

금융위기와 소득불균형

서울대학교 경제학부

최병선 교수

2016. 11. 30.

The Crisis and Financial Engineering

2007년 금융파생상품 (출처 BIS)

상장원본(notional amount) USD 677T

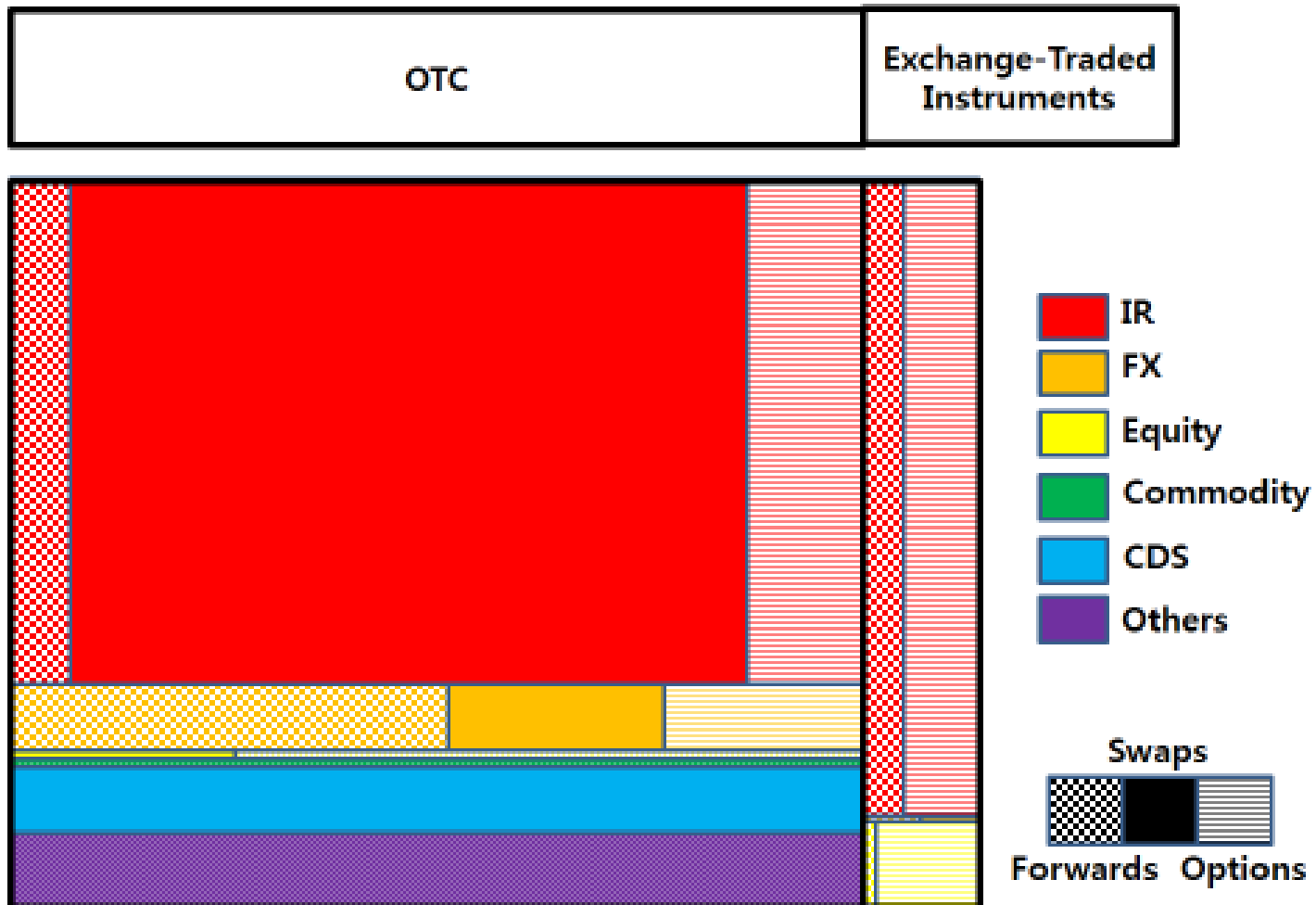
(1) 이자율 파생상품: USD 500T (80%)

(2) 환율 파생상품: USD 63T (10%)

(3) 신용파생상품: USD 22T (3%)

(4) Equity파생상품: USD 6T (1%)

2007 Derivatives ©최병선



Valuation Under BS Environment

- Duplication
- Risk-free interest rate
- No arbitrage (Law of one price)
- Risk-neutral valuation/PDE
- Black-Scholes formula
- Feynman-Kac theorem

Boundary Value Problem

- Strike price @ expiry T

$$C(S_T, T) \doteq [S_T - K]^+$$

Definition of Call Option

Terminal Condition (Boundary condition)

- Black-Scholes 방정식

$$\frac{\partial C}{\partial t} + \frac{1}{2}\sigma^2 S^2 \frac{\partial^2 C}{\partial S^2} + rS \frac{\partial C}{\partial S} - rC = 0$$

