Some Things Economists Know That Just Aren't So*

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It Isn’t Ignorance So Much That Hurts Us. It’s The Things We Know That Just Aren’t So.

Will Rogers

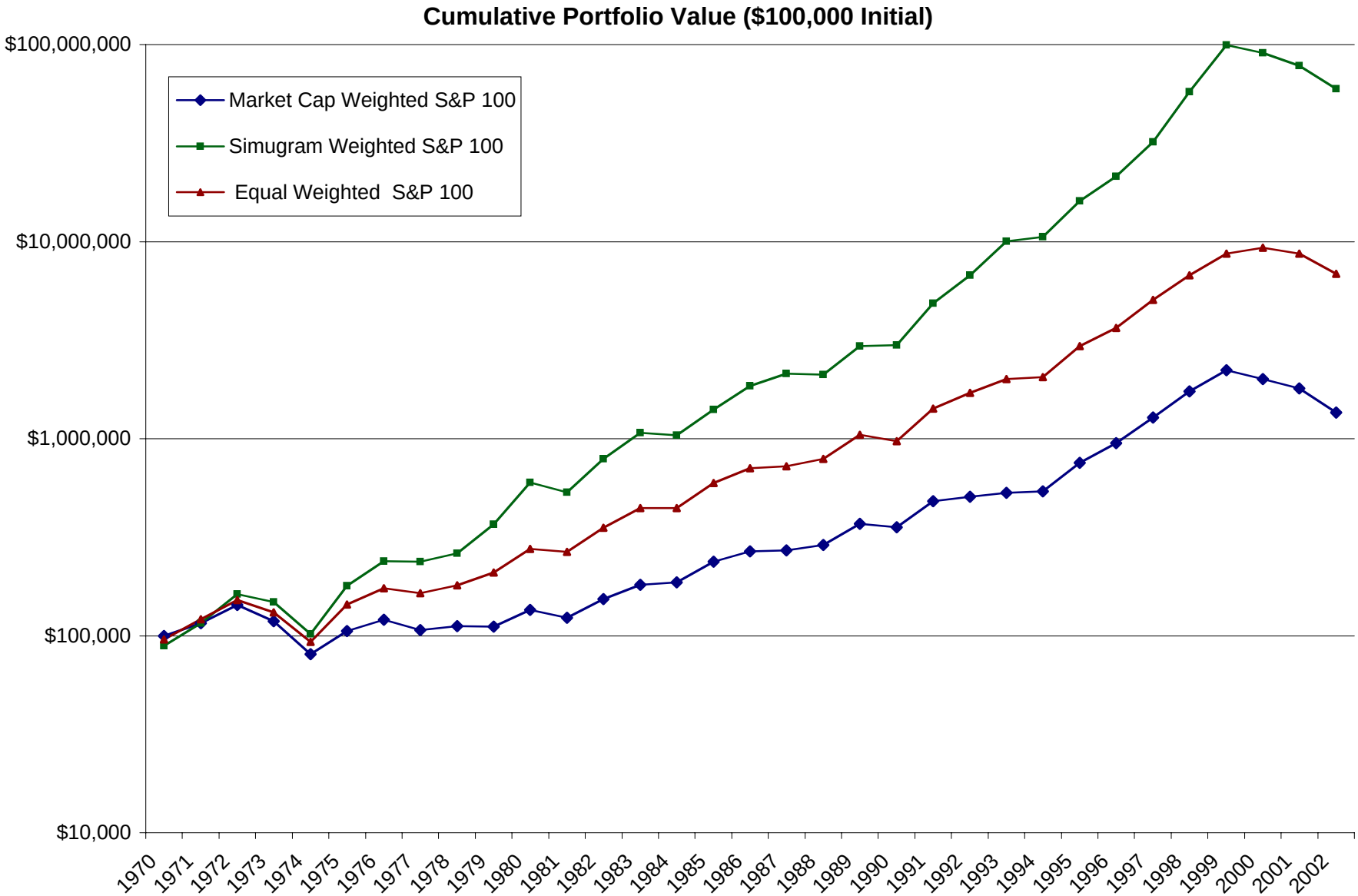
Be most slow to believe what you most want to be true.
Samuel Pepys

Bad News

- Many of the basic models of contemporary computational finance are inconsistent with real world data.
- We do not at present have alternative models to replace these flawed models.

Good News

- In the absence of models there is much that can be done with empirical data based techniques.
- We can, over time, develop models that do work.


Cumulative Portfolio Value ($100,000 Initial)
$100,000,000
$10,000,000
$1,000,000
$100,000
$10,000
Market Cap Weighted S&P 100
Simugram Weighted S&P 100
Equal Weighted S&P 100
1970
1971
1972
1973
1974
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1976
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2002

Goals

- To subject some of the accepted models of finance to concordance with real data.
- To come up with practical means for dealing with risk.
- To estimate the long-term aggregate risk of a portfolio strategy, taking into account the history of the securities considered.
- To obtain useful means for portfolio selection. This amounts to solving empirically an ill-posed problem.

Some Lessons From The Bad Old Days

Marxian Memories

Antonio Gramsci: Indeed in politics the assumption of the law of statistics as an essential law operating of necessity is not only a scientific error, but becomes a practical error of action.

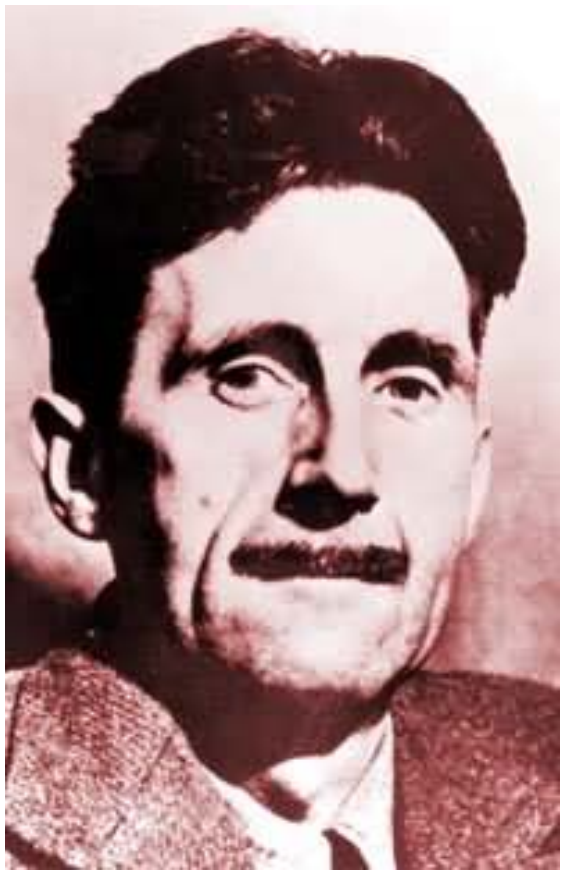
What is more it favors mental laziness and superficiality …

The situationing of the problem as a search for laws and for constant, regular and uniform lines is connected to a need, conceived in a somewhat puerile and ingenuous way, to resolve in preemptory fashion the practical problem of the predictability of historical events...

Georg Lukács

“If theory does not conform to the facts,then so much the worse for the facts.”

George Orwell



O’Brien to Winston Smith

- “The law of gravity is preposterous. No such law exists. If I think I float and you think I float, then it happens.”
- “If you want a picture of the future, Winston, think of a boot stepping onto a man’s face forever.”

Freedom is the freedom to say that two plus two equal four. Given that, all else follows.

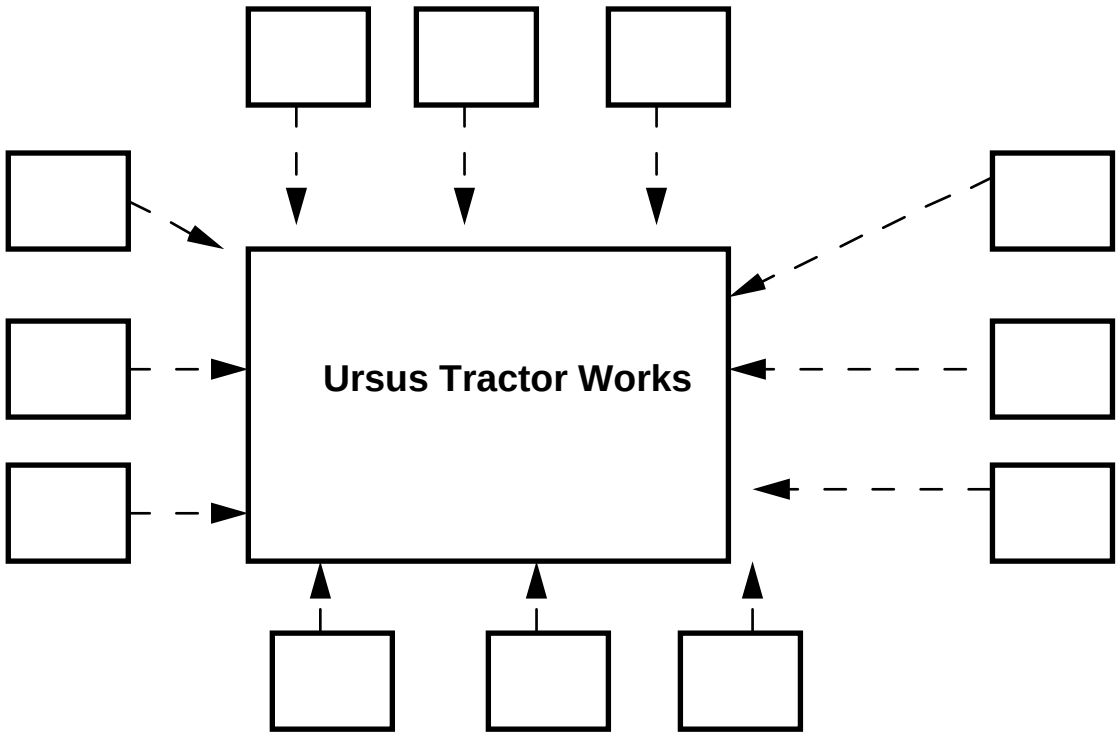
If there is hope, it lies with the proles.

