Topic 5

Capitalization: The Architecture of Power

Conservation
- There is no such thing as a free lunch: from taxation to chemistry to value
- Capital: is finance the same as "real capital"?

The *nomos*
- The imperative of capitalist determinism: justify profit, critique exploitation
- How are non-capitalist prices set?
- How are capitalist prices set?

The unit of order
- Categories, forms, numbers
- Price: the capitalist unit of order
- Value theory: why was it born only in the 19th century?
- The breadth and depth of the price system

The pattern of order
- Capitalization: the generative order
- Discounting: future earnings and the discount rate
- Fourteenth century Italy: foreign bills
- Seventeenth century England: domestic bills
- Nineteenth century Germany: forestry
- Early twentieth century America: universal principles
- The 1950s takeoff: capital budgeting and portfolio theory

The capitalization of every thing
- Human capital: the Bernoullian "humanoid"
- The brave new world of emotions an genes: creating and discounting a predictable subject
- Organizations: discounting education and entertainment
- Capitalizing institutions: from the law to organized crime to religion
- Discounting processes: from military assets to the course of war
- The future of humanity: it's all in the discount rate

Capitalization: fiction, mirror or distortion?
- The duality: Hume's classical dichotomy
- The real world: material production and consumption
- The financial mirror: symbolic images and echoes
- Capital goods versus capitalization: the "thing" meets its "idea"
- Marx: a financial fiction converges
- The neoclassicists: a financial mirror distorted

Marx's View
- Why is finance a fiction: no "principal"; putative profit; dependency on the rate interest rate
- The dilemma: finance "distorts" values
- The Ghost in the Machine: crisis brings finance down to earth
- Why is there no Marxist theory of finance?

Irving Fisher's House of Mirrors
- From capital wealth to income services
- From income services to income value
- From income value to capital value
- From capital value to capital wealth
- The two sides of the balance sheet

The quantity of wealth
- The real benchmark: what is finance "equal" to?
- Can material qualities be quantified: the Cambridge Controversy
- Fundamental quantities of physics: mass, distance, time, electrical charge and heat
- Fundamental quantities of economics: utils and socially necessary abstract labour
- Revealed preferences: let prices tell all
- The curse of equilibrium: Can we know it when we see it? Does it ever happen?
- The big cheat: reality is in the mirror, but the mirror is shattered
- With nothing to match, what is there to mismatch?

Microsoft vs. General Motors
- Who is the giant, who is the dwarf?
- Productive capacity and employment
- Equity and total capitalization
- A "technological fix"?

Tobin's Q: adding intangibles
- Market value of equities and bonds versus current cost of fixed assets
- Why is Tobin's Q greater than 1?
- Dark matter and the intangible revolution
- Going in reverse: let the market tell all

Boom and bust: adding irrationality
- Why does Tobin's Q fluctuate?
- When people misbehave: distortions
- The curse of excess: too optimistic, too pessimistic
- Bubbles and fake wealth, crashes and underpriced assets
- Order in the chaos: pro-cyclical irrationality?

The gods must be crazy
- A world turned on its head: capitalists accumulate when capital "decumulates"?
- Force is nothing but its effect: toward a power theory of capital

Capitalization: elementary particles
- The Cowles Commission and the birth of modern finance: science or collective ethos?
- Science: if you are so smart, how come you aren't rich?
- Ethos: the unified ritual and its basic building blocks
- Automaticity vs. power: reactive finance from below, active finance from above

Earnings and hype
- Capitalization and earnings: the long-run and short-run views
- Expectations decomposed: ex-post earnings and hype
- Leveraging hype: passive and active insiders
- Ignoring hype: Kendall's random walk and Fama's efficient market hypothesis
- Smart money: do the experts keep the market efficient?
- IBES and the clueless experts

The normal and the risky
- Uncertainty: how much do you trust your own predictions?
- Decomposing the rate of interest: benchmark and deviation
- The neoclassical constant: the productive normal rate of return and the deviations of "risk"
- The rate of interest in antiquity: power, religion and custom
- The scientific/capitalist backdrop: probability meets statistics
- Probability: Pascal and Ferma and the mathematical laws of bourgeois morality
- Statistics: Graunt, Petty and Halley and the mapping of an ever-changing society
- Delineating the unknown: extracting truth from the distribution of errors
- The new stochastic cosmology: bounding uncertainty, explosive science, social restructuring

Risk and uncertainty
- Daniel Bernoulli: from diminishing marginal utility to risk aversion
- The new calculus of accumulation: from expected earnings to expected utility
- The Bernoullian investor: individual, hedonic and risk averse
- The dubious conversion of qualitative uncertainty to quantitative risk: Hume, Knight and Keynes