BS-Call Option Value

- Call option value @ time t

$$C(S, t) = N(d_1)S - N(d_2)Ke^{-r(T-t)}$$

$$d_1 = \frac{1}{\sigma\sqrt{T-t}} \left[\ln \left(\frac{S}{K} \right) + \left(r + \frac{\sigma^2}{2} \right) (T-t) \right]$$

$$d_2 = \frac{1}{\sigma\sqrt{T-t}} \left[\ln \left(\frac{S}{K} \right) + \left(r - \frac{\sigma^2}{2} \right) (T-t) \right]$$

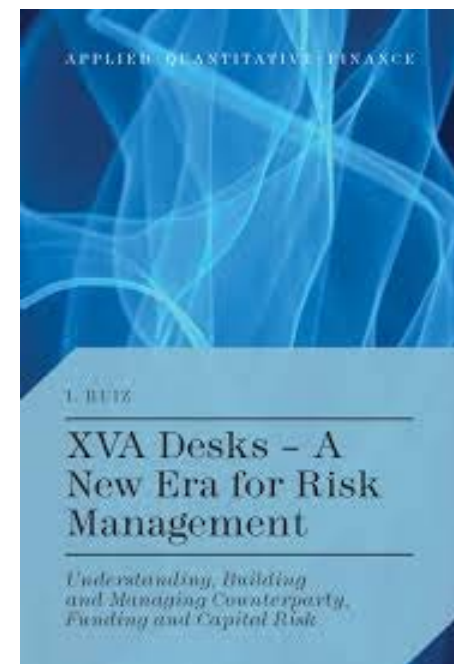
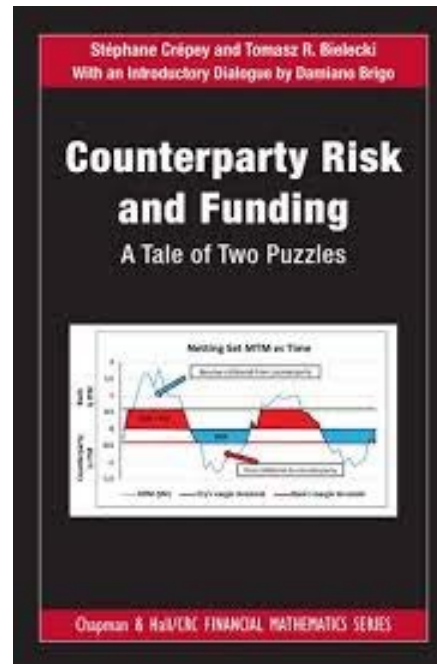
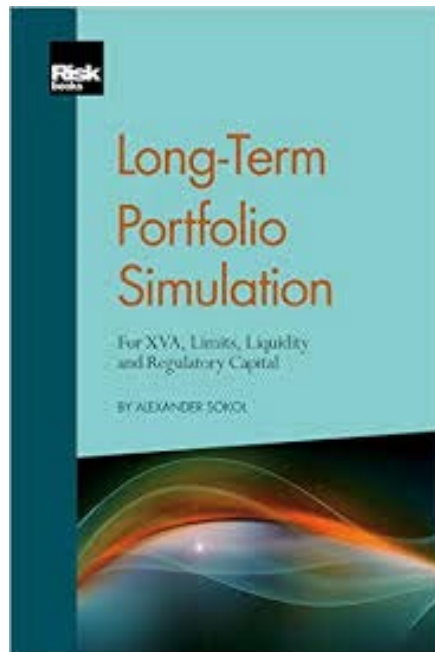
$$= d_1 - \sigma\sqrt{T-t}$$

$$N(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-\frac{z^2}{2}} dz.$$

The Most Significant Limitation of BS model

- **No arbitrage** implies **the law of one price** (LOP).
- Practically nothing around us has a unique price.
- Why should derivatives different?
- There isn't such a thing as one unique price for a derivative.
- Practically the **unique** no-arbitrage price does NOT exist.

XVA 참고문헌



Authors

- Alexander Sokol: A founder of **Numerix** and **CompatibL** Technologies, PhD from L.D. Landau Institute for Theoretical Physics
- Stéphane Crépey: Professor in Math, Univ of Evry, PhD in Applied Math from Ecole Polytechnique and INRIA.
- Tomasz R. Bielecki: Professor in Applied Math, Illinois Inst. Technology, PhD from Warsaw School of Economics
- Damiano Brigo: Chair in Mathematical Finance, Imperial College, PhD in Stochastic Filtering with Differential Geometry from Free Univ of Amsterdam
- Ignacio Ruiz: Founder of iRuiz Consulting, PhD in Quantum Physics from Cambridge University