Mikail Ostatny

Fall of Communism June 4, 1989

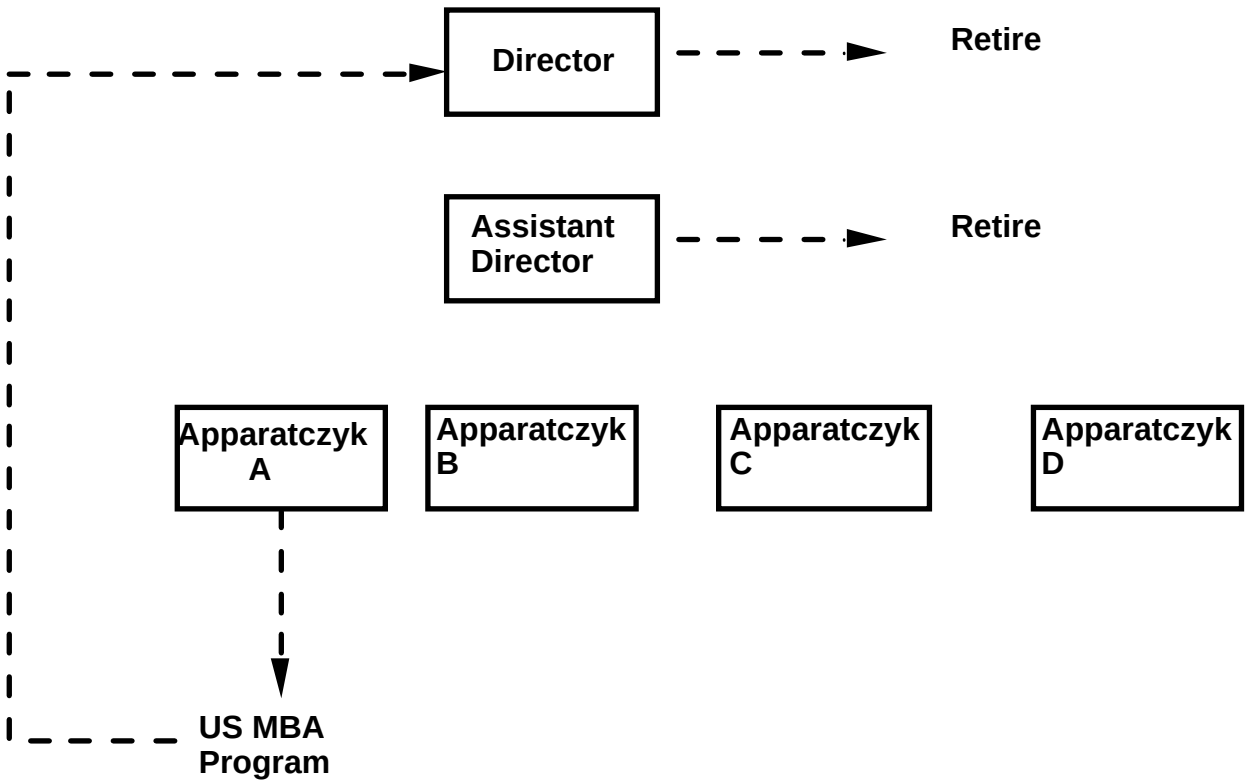
A Poison Pill for Ursus

Marxist Poison Pill (#613)

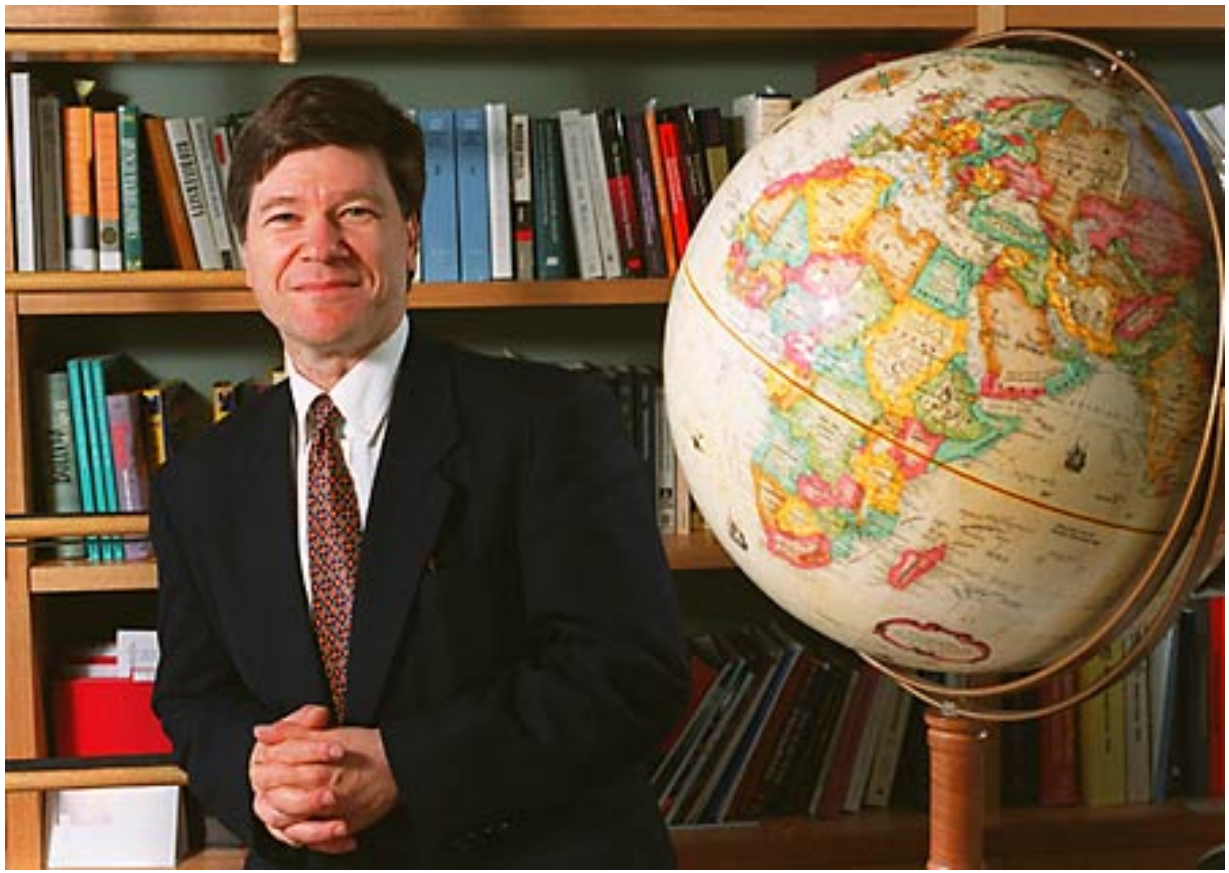


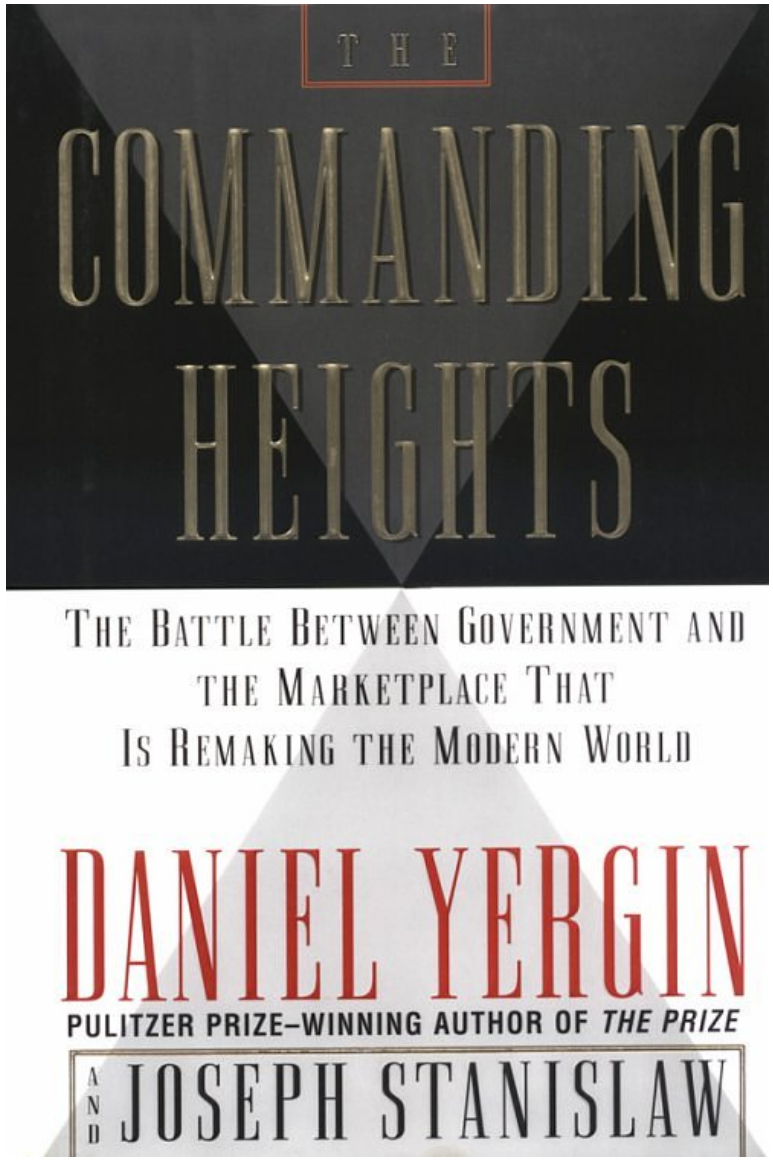
“Help from the USA”