CAPM
- Nobel Prizes for the (hetero)*nomos* makers
- Markowitz's framework for institutional investing: risk and diversification
- The Sharpe and Lintner ritual: let excess return tell the risk premium

Risk and power
- Barking up the wrong tree: hedonic, passive, risk-averse individual
- The real thing: power driven, active, risk-shaping capitalist organizations
- Barking up the wrong tree: price volatility
- The real thing: earnings predictability
- The confident rate of interest and the risk coefficient
- Capitalist power: co-shaping earnings growth and earnings volatility
- Capitalist power: "converting" uncertainty to risk
- Bringing risk into accumulation

Formulae

Consider a $1,000 payment due in a year's time (K_{t+1}) and 'discounted' at a 5 per cent rate of interest (r). Its present value (K_t) will be equal of $952.38.

Explanation: suppose the capitalist invests K_t dollars now (the present value of $952.38) in order to get back a year from now K_{t+1} dollars (the future payment of $1,000). The capitalist engages in this transaction because the future payment is bigger than its present value: it comprises the repayment of the original investment *plus* additional earnings ($K_{t+1} = K_t + E_{t+1}$). Since in this case the capitalist knows both the original investment and the future payment, he can compute the rate of return (r):

$$1. \quad r = \frac{E_{t+1}}{K_t} = \frac{K_{t+1} - K_t}{K_t} = \frac{K_{t+1}}{K_t} - 1 = \frac{\$1000}{\$952.38} - 1 = 0.05$$

If we know the future payment and the going rate of interest, we can rearrange the equation to figure out how much the capitalist believes is appropriate to pay for it now, namely the 'present value':

$$2. \quad K_t = \frac{K_{t+1}}{1+r} = \frac{\$1{,}000}{1.05} = \$952.38$$

This expression can be generalized for an earning flow of a constant or varying magnitude (E), paid over n periods and discounted by successive compounding of the rate of interest, such that:

$$3. \quad K_t = \frac{E_{t+1}}{1+r} + \frac{E_{t+2}}{(1+r)^2} + \ldots + \frac{E_{t+n}}{(1+r)^n}$$

If the payments are uniform over time (so $E_{t+1} = E_{t+2} = \ldots = E_{t+n}$), their capitalized value would be:[1]

$$4. \quad K_t = \frac{E}{r} \times \left(1 - \frac{1}{(1+r)^n}\right)$$

If these equal payments continue in perpetuity (so $n \to \infty$), the present value becomes:[2]

$$5. \quad K_t = \frac{E}{r}$$

And if the perpetual payments are expected to grow at a rate of g per period (provided $g<r$), the present value becomes:[3]

$$6. \quad K_t = \frac{E}{r-g}$$

[1] To obtain Equation (4), multiply both sides of Equation (3) by $(1+r)$, subtract the original equation from the new one and rearrange the terms.

[2] When the number of payments (n) grows infinitely large, the expression in the brackets of Equation (4) approaches 1.

[3] To derive Equation (6), assuming $g<r$, substitute $E(1+g)^i$ for E_{t+i} (with $i = 1, 2, 3, \ldots n$) in Equation (3), multiply both sides of the new equation by $(1+r)/(1+g)$, and follow the remaining steps of footnotes 1 and 2.

Universal Discounting: Toward the Capitalization of Everything

"It is evident that not bonds and notes alone, but all securities, *imply* in their price and their expected returns a rate of interest. There is thus an implicit rate of interest in stocks as well as in bonds. . . . It is, to be sure, often difficult to work out this rate definitely, on account of the elusive element of chance; but it has an existence in all capital. . . . It is not because the orchard is worth $20,000 that the annual crop will be worth $1000, but it is because the annual crop is worth $1000 that the orchard will be worth $20,000. The $20,000 is the discounted value of the expected income of $1000 per annum; and in the process of discounting, a rate of interest of 5 per cent. is implied."

> (Fisher, Irving. 1907. *The Rate of Interest. Its Nature, Determination and Relation to Economic Phenomena.* New York: The Macmillan Company, pp. 10-11, 13, original emphasis)

Universal Discounting: Since the Dawn of Time

"The primitive economy in its choice of enjoyable goods of different epochs of maturity, in its wars for the possession of hunting grounds and pastures, in its slow accumulation of a store of valuable durable tools, weapons, houses, boats, ornaments, flocks and herds, first appropriated from nature, and then carefully guarded and added to by patient effort – in all this and in much else the primitive economy, even though it were quite patriarchal and communistic, without money, without formal trade, without definite arithmetic calculations, was nevertheless *capitalizing,* and therefore embodying in its economic environment a rate of premium and discount as between present and future."