xVA의 발전



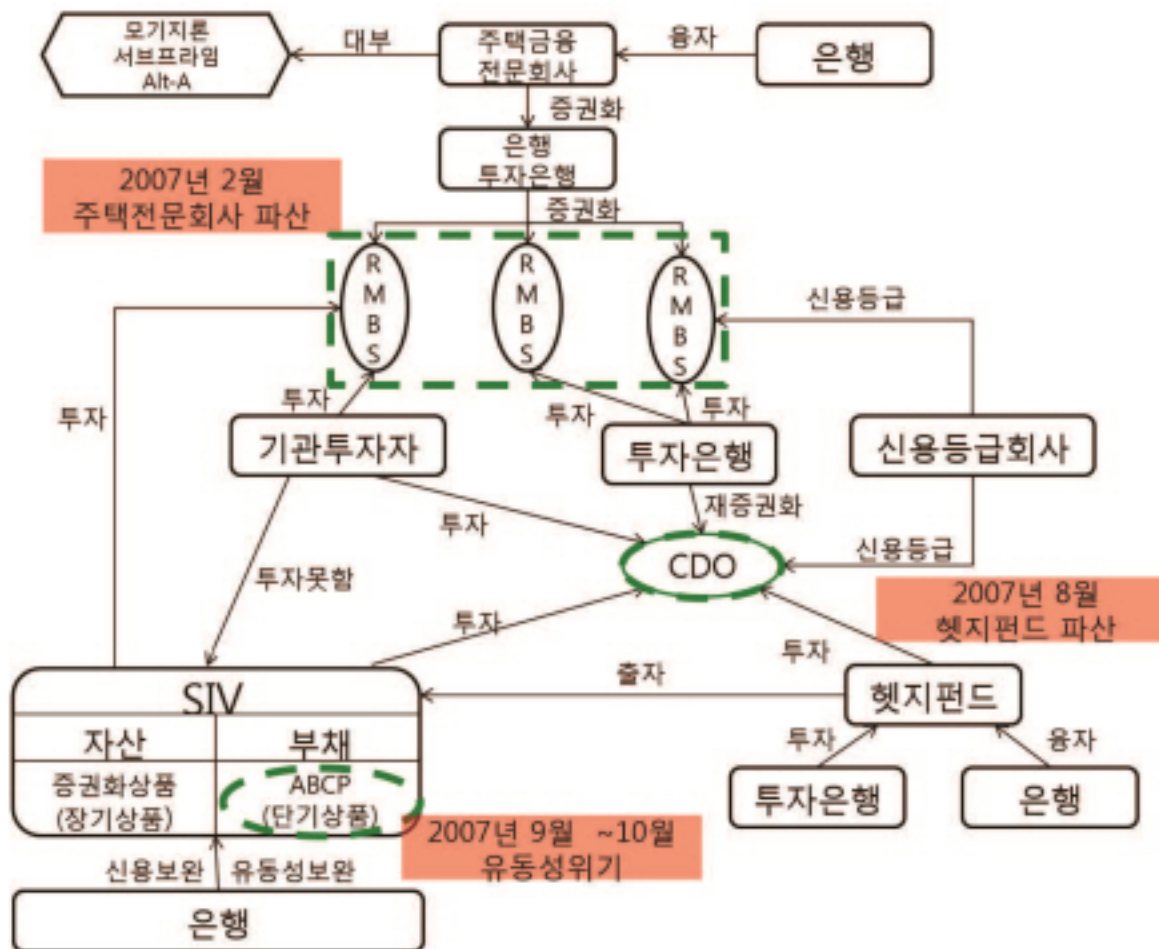
Derivative Valuation

- XVA accounts for costs that are "hidden" to BS world as a result of its limiting theoretical assumptions.
- For manufacturer of a derivative, value-to-me(VtM) is

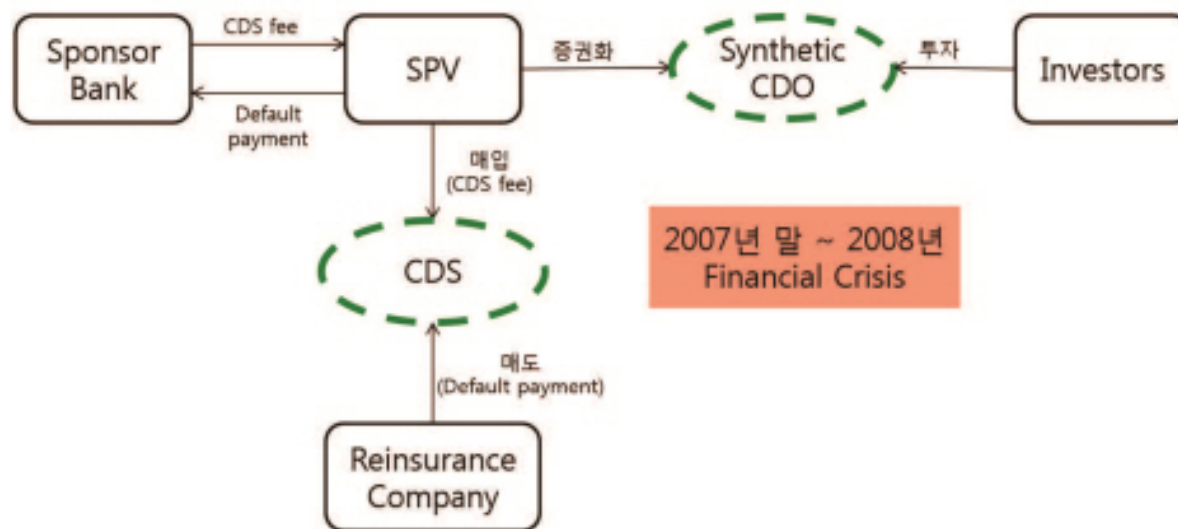
$$VtM = [P_{sale} - P_{BS}] - XVA$$
$$VtM_{RiskNeutral} - XVA.$$