Reorganization of "Elites" Recommended By USA and World Bank "Experts"



Jeffrey Sachs Capitalism Cold Turkey




THE
COMMANDING
HEIGHTS
THE BATTLE BETWEEN GOVERNMENT AND
THE MARKETPLACE THAT
IS REMAKING THE MODERN WORLD
DANIEL YERGIN
PULITZER PRIZE–WINNING AUTHOR OF THE PRIZE
AND JOSEPH STANISLAW

Marxism Makes for Simplicity In Economic Modeling

So Does The Efficient Market Hypothesis

- Martingales abound
- Pricing of options becomes simply another application of the heat equation
- Data analysis is unnecessary, since we know our models are correct, facts notwithstanding

The View In This Paper

The Models Being Flawed, We Need To Turn To The Empiricism of Exploratory Data Analysis

Tukey's Maxim

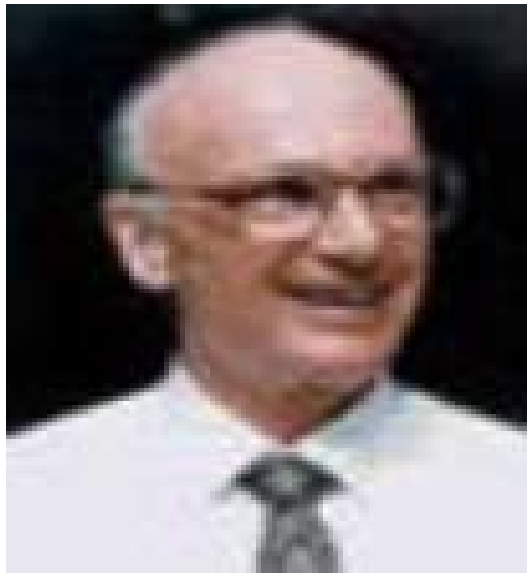
Far better an approximate answer to the right question, which is often vague,than an exact answer to the wrong question,which can always be made precise.

John Maynard Keynes

The market can remain irrational longer than you can remain solvent

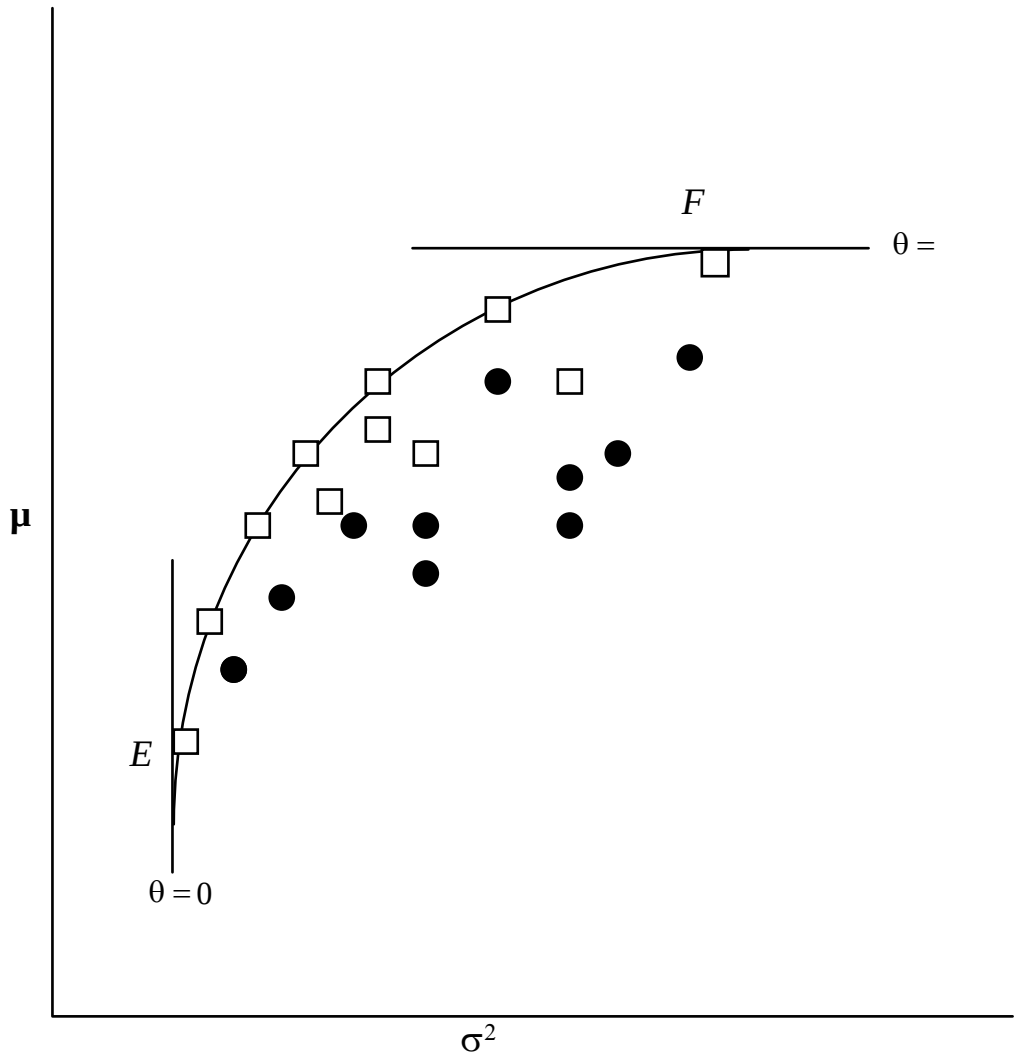
Some Famous Flawed Models

Harry Markowitz



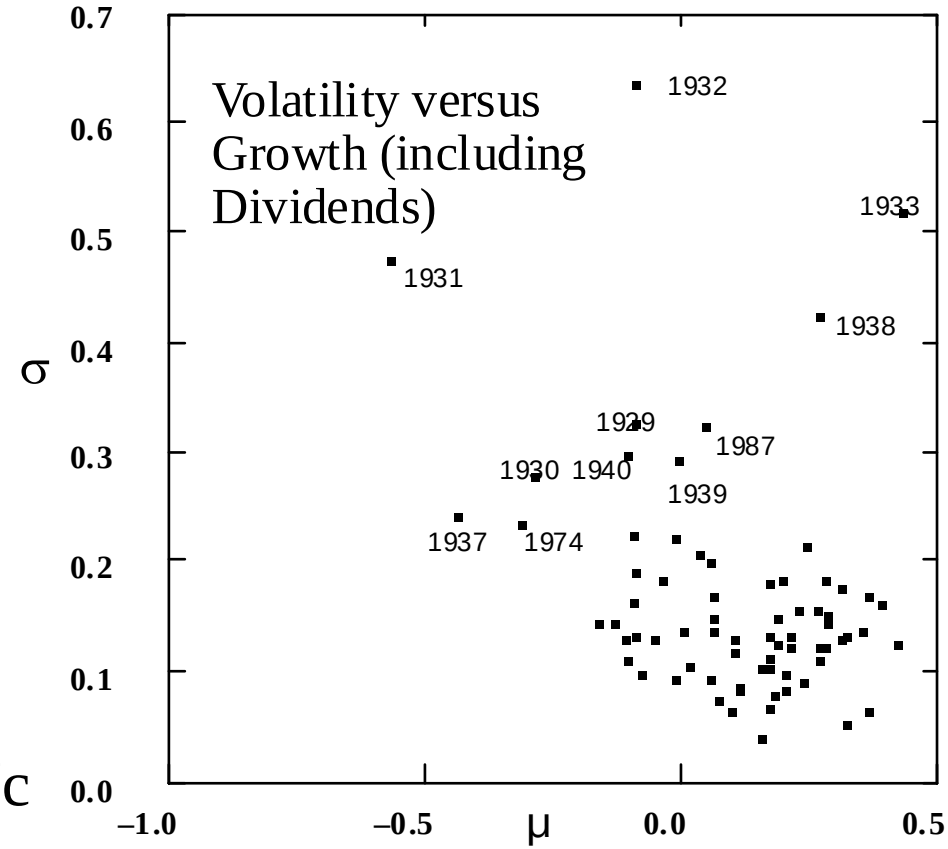
Fifty years ago, Harry Markowitz posed and solved the following problem:

Given a set of n stocks and a capital to be invested of C, what is the allocation of capital which maximizes the expected return, at a future time t, of the portfolio P(t) for an acceptable volatility of the total portfolio $\sigma(t)$?