> (Fetter, Frank Albert. 1914. Interest Theories, Old and New. *American Economic Review*, Vol. 4, No. 1, March, p. 77, original emphasis)

The Bernoullian Humanoid

"There is then nobody who can be said to possess nothing at all in this sense unless he starves to death. For the great majority the most valuable portion of their possessions so defined will consist in their productive capacity, this term being taken to include even the beggar's talent: a man who is able to acquire ten ducats yearly by begging will scarcely be willing to accept a sum of fifty ducats on condition that he henceforth refrain from begging or otherwise trying to earn money. For he would have to live on this amount, and after he had spent it his existence must also come to an end. I doubt whether even those who do not possess a farthing and are burdened with financial obligations would be willing to free themselves of their debts or even to accept a still greater gift on such a condition. But if the beggar were to refuse such a contract unless immediately paid no less than one hundred ducats and the man pressed by creditors similarly demanded one thousand ducats, we might say that the former is possessed of wealth worth one hundred, and the latter of one thousand ducats, though in common parlance the former owns nothing and the latter less than nothing."

> (Bernoulli, Daniel. 1738. [1955]. Exposition of a New Theory on the Measurement of Risk. [Originally published in Latin in 1738 as 'Specimen Theoiae Novae de Mesura Sortis']. Translated by Louise Sommer. *Econometrica*, Vol. 22, No. 1, January, p. 25)

Table 1: "Military Assets"?

Fixed Asset Table

Table 7.2B. Chain-Type Quantity Indexes for Net Stock of Government Fixed Assets

[Index numbers, 2005=100]

Today is: 10/17/2009 Last Revised on October 01, 2009

Data Table Options | Tools Options

First Year: 1997-A | Last Year: 2008-A | Series: Annual(A) Quarterly(Q) Monthly(M) | Get all years | Update

HTML Locking Stubs (Enables graph and chart generation) What is that?

Line		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	**Government fixed assets** [1]	**85.646**	**87.102**	**88.783**	**90.507**	**92.300**	**94.321**	**96.360**	**98.269**	**100.000**	**101.915**	**103.857**	**105.887**
2	Equipment and software	89.742	90.171	91.259	92.144	92.805	94.145	95.647	97.005	100.000	103.514	106.703	111.006
3	Structures	85.057	86.667	88.434	90.276	92.222	94.331	96.440	98.416	100.000	101.741	103.554	105.345
4	Residential	90.137	91.532	92.883	93.934	95.203	96.551	97.849	99.044	100.000	100.461	101.118	101.723
5	Industrial [2]	119.426	116.497	113.612	110.867	108.405	105.839	104.143	102.118	100.000	97.912	95.605	93.563
6	Office	78.087	80.626	83.284	85.885	88.056	91.388	94.621	97.695	100.000	101.747	104.071	106.567
7	Commercial	87.801	92.466	97.155	97.011	96.994	98.339	99.652	100.274	100.000	101.651	104.397	107.778
8	Health care	92.423	93.634	94.465	95.161	95.876	97.085	98.111	99.086	100.000	100.654	101.615	102.531
9	Educational	75.347	77.679	80.429	83.409	86.729	90.166	93.616	96.997	100.000	103.424	106.947	110.522
10	Public safety	85.822	88.793	91.606	94.086	96.058	97.843	98.917	99.708	100.000	100.183	100.845	101.614
11	Amusement and recreation	79.879	82.263	84.698	87.657	90.712	93.640	96.085	98.162	100.000	101.237	102.931	104.652
12	Transportation	74.020	76.321	78.926	82.437	85.751	89.762	93.796	97.415	100.000	101.648	103.307	104.840
13	Power	91.371	91.320	91.724	92.461	93.228	94.129	96.733	98.470	100.000	102.242	105.518	108.154
14	Highways and streets	86.669	88.207	89.912	91.678	93.665	95.472	97.153	98.775	100.000	101.400	102.533	103.591
15	Military facilities [3]	105.054	104.509	103.826	103.132	102.321	101.656	101.177	100.677	100.000	99.481	99.403	99.748
16	Conservation and development	94.484	95.074	95.841	96.879	97.807	98.569	98.993	99.671	100.000	100.583	100.998	101.553
17	Other structures [4]	86.117	87.622	89.164	90.547	92.179	94.121	96.205	98.179	100.000	102.941	105.875	108.481
18	**Federal**	**100.419**	**99.963**	**99.719**	**99.202**	**98.651**	**98.699**	**98.949**	**99.477**	**100.000**	**100.760**	**101.533**	**103.054**
19	**National defense**	**104.977**	**103.306**	**101.925**	**100.645**	**99.464**	**99.058**	**99.038**	**99.510**	**100.000**	**100.717**	**101.574**	**103.399**
20	Equipment and software	103.681	100.956	98.957	97.181	95.637	95.649	96.192	97.961	100.000	102.527	105.029	109.293
21	Aircraft	114.722	109.634	105.788	102.954	100.146	98.795	97.230	97.524	100.000	101.985	102.815	104.070
22	Missiles	147.029	139.349	131.369	123.425	116.716	111.577	105.705	102.802	100.000	98.491	96.622	94.650
23	Ships	108.522	105.864	103.788	101.584	100.109	99.999	100.498	100.583	100.000	99.349	98.243	97.193
24	Vehicles	99.630	95.435	92.401	90.457	89.148	91.100	93.985	94.927	100.000	108.686	120.179	141.307
25	Electronics and software	79.974	80.336	81.901	83.325	83.762	85.141	88.046	93.014	100.000	109.547	122.707	144.320
26	Other equipment	81.272	81.483	82.387	83.177	83.885	86.334	90.073	95.749	100.000	105.064	110.584	118.974
27	Structures	105.701	105.044	104.250	103.428	102.569	101.805	101.310	100.718	100.000	99.374	99.041	99.027
28	Buildings	107.345	106.396	105.320	104.169	103.187	102.174	101.637	100.818	100.000	99.104	98.112	97.159
29	Residential	98.380	98.937	99.233	99.285	99.410	99.540	99.839	99.883	100.000	99.982	100.012	99.923
30	Industrial	119.426	116.497	113.612	110.867	108.405	105.839	104.143	102.118	100.000	97.912	95.605	93.563
31	Military facilities [3]	105.054	104.509	103.826	103.132	102.321	101.656	101.177	100.677	100.000	99.481	99.403	99.748