- $XVA = CVA + FVA (+FBA) + KVA$

금융위기의 3단계 1



금융위기의 3단계 2



David Roche and Bob McKee

New Monetarism, 2007

- The substantial buildup of foreign reserves in central banks of emerging markets and developing countries, is really a liquidity creation scheme that relies on the dollar's favored position in trade and as a reserve currency in the post-Bretton-woods era.
- Beggar-thy-neighbor policy (근린공핍화정책)
- Fleecing of the flock (양털깎기)
- *Trump는 달러패권을 포기할 수 있을까?*

Quantum Fund in 1992 (5)

- Borrow USD 3B w/ USD 1B collateral
- 10B investment position
- (1) Short USD 9B on GBP (B = 10억)
 - (2) Long USD 6B on DM
 - (3) Long USD 0.5B on UK stocks
 - (4) Long on Germany and French bonds
 - (5) Short on Germany and French stocks

Sep 16, 1992 (7)

- GBP-ITL 매도 / DM 매입
- 11:00AM Lamont재무상 금리 2% pt 인상
- 다시 금리 3% pt 인상 (금리 15%)
- GBP 가치 하락이 계속 됨
- Major총리 ERM탈퇴 서명하고 GBP 절하
- 이탈리아도 ERM에서 탈퇴
- **GAME OVER**

Thai Baht위기 | 1997

- THB pegged by USD & JPY due to 1973 Oil Crisis and 1979 Energy Crisis
- 1985 Plaza Accord; USD devaluation
- JPY had appreciated. (Yen-carry)
- 1997.05.14. Soros' THB short sale
- Thai Gov increased IR up 3,000%
- 1997.07.02. Gave up the pegged FX rate to USD and JPY

(JPY A0-FX - JAPANESE YEN,M) Dynamic,0:00-24:00

USD/JPY Price Action Around 1997 Tax Hike

10% Rally in
Q1 (Before
Tax Hike)

4.5% Rally
in Q4 1996

Swift
Recovery

13% Drop
After Tax
Hike

© eSignal, 2010

1994

1995

1996

1997

1998

1999

Published by eSignal (www.esignal.com)



사카키바라 에이스케

- 1997년 9월 22일 홍콩 IMF와 세계은행의 연차총회
- Soros "사카키바라씨, 한국의 은행들이 행한 해외대출의 상당 부분은 인도네시아에 대한 것입니다."
- 12월 한국에 외환위기 발생
- Soros vs IMF, 금모으기, 서울증권
- 한겨레21 2000년 03월 02일 제297호