F
θ =
μ
E
θ = 0
σ²

For this contribution, Markowitz received the Nobel Prize. His result is the foundation of portfolio analysis. However, it is flawed. “Volatility” is the square root of the variance of the value of the portfolio. It is a poor surrogate for risk. The concept of risk is a hard one to grasp. Laurence Siegel, treasurer of the Ford Foundation, defines risk rather forcefully, if imprecisely:

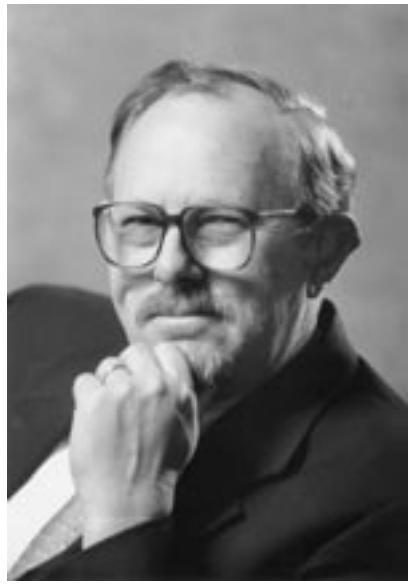
… risk is the possibility that, in the long run, stock returns will be terrible.

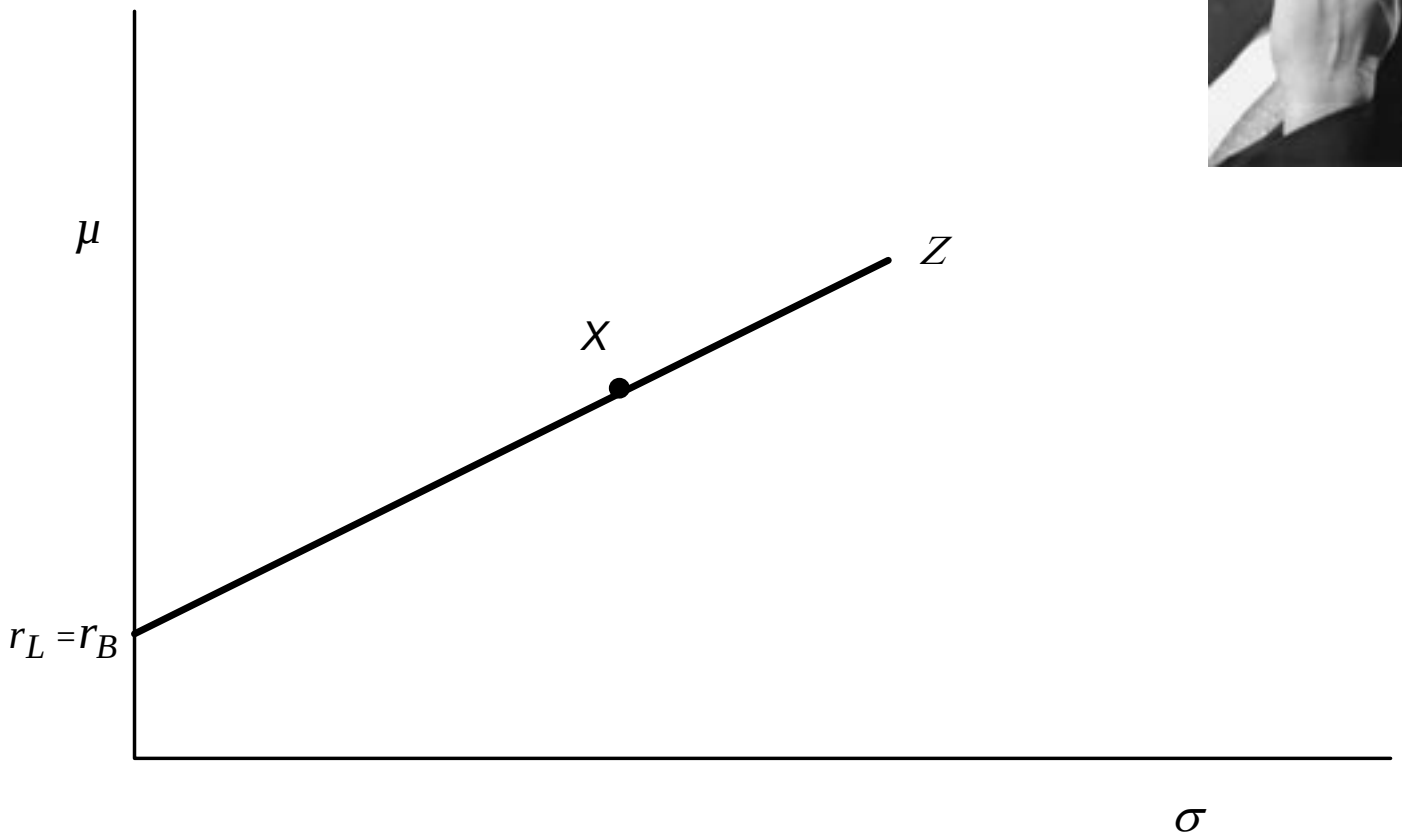


ρ=–.317c

Cover of *Models for Investors in Real World Markets*
James R.Thompson, Edward E. Williams & M. Chapman Findlay III

William Sharp (Nobel 1990)
Capital Market Line
CREF
John Bogle Vanguard

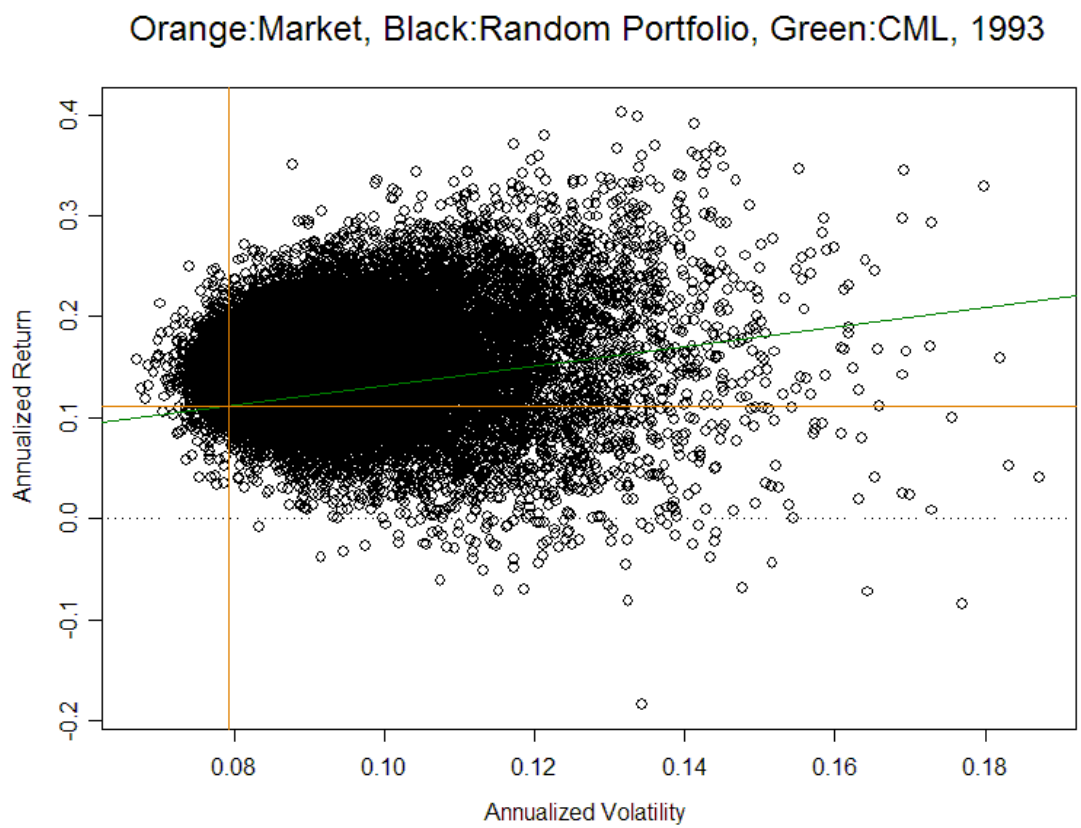




Our Large Scale Simulation Shows That Since 1960 65% Of The Random Portfolios Beat The Market Cap Weighted Portfolio.

"Market Cap Weighting - Where's the Risk Management?"

William C. Wojciechowski and James R. Thompson (2004)


Orange:Market, Black:Random Portfolio, Green:CML, 1993
Annualized Return
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
0.08
0.10
0.12
0.14
0.16
0.18
Annualized Volatility

Black-Scholes-Merton and Their Amazing Money Machine

Definition: A Call Option is the right (but not the obligation) to buy a security of current price $S(0)$ for strike price X at a future time T.

What is the "fair price" C of such a call option?

Answer: There is no such thing.

Wrong Answer!