SOURCE:
http://www.bea.gov/national/FA2004/TableView.asp?SelectedTable=31&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1997&LastYear=2008&3Place=N&Update=Update&JavaBox=no#Mid

The Future of Humanity: It's all in the Discount Rate

What is the present value of $1,000 of environment damage, incurred 100 years from now?

7. $$K_t = \frac{E_{t+n}}{(1+r)^n}$$

Using a discount rate of 1.4%:

8. $$\$249 = \frac{E_{t+n}}{(1+r)^n} = \frac{\$1{,}000}{(1.014)^{100}} = \frac{\$1{,}000}{4.016}$$

Using a discount rate of 6%:

9. $$\$3 = \frac{E_{t+n}}{(1+r)^n} = \frac{\$1{,}000}{(1.06)^{100}} = \frac{\$1{,}000}{339.3}$$

Figure 1
The Classical Dichotomy: Real and the Financial

Economist.com **FINANCE & ECONOMICS**

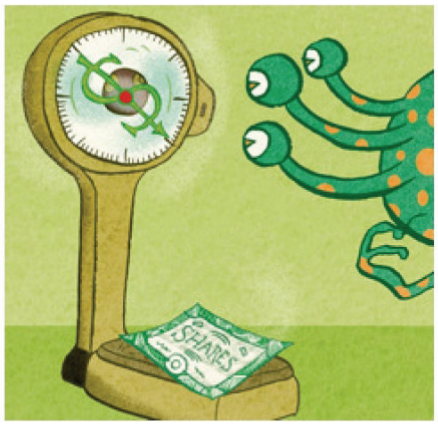
Buttonwood

The nature of wealth

Oct 8th 2009
From The Economist print edition

The world confused financial assets with real ones

Illustration by S. Kambayashi



AT THE heart of the current crisis is a fundamental confusion about the nature of wealth. Think about it from the perspective of a Martian. Were an extraterrestrial to be shown a room full of gold ingots, a stack of twenty-dollar bills or a row of numbers on a computer screen, he might be puzzled as to their function. Our reverence for these objects might seem as bizarre to him as the behaviour of the male bowerbird (which decorates its nest with shiny objects to attract a mate) seems to us.

Wealth consists of the goods and products we wish to consume or of things (factories, machinery, an educated workforce) that give us the ability to produce more such goods and services. Financial assets arise from the desire to postpone consumption so that money can be saved, either for precautionary reasons or to invest so that more goods and services can be consumed in the future.

Looked at in that way, financial assets are not "wealth" but a claim on real wealth. If those claims multiply or rise in price, that does not mean aggregate wealth has increased. If a pizza is cut into eight instead of four slices, there is no more food to eat. If everyone sitting at the table is given shares in the pizza and the share price rises from $1 to $2, the meal will still be no bigger.