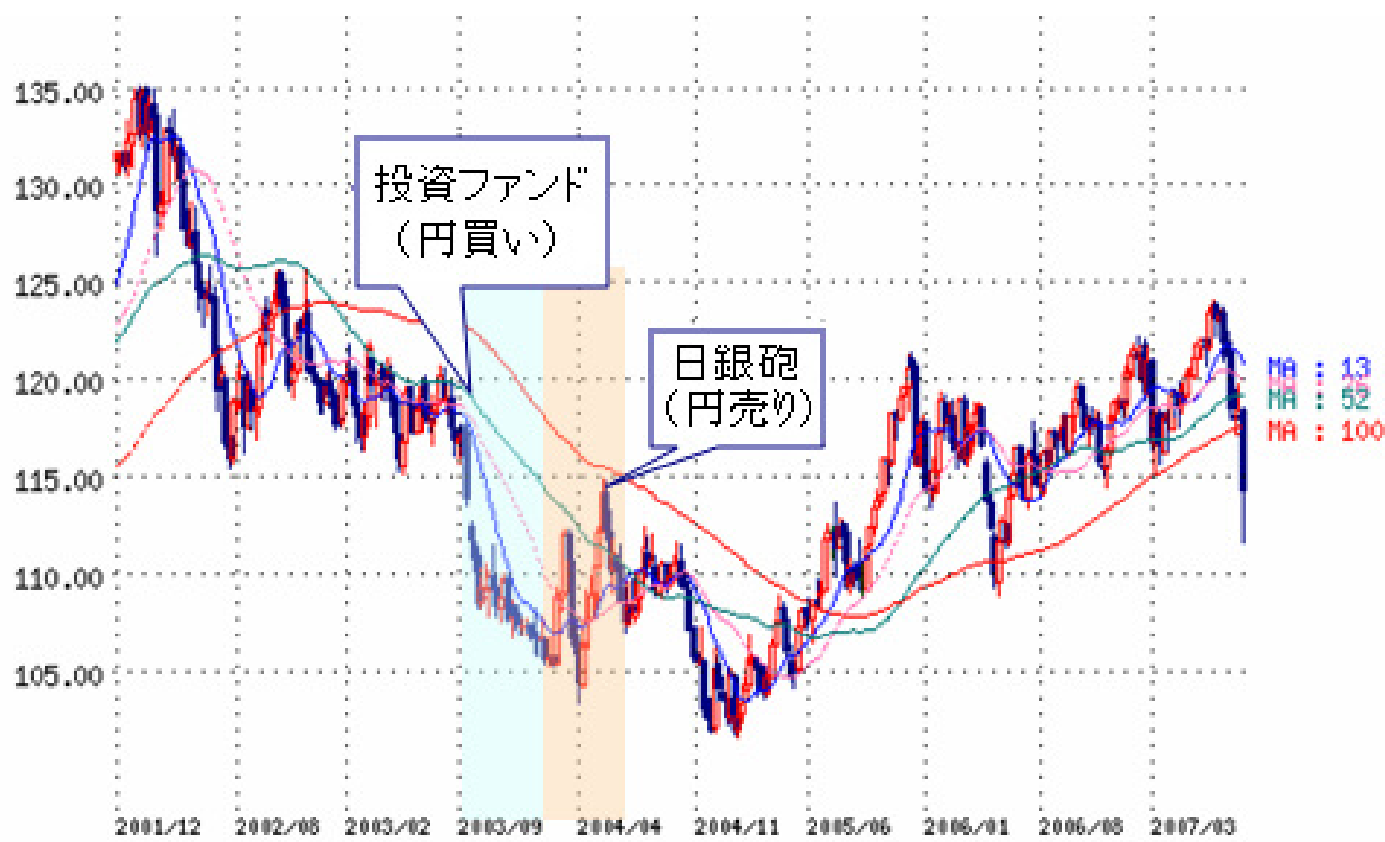
아시아 외환위기

- 1997. 08. 14. 인도네시아 루피아 화 폭락
- 1997. 10. 17. 타이완 외환방어 포기
- 1997. 10. 23. 홍콩 증시 폭락
- 1997. 12. 04. 한국에 대한 대기성차관협약 (Stand-By Arrangement) IMF 이사회 승인; 총 210억달러 승인 (대기성차관 75억 달러, 보완준비금융 135억 달러)

Diamond Fund (1)

- 1990년대 중반 JP Morgan (JPM)은 THB에 USD 1B 투자: JPM은 USD-JPY를 이자율 4%로 차입해서 THB국채를 12%로 매입
- 1995년부터 태국 경제가 급속도로 추락, 1996년에는 경상수지 적자
- THB를 원자산으로 하는 TRS(Total return swap)를 만들어서 THB가치가 떨어져도 이 TRS에서 같은 액수의 돈을 벌게 만듦

Japan 2003, 日銀砲事件 [1]



Finance(Financial) Capitalism

- A form of capitalism where the intermediation of saving to investment becomes a dominant function in the economy
- Wider implications for political process and social evolution
- Since the late 20th century, it has become predominant force in the global economy, whether in neoliberal or other form
- The New Capitalism by M. Wolf, **Financial Times**, Jun 19 2007
- Casino Capitalism by T. Palley (2012)

FIRE economy

- Finance, Insurance, and Real Estate economy
- Financial capital and income – as opposed to industrial capital and income.
- Their products are written on papers, which are easy to make FIRE.
- The FIRE economy made an incredibly big fire of the world economy.