How about

$$C = exp(-\mu T)\, E\{Max(0, S(T) - X)\}$$

$$= e^{-\mu T}\left(e^{\mu T} S(0)\Phi\left(\frac{\log(S(0)/X) + (\mu + \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right.$$

$$\left. - X\Phi\left(\frac{\log(S(0)/X) + (\mu - \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right)$$

No. What is wanted is:

$$C_{BS} = e^{-rT}\left(e^{rT} S(0)\Phi\left(\frac{\log(S(0)/X) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right.$$

$$\left. -X\Phi\left(\frac{\log(S(0)/X) + (r - \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right)$$

Transforms a noisy game into a sure thing.

Some Problems with Black-Scholes

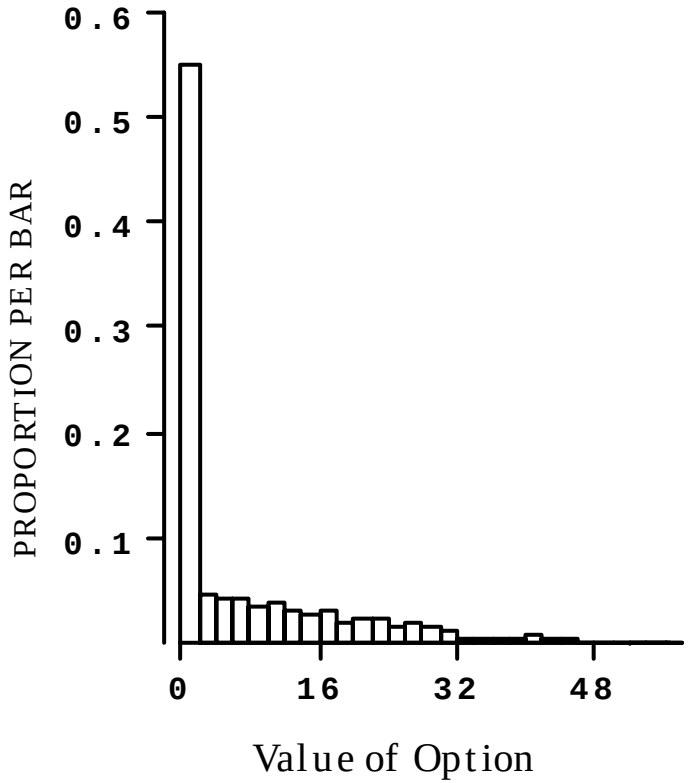
Transaction costs are not really free.
The closer the hedge gets to being riskless,
the more frequently one must rebalance
(and this results in material transaction costs).

The realistic value of r will be significantly
higher than that of a Treasury bill.

Historical records show that the Black-Scholes formula, generally does not give the actual market price of a call option. To correct this imperfection in nature, it is customary for some traders to plug in whatever value
is necessary for σ to give the market price for the option.

Moreover, if we look at the same execution time T and two different strike prices, then we generally get two different plug-in estimates for implied volatility.

Looking at expectations and variances does not tell the story.We need to look at the distribution function of the payoffs.



μ=.15; T=0.5; σ=0.20; X=$108;
S(0) = $100 E= $7.23

C=$3.54 55%of the time V=0.

$$C_{vendor} = e^{-\eta T}\left(e^{\eta T} S(0)\Phi\left(\frac{\log(S(0)/X) + (\eta + \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right.$$

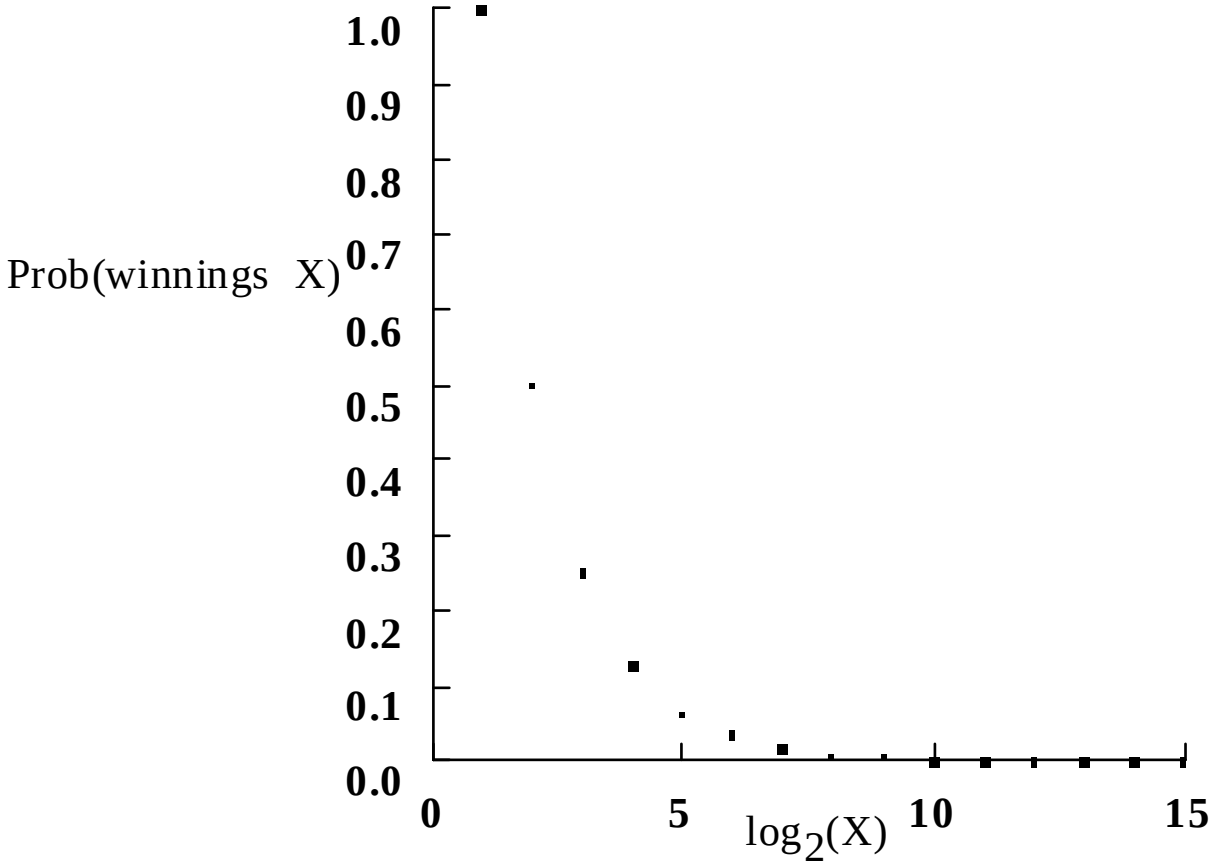
$$\left. -X\Phi\left(\frac{\log(S(0)/X) + (\eta - \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right)$$

$$C_{buyer} = e^{-\mu T}\left(e^{\mu T} S(0)\Phi\left(\frac{\log(S(0)/X) + (\mu + \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right.$$

$$\left. -X\Phi\left(\frac{\log(S(0)/X) + (\mu - \sigma^2/2)T}{\sigma\sqrt{T}}\right)\right)$$

$$\mu > \eta > r$$

There are dangers with maximizing the expectation of payoff.



St. Petersburg Paradox

When Models Fail

In 1998, Alan Greenspan organized a 3.5 billion dollar bailout of the failed LTCM "hedge fund." Long Term Capital Management, like Enron, produced nothing. It simply bought and sold stocks, bonds and derivatives with leveraging aplenty (typically, a "hedge fund" is actually a collection of speculative ventures). It was organized based on the "risk neutral" theories of Black, Scholes and Merton, which theories had been rewarded with the 1997 Nobel Prize in Economics. Indeed, Scholes and Merton were conspicuous advisors (Black was deceased) to LTCM.

Unfortunately, Dr. Greenspan acted like a true believer who, when facts are not in accord with cherished beliefs, fails to use facts to modify theory. He reacted quickly to avert the embarrassment caused by what was supposed to be “a six sigma event.” Across America, company chieftains, growing accustomed to cooking their books in order to gain the time necessary for their “risk neutral” approaches to bear fruit, heaved a collective sigh of relief and redoubled their cooking. Indeed, the writing of uncovered options and other dubious business practices expanded after LTCM. Greenspan tried to quell irrational exuberance by raising the prime. This cut off the oxygen to high tech.He then tried to resuscitate the patient by dropping the prime to 1%. Unfortunately, the patient was already dead.