Divergence: Fictitious Capital Unleashed

"All connection with the actual process of self expansion of capital is thus lost to the last vestige, and the conception of capital as something which expands itself automatically is thereby strengthened. . . . The accumulation of the wealth of this class [the large moneyed capitalists] may proceed in a direction very different from actual accumulation. . . . Moreover, everything appears turned upside down here, since no real prices and their real basis appear in this paper world, but only bullion, metal coin, notes, bills of exchange, securities. Particularly in the centers, in which the whole money business of the country is crowded together, like London, this reversion becomes apparent; *the entire process becomes unintelligible*."

> (Marx, Karl. 1894. *Capital. A Critique of Political Economy. Vol. 3: The Process of Capitalist Production as a Whole*. Edited by Friedrick Engels. New York: International Publisher, pp. 549, 561, 576)

Convergence: Fictitious Capital Tamed

"In order for the price system to work, financial forces should cause fictitious capitals to move in directions that parallel changes in reproduction values. . . . By losing any relationship to the underlying system of values, strains eventually build up in the sphere of production until a crisis is required to bring the system back into a balance, whereby prices reflect the real cost of production. The fiction of fictitious value cannot be maintained indefinitely. At some unknown time in the future, prices will have to return to a rough conformity with values. . . ."

> (Perelman, Michael. 1990. The Phenomenology of Constant Capital and Fictitious Capital. *Review of Radical Political Economics*, Vol. 22, Nos. 2-3, p. 83)

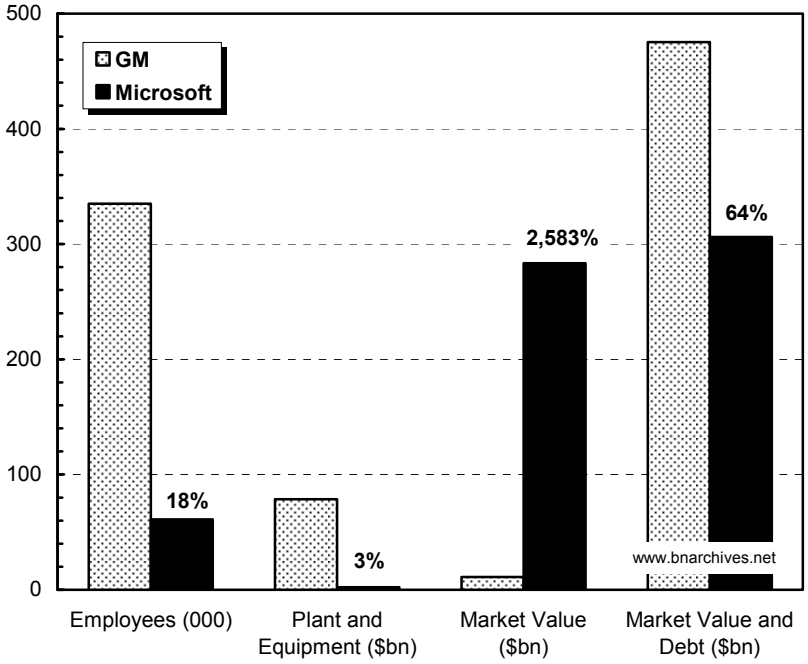
Table 2
Irving Fisher's House of Mirrors

	PRESENT CAPITAL		FUTURE INCOME
QUANTITIES (REAL)	*capital wealth*	❶ →	*income services*
			↓ ❷
VALUES (FINANCIAL)	*capital value*	← ❸	*income value*

"The statement that 'capital produces income' is true only in the physical sense; it is not true in the value sense. That is to say, *capital-value does not produce income-value.* On the contrary, income-value produces capital-value. . . . [W]hen capital and income are measured in *value,* their causal connection is the reverse of that which holds true when they are measured in *quantity.* The orchard produces the apples; but the value of the apples produces the value of the orchard. . . . We see, then, that present capital-*wealth* produces future income-*services,* but future income-*value* produces present capital-*value*".