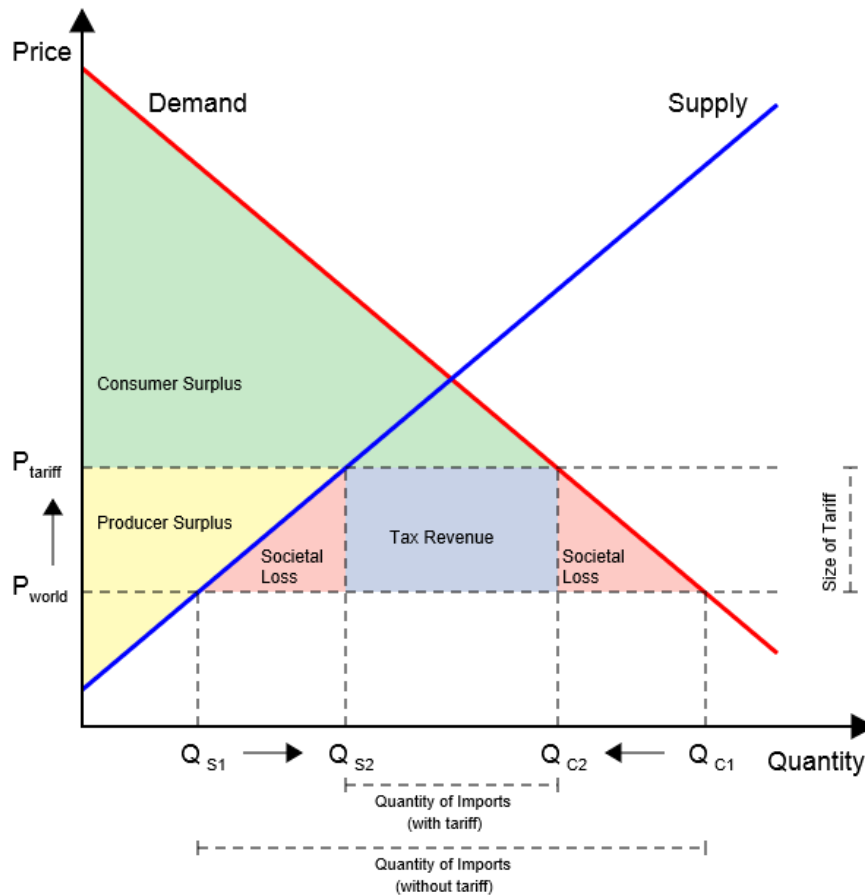
대한민국의 금융

- 2014 World Economic Forum: 대한미국의 금융시장 성숙도는 세계 80위
- 2005년 대한민국 상장기업들의 순이익 69조 원. 주식시장에서 외국인이 80조 원을 가져감.

Washington Consensus 1 (Wiki)

- A set of 10 economic policy prescriptions considered to constitute the "standard" reform package promoted for [crisis-wracked developing countries](#) by Washington, D.C.–based institutions such as IMF, World Bank, and the [US Treasury Department](#).
- The prescriptions encompassed policies in such areas as macroeconomic stabilization, economic opening with respect to both trade and investment, and the expansion of market forces within the domestic economy.

Neoliberalism (Wiki)



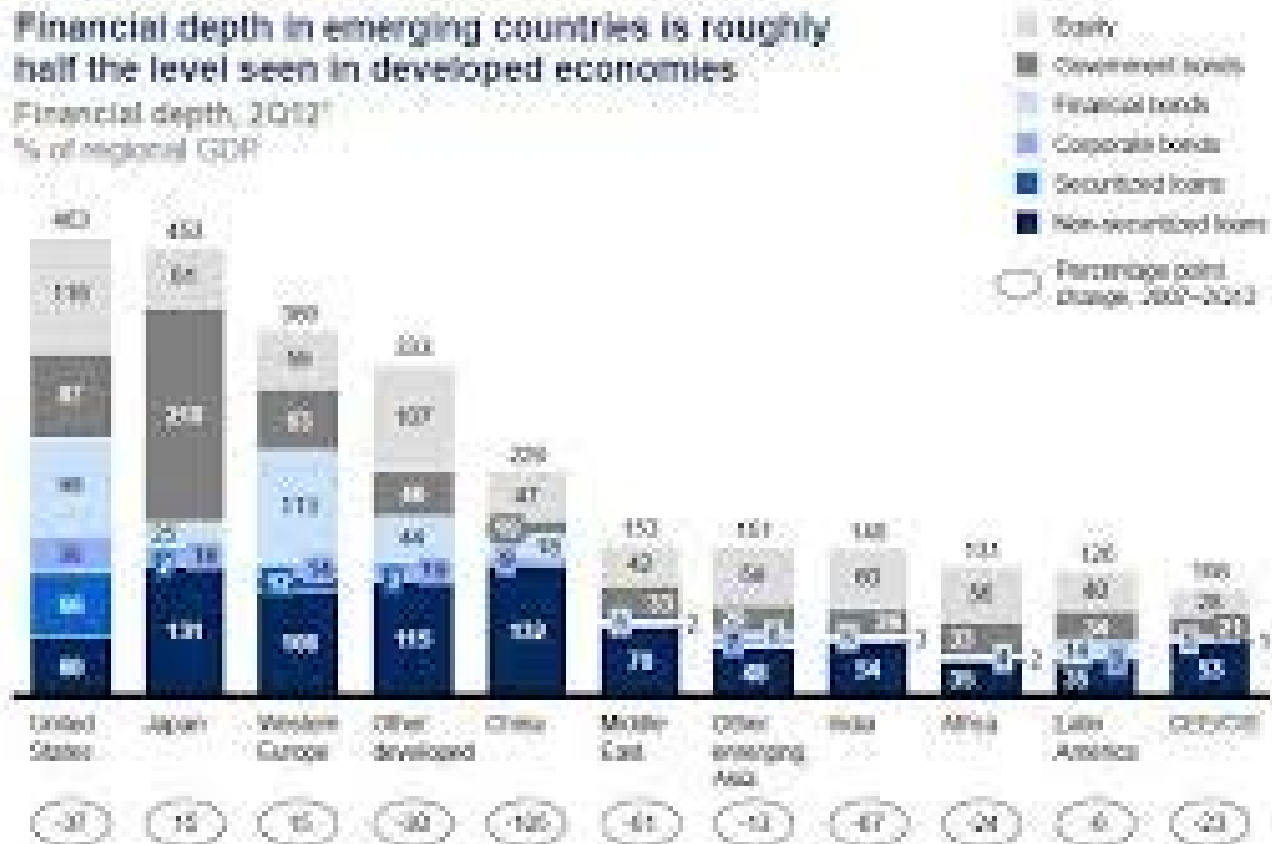
Financial Depth (World Bank)