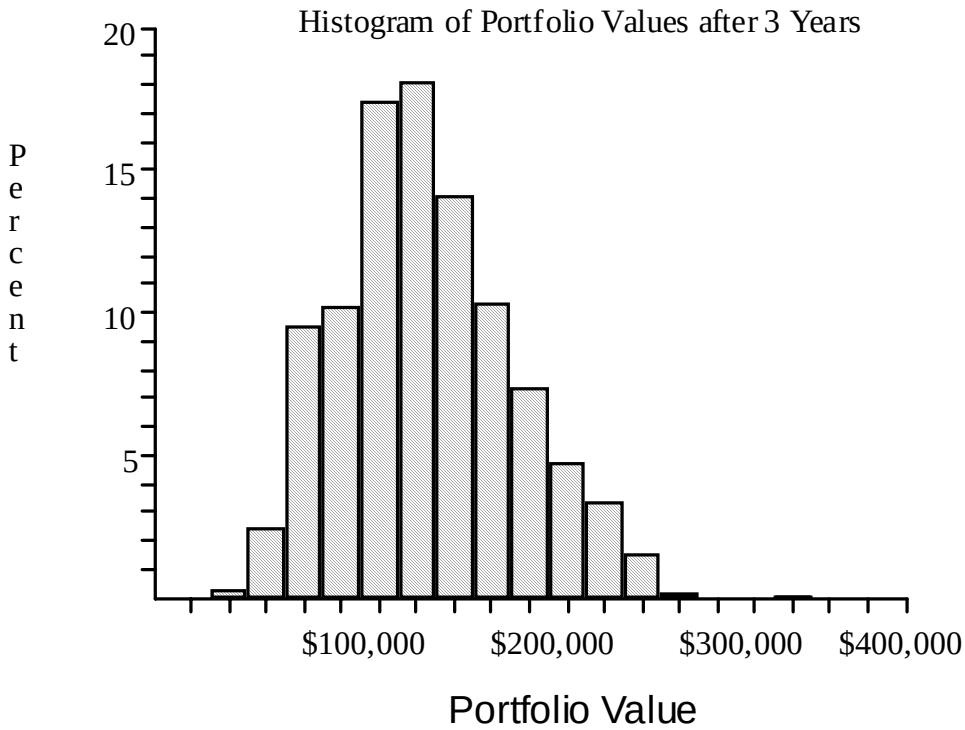
From the standpoint of the dollars involved, the 1998 crash of LTCM (a $3.5 billion dollar bubble) was orders of magnitude less significant than that of the $62 billion Enron debacle in late 2001. The Enron collapse was too large for even Dr. Greenspan to make disappear. Then there is the long list of other companies zapped by belated discovery of their irresponsible accounting practices in 2002 and subsequently. The total wreckage will easily top a hundred times the LTCM figure.

The Simugram™

An Expert System for Forecasting the Probability Distribution of Future Security Prices

The Simugram* Using Ibbotson Index Data

Look at a simugram for an Ibbotson Index Portfolio of initial value $100,00 over a 3 year period, using data using data from 1926-2000.



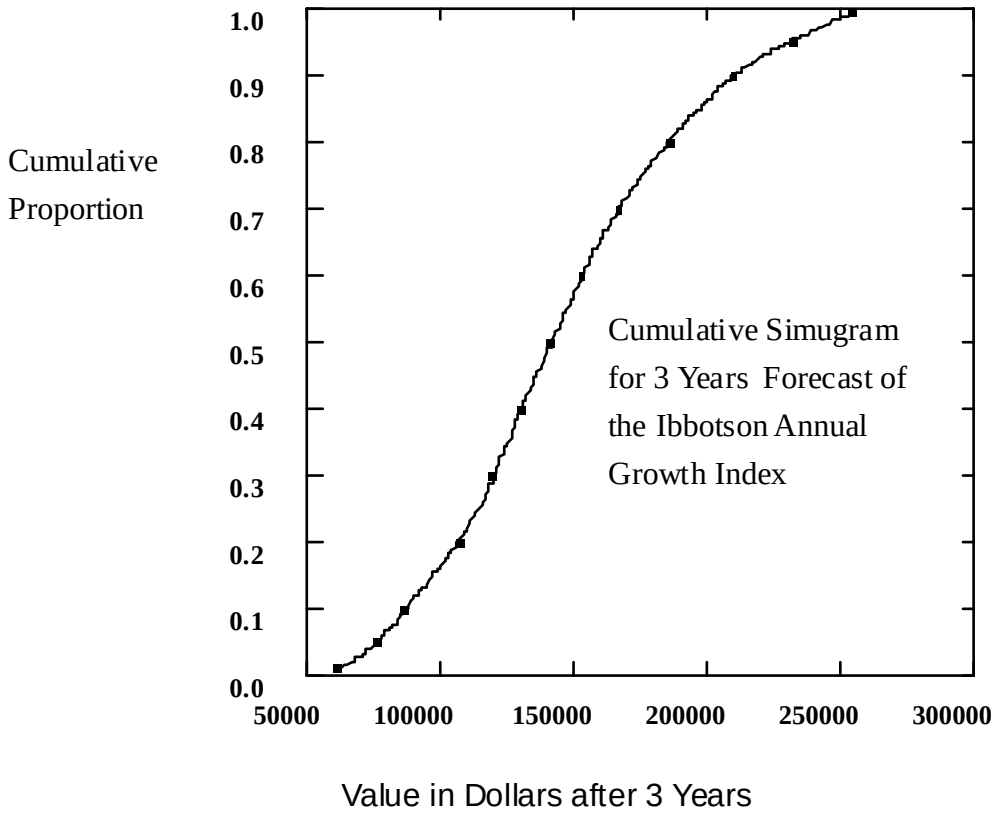
*Copyright and Trademark Granted, Patent Pending

Easier to use is the cumulative simugram* shown below

From this diagram we can note

•that the value of the portfolio is less than $142,000 50% of the time

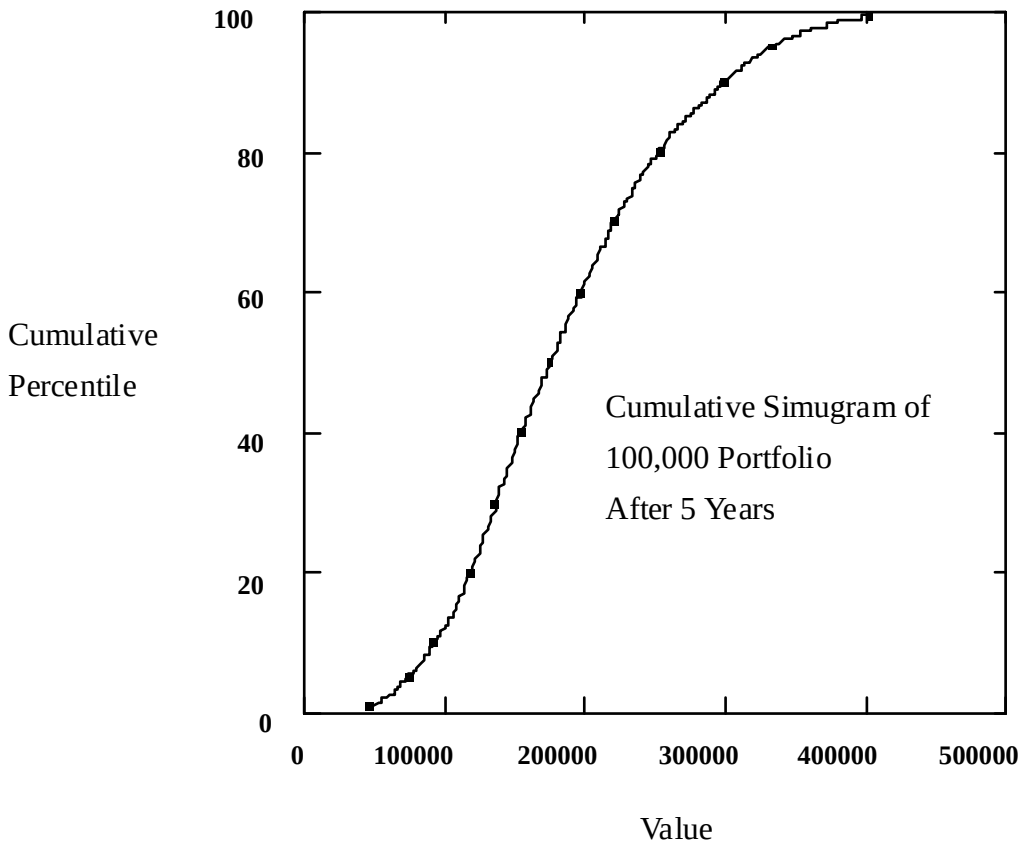
•and that it is less than $86,000 10 % of the time.



The mean value of a $100,000 portfolio after five years is $192,676.

The median value is $175,530 (growth rate of .1125).

