- Manipulative, deceitful, callous, hostile
- Irresponsible, impulsive, risk-taking

Borderline Personality Disorder much more Common in Women

- Instability of interpersonal relationships and self image
- Extremes of overidealization and then devaluation of others
- Depressed moods lasting hours to days
- Inappropriate intense anger
- Frantic efforts to avoid real or imagined abandonment

- Criminology literature finds that 65% to 75% of convicted criminals have APD [Hare found 40%]
- Archives of General Psychiatry have discovered that men with APD have 11 percent less gray matter than normal men in the prefrontal cortex
- Vogel et al. finds no prefrontal abnormalities associated with borderline personality disorder

Finance Profession Tries to Eject Such People and Retain Good

- The profession is substantially successful in removing such people, as are other professions
- For that reason, the impact of public psychological vulnerability is limited by the integrity of the people running the profession
- Still, these vulnerabilities show up in financial phenomena

Aspects of Psychology Play a Role in Many Economic Institutions

- Insurance and loss aversion
- Corporate stocks and gambling
- Bonds and Money Illusion
- Banks and trust
- Central banks and Bubbles
- Investment banks and framing
- Exchanges and sensation seeking
- Options and salience