- Financial depth captures the financial sector relative to the economy.
- It is the size of banks, other financial institutions, and financial markets taken together and compared to a measure of economic output.
- A proxy variable is private credit relative to gross domestic product (GDP).

<http://tomjconley.blogspot.ca/>

Financial depth in emerging countries is roughly half the level seen in developed economies

Financial depth, 2012¹
% of regional GDP



¹ Calculated as total regional debt and equity outstanding divided by regional GDP

SOURCE: McKinsey Global Institute Financial Assets Database; McKinsey Global Institute analysis

McKinsey Global Institute

MAP OF GLOBAL FINANCIAL DEPTH

Value of bank deposits, bonds and equity as a percentage of GDP, 2006



* Log scale.

Source: McKinsey Global Institute Global Financial Stock Database

한국의 자본집적도 (Not %)



출처 : 한국은행, 「자금순환표」, 각 년도; 「국민계정」, 각 년도

Deepening Financial Depth

- Neoliberalism
- 산업자본주의 -> 금융자본주의
- Wealth: 노동자/기업가 -> 투자자/은행
- 상류층(1% 지배층, 9% 부유층: Piketty)에 소득이 집중
- '자본집적도 상승'하는 악순환
- '빈익빈 부익부'의 심화(중산층의 몰락)
- 경제 회복이 안됨

Plutonomy

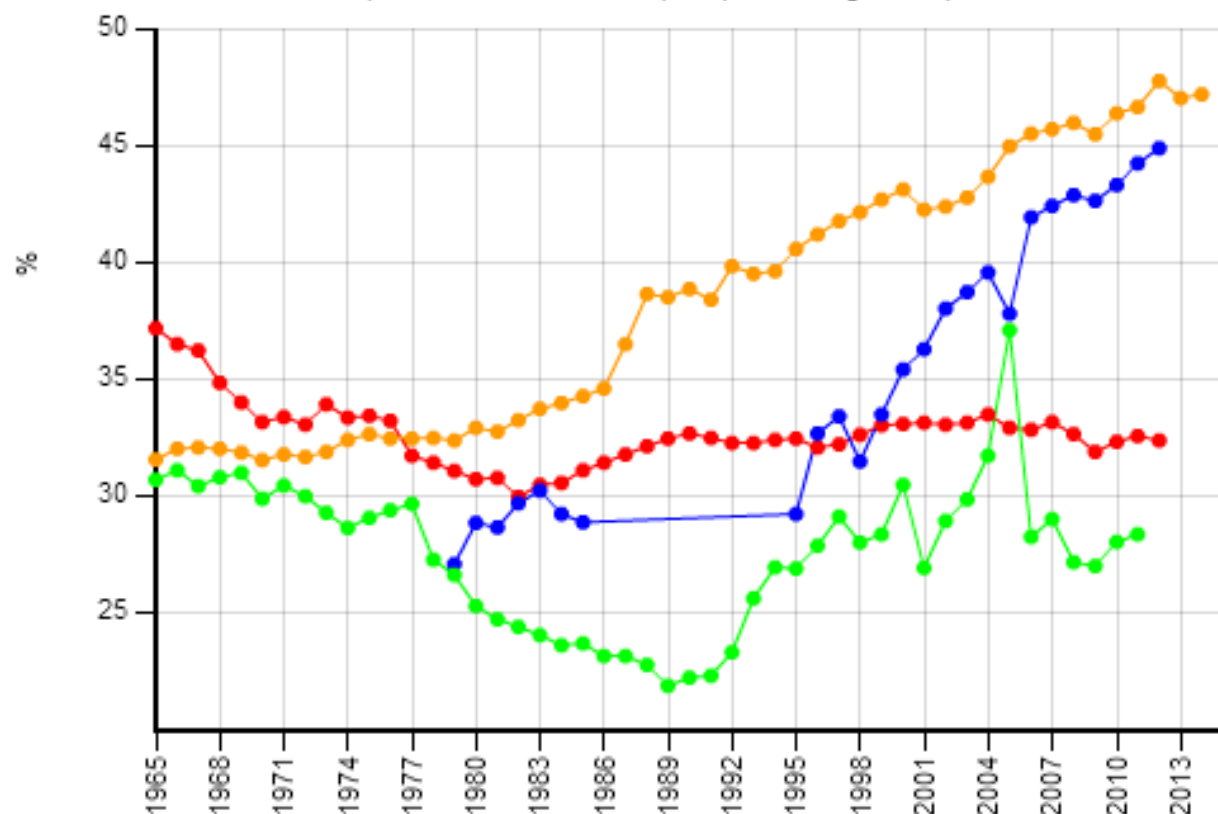
- ploutos (wealth)+nomos (law)
- plutocracy + economy
- Where economic growth is powered by and largely consumed by the wealthy few
- In 3 reports for super-rich Citigroup clients published in 2005 and 2006