(Irving Fisher, *The Rate of Interest*, 1907, NY: The Macmillan Company, pp. 13-14, original emphases)

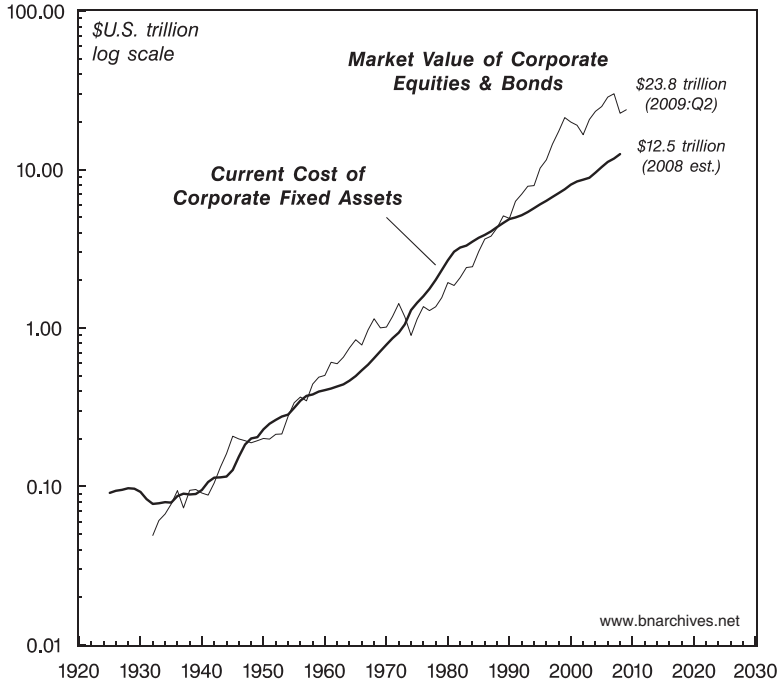
Figure 2
General Motors *versus* Microsoft, 2005



NOTE: The per cent figures indicate, for any given measure, the size of Microsoft relative to GM.

SOURCE: Compustat through WRDS (series codes: data29 for employees; data8 for net plant and equipment; data24 for price; data54 for common shares outstanding; data 181 for total liabilities).

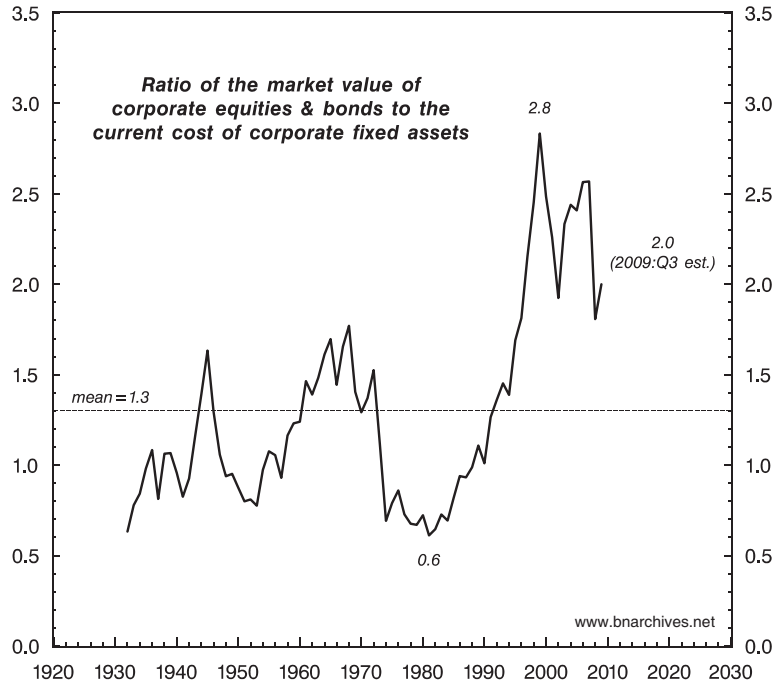
Figure 3
The "Quantity" of U.S. Capital



NOTE: The market value of equities and bonds is net of foreign holdings by U.S. residents.

SOURCE: U.S. Bureau of Economic Analysis through Global Insight (series codes: FAPNREZ for current cost of corporate fixed assets). The market value of corporate equities & bonds splices series from the following two sources. 1932-1951: Global Financial Data (market value of corporate stocks and market value of bonds on the NYSE). 1952-2007: Federal Reserve Board through Global Insight (series codes: FL893064105 for market value of corporate equities; FL263164003 for market value of foreign equities held by U.S. residents; FL893163005 for market value of corporate and foreign bonds; FL263163003 for market value of foreign bonds held by U.S. residents).