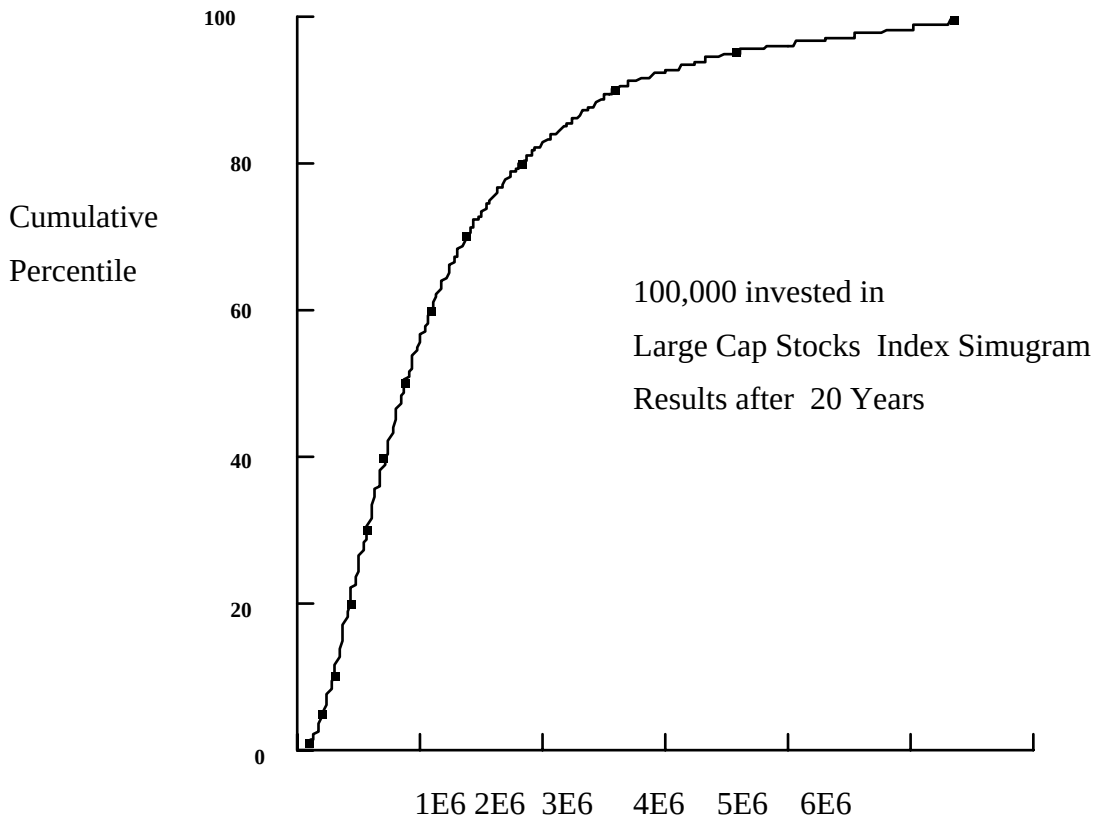
However, the lower ten percentile is $92,747 (growth rate of -.015).



Next, we consider the same scenario except looking 20 years into the future.

The median value is $873,100, an annual increase of 10.8%.

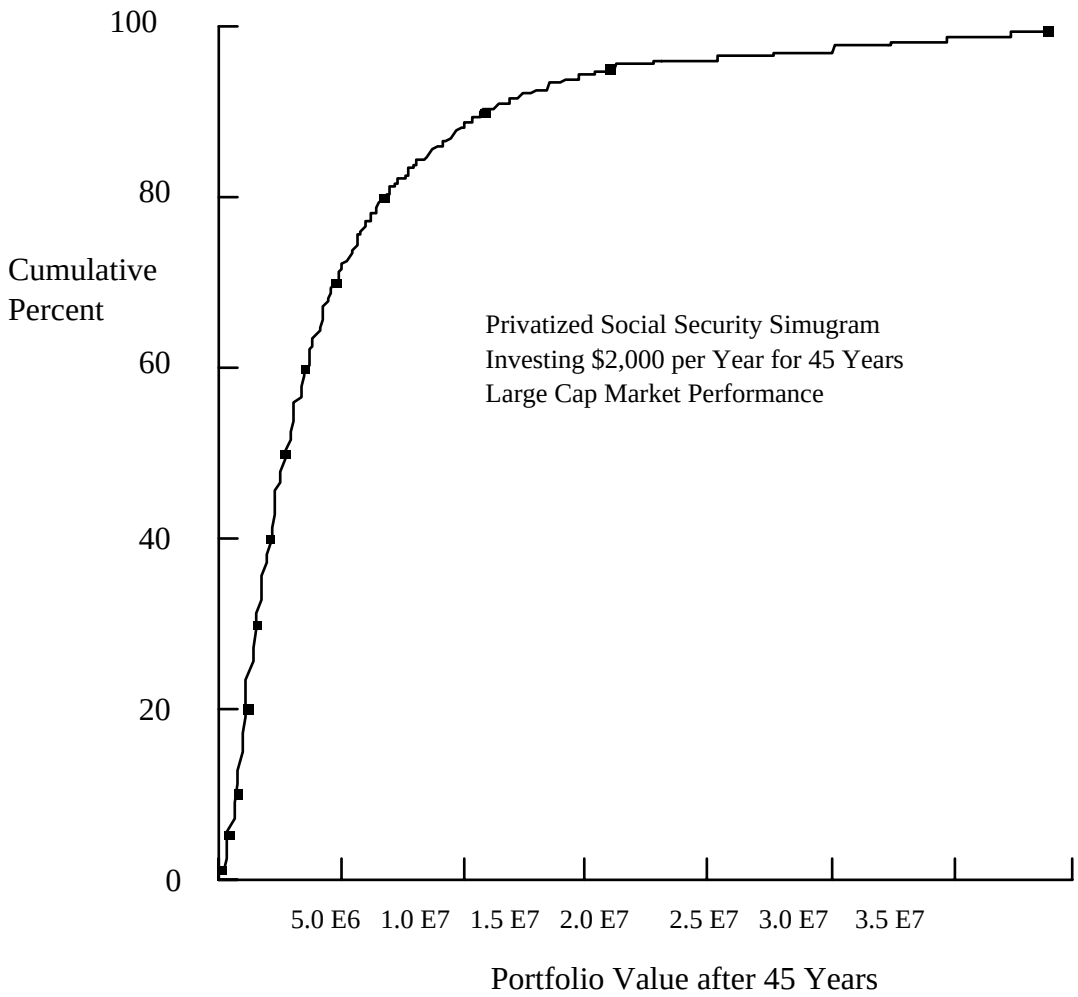
Even the lower ten percentile value of $285,590 represents a growth rate of 5.2%.

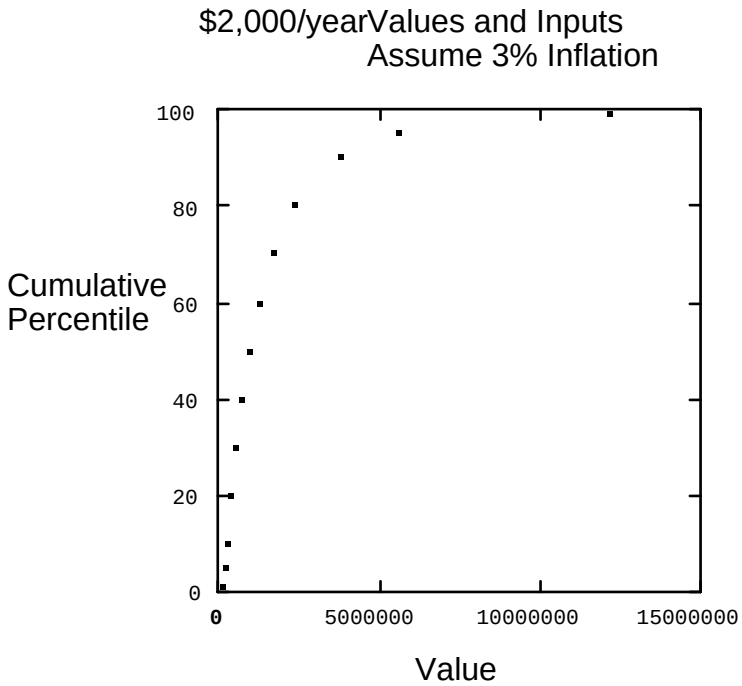


The Stock Market As Casino

- In the case of a casino, over the long haul, the player loses.
- In the case of the US market, over the long haul, the player wins.
- It is rather like a St. Petersburg Trust (see p 45 in Models for Investors in Real World Markets).

Mean = $4,850,000
Median = $2,725,000
Lower Ten Percentile = $695,000





Lower 10 Percentile = $269,000

Median = $993,000

Mean = $1,745,000

A Portfolio Case Study

Next we take the 90 stocks in the S&P 100 that were in business prior to 1991.

Optimal investment allocation maximizing a combination of various simugram percentiles

Constraining each stock to no more than 5% of the portfolio share

Table A.3. Portfolio Allocation from S&P 100. Maximizing One Year 20 Percentile with Max 5% in Any Stock.