Credit Suisse Global Wealth Report 2015

- Wealth inequality has widened in the aftermath of the financial crisis and this year was no exception.
- This year's rise in equity prices and in the size of financial assets pushed up the wealth of some of the richest people.
(Year 2015; Financial wealth is 55%).
- Top 1% of wealth holders own over half of the world's wealth,
- Top 10% do 87.7 percent.

Top income shares. 1965-2014

Sources: The World Top Incomes Database. <http://topincomes.g-mond.parisschoolofeconomics.eu/>



- ✓ Top 10% income share (France)-Piketty (2001, 2007); Landais (2007)
- ✓ Top 10% income share (Korea)-Kim & Kim (2014)
- ✓ Top 10% income share (Norway)-Aaberge & Atkinson (2010); Aaberge, Atkinson & Modalsli (2013)
- ✓ Top 10% income share (United States)-Piketty & Saez (2007)

소득불균형과 경제위기

2016. 7. 29. another way to look at inequality is to consider how much of the national income goes to the top of the distribution here's the share of income for the top 10% in the us over the last century or so.jpg

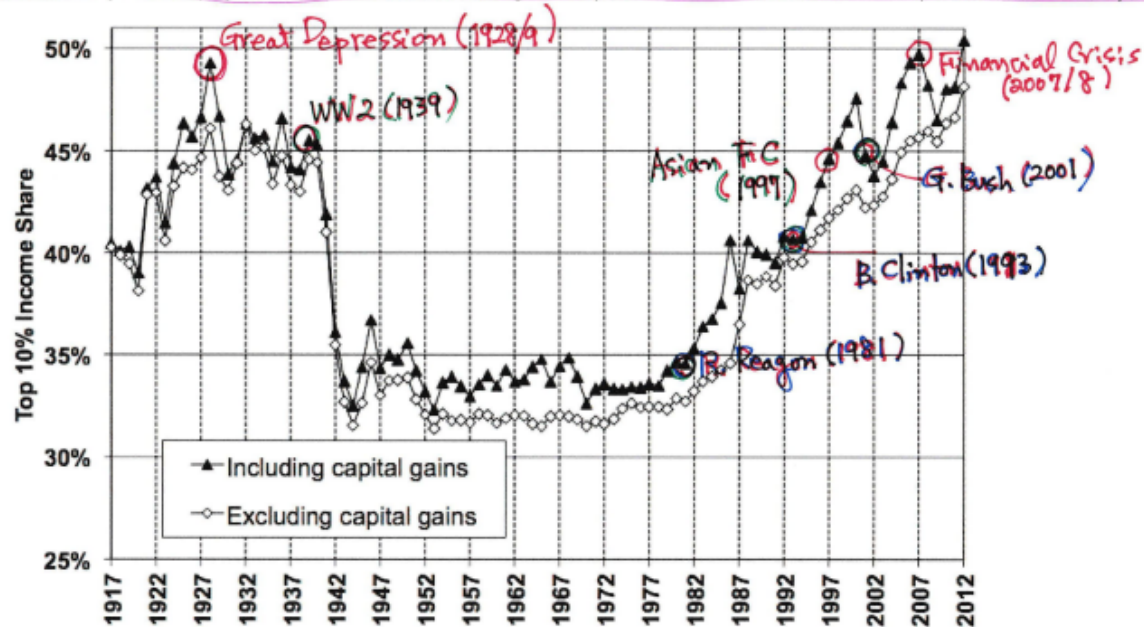


FIGURE 1
The Top Decile Income Share, 1917-2012

<http://static4.uk.businessinsider.com/image/5463c604d0895e9638b45ba-1200/another-way-to-look-at-inequality-is-to-consider-how-much-of-the-national-income-goes-to-the-top-of-the-distribution-here's-the-share->

Deung's Quote: Inequality

"Young leading cadres
have risen up by
helicopter. They should
really rise step by step."

Deng Xiaoping

To travel is to live.

Thanks!