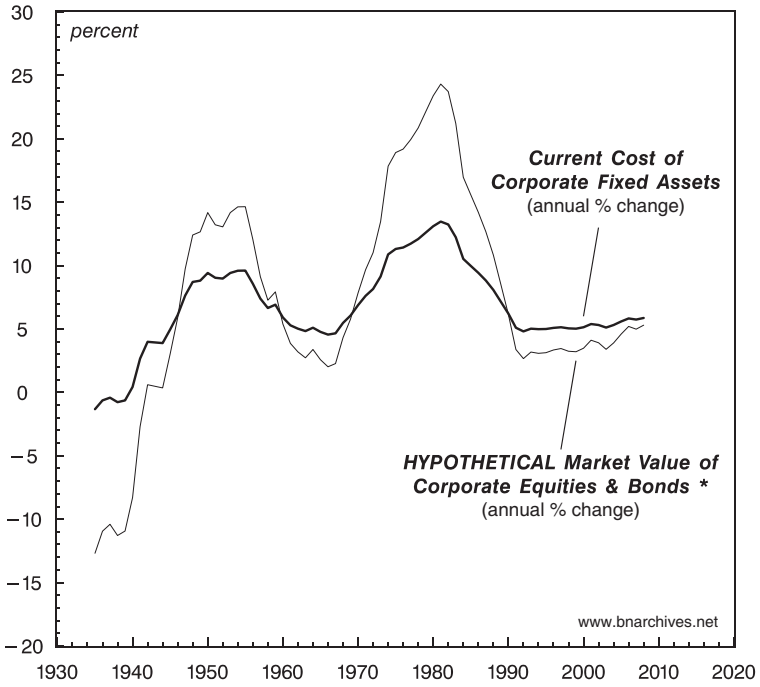
Figure 4
***Tobin's Q* in the United States**



NOTE: The market value of equities and bonds is net of foreign holdings by U.S. residents. The 2009 estimate is based on extrapolating the underlying series. The last data point for the market value of corporate equities and bonds is for 2009:Q2. The extrapolation assumes that during 2009:Q3 the market value of equities rose by 20% and that the value of bonds remained unchanged. The last data point for the current cost of corporate fixed assets is for 2008. The extrapolation assumes that over the next nine months (by 2009:Q3) this cost rose by 4.5% – an increase equivalent to the average nine-month growth rate during the previous ten years.

SOURCE: See Figure 3.

Figure 5
The World According to the Scriptures

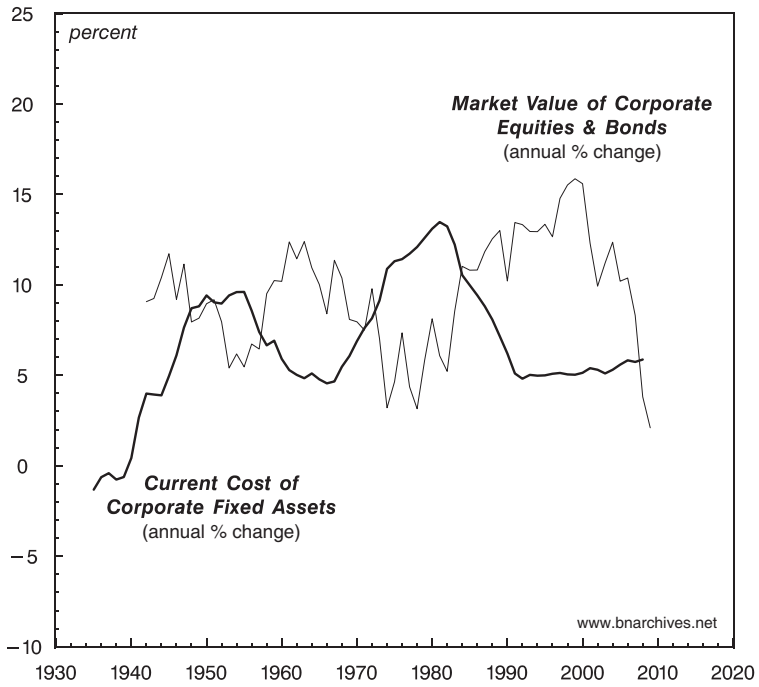


* Computed annually by adding to the historical average of the growth rate of current corporate fixed assets 2.5 times the deviation of the annual growth rate from its historical average.

NOTE: Series are smoothed as 10-year moving averages. The last data points are for 2008.

SOURCE: U.S. Bureau of Economic Analysis through Global Insight (series codes: FAPNREZ for current cost of corporate fixed assets).

Figure 7
U.S. Capital Accumulation: Fiction vs. Reality



NOTE: The market value of equities and bonds is net of foreign holdings by U.S. residents. Series are shown as 10-year moving averages. The last data points are 2009:Q2 for the market value of corporate equities and bonds, and 2008 for the current cost of corporate fixed assets.

SOURCE: See Figure 4.