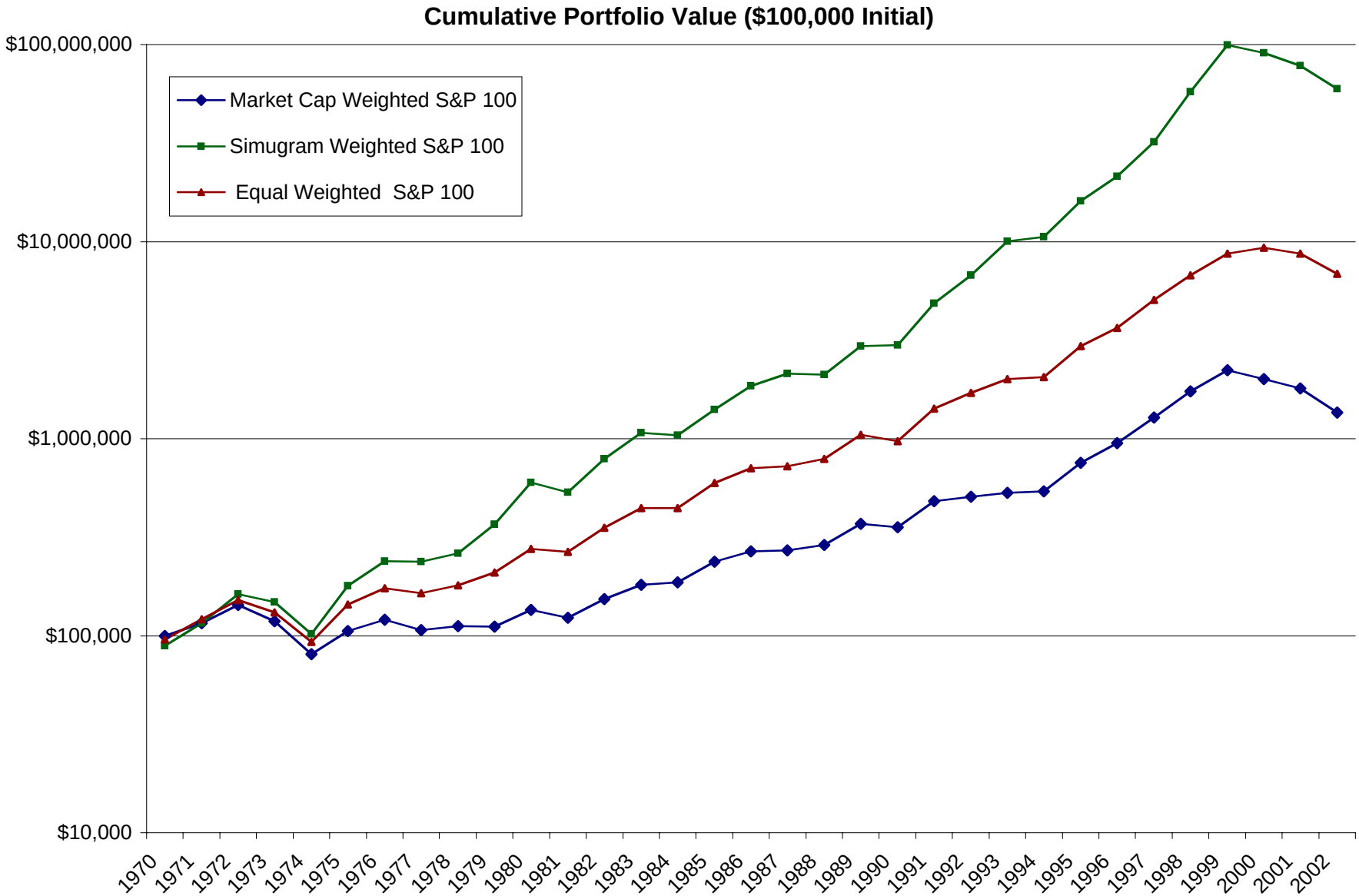
id	permno	ticker	š	se	par alloc	rnpar alloc
1	10104	ORCL	0.44	0.65	0.05	0.05
2	10107	MSFT	0.39	0.48	0.05	0.05
3	10145	HON	0.12	0.44	0.00	0.00
4	10147	EMC	0.48	0.61	0.00	0.01
5	10401	T	0.05	0.40	0.00	0.00
6	10890	UIS	0.36	0.68	0.00	0.01
7	11308	KO	0.07	0.31	0.00	0.00
8	11703	DD	0.05	0.28	0.00	0.00
9	11754	EK	° 0.11	0.35	0.00	0.00
10	11850	XOM	0.12	0.17	0.00	0.00
11	12052	GD	0.19	0.25	0.05	0.05
12	12060	GE	0.23	0.26	0.00	0.00
13	12079	GM	0.08	0.36	0.00	0.00
14	12490	IBM	0.32	0.34	0.05	0.00
15	13100	MAY	0.07	0.29	0.00	0.00
16	13856	PEP	0.13	0.28	0.00	0.00
17	13901	MO	0.13	0.32	0.00	0.00
18	14008	AMGN	0.32	0.39	0.05	0.05
19	14277	SLB	0.12	0.36	0.00	0.00
20	14322	S	0.05	0.36	0.00	0.00
21	15560	RSH	0.27	0.49	0.05	0.05
22	15579	TXN	0.40	0.56	0.00	0.01
23	16424	G	0.09	0.33	0.00	0.00
24	17830	UTX	0.21	0.35	0.00	0.00
25	18163	PG	0.16	0.31	0.04	0.00
26	18382	PHA	0.12	0.30	0.00	0.00
27	18411	SO	0.14	0.24	0.05	0.05
28	18729	CL	0.25	0.33	0.05	0.05
29	19393	BMY	0.20	0.26	0.01	0.03
30	19561	BA	0.05	0.35	0.00	0.00
31	20220	BDK	0.06	0.38	0.00	0.00
32	20626	DOW	0.07	0.30	0.00	0.00
33	21573	IP	0.07	0.36	0.00	0.00
34	21776	EXC	0.17	0.33	0.05	0.05
35	21936	PFE	0.26	0.28	0.05	0.05

Simugram Systems™
Patent Pending

Table A.3. Portfolio Allocation from S&P 100.
Maximizing One-Year 20 Percentile
with Max 5% in Any Stock (continued).

id	permno	ticker	„		par alloc	npar alloc
36	22111	JNJ	0.20	0.26	0.00	0.02
37	22592	MMM	0.14	0.25	0.00	0.00
38	22752	MRK	0.17	0.31	0.00	0.00
39	22840	SLE	0.11	0.31	0.00	0.00
40	23077	HNZ	0.06	0.25	0.00	0.00
41	23819	HAL	¡ 0.03	0.47	0.00	0.00
42	24010	ETR	0.11	0.29	0.00	0.01
43	24046	CCU	0.27	0.38	0.00	0.00
44	24109	AEP	0.04	0.22	0.00	0.00
45	24643	AA	0.21	0.37	0.00	0.00
46	24942	RTN	0.02	0.44	0.00	0.00
47	25320	CPB	0.04	0.29	0.00	0.00
48	26112	DAL	0.00	0.33	0.00	0.00
49	26403	DIS	0.05	0.33	0.00	0.00
50	27828	HWP	0.11	0.48	0.00	0.00
51	27887	BAX	0.21	0.24	0.05	0.05
52	27983	XRX	0.04	0.61	0.00	0.00
53	38156	WMB	0.14	0.33	0.00	0.00
54	38703	WFC	0.20	0.31	0.00	0.00
55	39917	WY	0.07	0.32	0.00	0.00
56	40125	CSC	0.17	0.48	0.00	0.00
57	40416	AVP	0.24	0.47	0.00	0.00
58	42024	BCC	0.00	0.33	0.00	0.00
59	43123	ATI	¡ 0.05	0.39	0.00	0.00
60	43449	MCD	0.05	0.26	0.00	0.00
61	45356	TYC	0.37	0.33	0.05	0.05
62	47896	JPM	0.15	0.38	0.00	0.00
63	50227	BNI	0.03	0.27	0.00	0.00
64	51377	NSM	0.35	0.69	0.05	0.05
65	52919	MER	0.31	0.44	0.00	0.01
66	55976	WMT	0.32	0.31	0.05	0.05
67	58640	NT	0.23	0.64	0.00	0.00
68	59176	AXP	0.19	0.31	0.00	0.00
69	59184	BUD	0.20	0.21	0.05	0.05
70	59328	INTC	0.37	0.52	0.00	0.00
71	59408	BAC	0.14	0.34	0.00	0.00
72	60097	MDT	0.28	0.28	0.05	0.05
73	60628	FDX	0.23	0.35	0.00	0.00
74	61065	TOY	0.06	0.48	0.00	0.00
75	64186	CI	0.20	0.28	0.00	0.00
76	64282	LTD	0.16	0.42	0.00	0.00
77	64311	NSC	¡ 0.02	0.34	0.00	0.00
78	65138	ONE	0.10	0.37	0.00	0.00
79	65875	VZ	0.11	0.29	0.00	0.00
80	66093	SBC	0.12	0.29	0.00	0.00
81	66157	USB	0.12	0.37	0.00	0.00
82	66181	HD	0.33	0.32	0.05	0.05
83	66800	AIG	0.26	0.26	0.05	0.05
84	69032	MWD	0.34	0.47	0.00	0.00
85	70519	C	0.35	0.36	0.03	0.05
86	75034	BHI	0.11	0.41	0.00	0.00
87	75104	VIA	0.21	0.37	0.00	0.00
88	76090	HET	0.09	0.39	0.00	0.00
89	82775	HIG	0.24	0.37	0.01	0.00
90	83332	LU	0.10	0.54	0.00	0.00

Next We Examine Results
Using A Fixed (over 33 years)
Propietary Simugram* Strategy


Cumulative Portfolio Value ($100,000 Initial)
$100,000,000
$10,000,000
$1,000,000
$100,000
$10,000
Market Cap Weighted S&P 100
Simugram Weighted S&P 100
Equal Weighted S&P 100
1970
1971
1972
1973
1974
1975
1976
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2002

Some Summary Statistics 1970–2002

Type of Fund	Annualized Return	Total Downside Loss
S&P 100 Index	8.2%	118.13%
S&P 100 Equal Weight	13.2%	90.57%
S&P 100 Simugram Weight	20.00%	112.74%.

Conclusions

1. Financial analysis is in a primitive stage of development.

2. We should focus on EDA rather than on simplistic models.

3. Looking at the mean and variance is not enough.

4. Our risk analysis should be of higher dimensionality.

5. The main weapons of the investor are diversification and time.

6.We can construct computer intensive forecasting paradigms which enable us readily and intuitively to consider questions of risk and growth simultaneously.