10. $K_t = \frac{E}{r}$

11. $P_t = \frac{EPS}{r}$

Figure 8
S&P 500: Price and Earnings Per Share

NOTE: The S&P 500 index splices the following three series: the Cowles/Standard and Poor's Composite (1871-1925); the 90-stock Composite (1926-1957); and the S&P 500 (1957-present). Earnings per share are computed as the ratio of price to price/earnings.

SOURCE: Global Financial Data (series codes: _SPXD for price; SPPECOMW for price/earnings); Standard and Poor's through Global Insight (series codes: JS&PC500 for price; PEC500 for price/earnings).

"Fictitiousness"

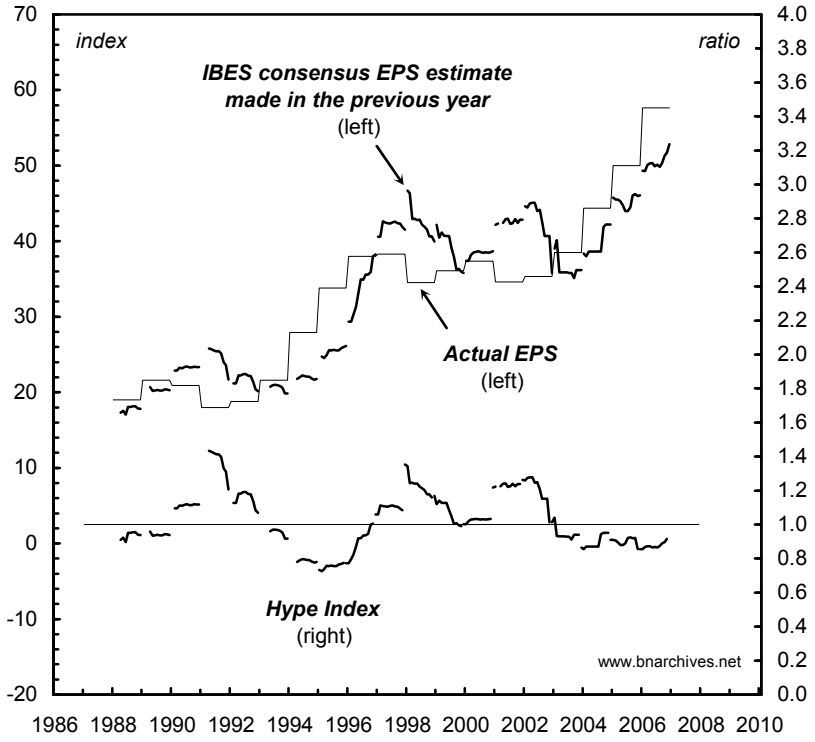
". . . professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitions, all of whom are looking at the problem from the same point of view. . . . We have reached the third degree where we devote our intelligence to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees."

(Keynes, John Maynard. 1936. *The General Theory of Employment Interest and Money.* New York: Harcourt, Brace and Company, p. 156)

12. $K_t = \frac{EE}{r} = \frac{E \times H}{r}$

13. $P_t = \frac{EEPS}{r} = \frac{EPS \times H}{r}$

Figure 9
S&P 500: Earnings, Earning Estimates and Hype



NOTE: EPS denotes earnings per share. The Hype Index is the ratio between the consensus EPS estimate and the actual EPS.

SOURCE: IBES through WRDS.

Which Corporation to Buy: Using the Probability of Expected *Earnings*

Civlisoft (more volatile): 50% chance of $50mn and 50% chance of $150mn

14. $\$100mn = \$50mn \times 0.5 + 150mn \times 0.5$

Weaponsoft (less volatile): 100% chance of $100mn

15. $\$100mn = \$100mn \times 1.0$

Which Corporation to Buy: Using the Probability of Expected *Utility*

Diminishing Utility Schedule

Marginal Earnings ($mn)	Total Earnings ($mn)	Marginal Utility	Total Utility
50	50	3,000	3,000
50	100	2,000	5,000
50	150	1,000	6,000

Civlisoft (more volatile): 50% chance of $50mn and 50% chance of $150mn

16. $4{,}500\ utils = utility\ of\ \$50mn \times 0.5 + utility\ of\ \$150mn \times 0.5 = 3{,}000\ utils \times 0.5 + 6{,}000\ utils \times \$0.5$

Weaponsoft (less volatile): 100% chance of $100mn

17. $5{,}000\ utils = utility\ of\ \$100mn \times 1.0 = 5{,}000\ utils \times 1.0$

Capitalization Unzipped

18. $K_t = \frac{EE}{r} = \frac{E \times H}{r_c \times \delta}$

With r_c being the "confident rate of return" and δ being the "risk coefficient" that inversely expresses the "degree of confidence" capitalists have in their earnings estimates (with δ rising as confident declines).