

*Models for Real-World Investors, and the Abyss Between
Value Investing and Financial Engineering, I*

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You may have come here today expecting to find formulas, theorems, and proofs, to enable you to make money in the financial markets without ever again having to think

I am (mildly) sorry to say that you're going to be disappointed.

My “models” will use very little math, and you will have to think

But don't rush to the exits; you'll benefit from our discussion

Model: The way in which *real-world investors* should *invest* their clients' funds.

Clients: People living in central PA, with cold winters, or Mexico, with hot summers

Recent retirees, or people hoping to retire soon

Parents facing college-tuition bills

Widows, widowers, orphans, etc.

Your family, friends, colleagues

You worked hard for many years to save that money, and you hope that your money managers will do their best for you

“Real-world” money manager: One who manages the pension, college-tuition, or grandchildren savings funds of people like us

Real-world money managers should remember always that they handle hard-earned pension, college-tuition funds, etc.

Real-world clients have *every* right to:

- Request their funds at *any* time

- Expect managers to act always to minimize potential losses

- Expect a reasonable increase in their funds after five years

- Expect managers to exercise *fiduciary responsibility* always

Fiduciary responsibility: A duty to handle finances in a trust-worthy manner; to represent the clients' best interests

The adjective “real-world” surely is redundant when used to describe an “investor”

All “investors” are in the real world. If not, their real-world clients may regret it

Casino Royale: A real-world money manager who should have attended this talk

Note: We have not yet defined the word “investor,” but we will get to it

The Good Old Days

Traders (speculators or investors) generated the full range of emotions in the public eye

“Investors” were admired when things went well

“Speculators” were detested when things went badly

Exxon was blamed some years ago for the high price of gasoline; the old days are back with us!

Fair disclosure: My pension fund owns a few shares of Exxon

The Good Old Days: There were few *recorded* rules on how to be systematically successful at investing or speculation

Lots of non-systematic advice was passed between generations as word-of-mouth rules: “wisdom,” “experience,” etc.

This gave rise to well-known sayings, e.g.,

Buy low, sell high

Buy cheap and sell dear

Buy when there's blood in the streets (the Rothschilds)

Buy when the cannons boom; sell when the trumpets sound

Dickson G. Watts, “Speculation as a Fine Art and Thoughts on Life.”

Gauss knew something; he traded in government bonds but left no records

One biography of Gauss notes that, on a relatively small salary, he left a very large estate

Walter Bagehot, “Lombard Street: A Description of the Money Market,” 1873

Hartley Withers, “The Quicksands of the City, and a Way through for Investors,” 1930

Let’s move forward to the 20th century: the 1930’s

Benjamin Graham

The “father of financial analysis”

The “father of value investing”

The “Dean of Wall Street”

His father died when he was quite young, and his mother raised the family on her own

Graham graduated from Columbia in 1914 and was admitted to the graduate programs in mathematics*, philosophy, and English

He instead went to work to help support his mother and siblings

* Graham, “Some calculus suggestions by a student,” *Amer. Math. Monthly* 24 (1917), 265–271

Graham lost a lot of money in The Great Crash in 1929 and the ensuing depression

He wrote of how badly he felt by the loss of his clients' funds and how hard he worked to recover them

Graham and David Dodd prepared comprehensive rules for analyzing securities

Graham and Dodd, [Security Analysis](#), 1934

The “bible” of value investing

Graham, [The Intelligent Investor](#), 1949

Margin of Safety

Graham's central idea: Margin of Safety

When you buy a stock or bond, don't cut it close

Buy only if the company's financial condition AND stock price are heavily in your favor

To buy is to choose to participate in the economic future of a particular enterprise

You should buy only if the worst-case scenario is improbable (bankruptcy? sleepless nights?)

In the worst case, you want your money back *in real terms*

Waiting for 29 years to get your money back in nominal terms?

Graham and Dodd developed rules for estimating the *intrinsic value* of a company

Purchase shares at a price lower than what you can get by shutting down the company and liquidating all assets in a fire sale

Calculate the company's net current assets per share (total current assets minus all liabilities)

Buy the shares if the price on the stock exchange drops below the net current asset value per share

Graham used this formula with lots of success: GEICO

Graham's students and followers also have done well

Graham's rules seem to work today only if markets are at extremely low levels (e.g., Japan in the '90's; ?? in 2012)

Martin Whitman (p. 4): Variations on Graham's valuation rules

Each stock market book presents a model for money managers

Graham's "The Intelligent Investor" is superb

Tweedy, Browne's letters to their shareholders

Whitman & Shubik, "The Aggressive Conservative Investor,"
1979

Warren Buffett

Buffett saw that few stocks reached Graham's bargain basement levels anymore, so he developed variations

Buffett's partnership (1957-1969) beat the Dow Jones Industrial Average every year

Total return of 2,749% vs. the Dow's 152.6%

Here is a graph of Buffett's partnership performance

Buffett bought control of Berkshire Hathaway Inc. in 1965

1965-2006

Berkshire Hathaway beat the DJIA in 36 of those 41 years;

Berkshire Hathaway's after-tax total return: 305,134%

Dow's pre-tax return: 5,583%

James R. Thompson, et al. (2003), "Models for Investors in Real World Markets," p. 220:

"As some readers may know, [Warren Buffett] turned a \$10,000 investment in 1955 into \$250 million today ..."

6/30/06-5/1/10: BRK is up 16%; the DJIA is **down** 9%

Buffett's most important contribution

Over 233,000 people are employed at Berkshire Hathaway

A “stock” is more than a wiggling line on a graph

It's a share of an economic enterprise

It involves the lives of real-world people, like you and me

The future of this country, as an on-going democracy, is highly dependent on economic stability

We academics should endeavor to shun any practices that encourage economic instability

A story about Enron

What is an “investment”?

Graham’s definition, taken from “The Intelligent Investor”

“An investment operation is one which, upon thorough analysis, promises safety of principal and an adequate return. Operations not meeting these requirements are speculative.”

Key words and phrases:

- thorough analysis
- safety of principal
- adequate return

You’re a speculator if your operation omits any of these items

Stanley Kroll: Most speculators lose money

Graham's Principle:

If it is a good investment then it is a good speculation

If it is a good investment then you may well make far more than an adequate return

If you continually make good investments then you'll probably do better than most speculators

Buffett lives by Graham's "Margin of Safety" rules: "You don't try to buy businesses worth \$83 million for \$80 million"

Graham deplored the use of the word "investor" to describe anyone who is trading stocks. Me too.

Graham also deplored the way the stock market was treated like a gambling casino, right down to the "blue chips" terminology.

When Buffett buys a company's shares, he seems prepared to keep the shares even if the stock market closes for 10 years

Mathematical models for real-world investors

Bachelier, 1900: Brownian motion model for financial securities

Optimal portfolio selection, Efficient Market Hypothesis (EMH)

Capital Assets Pricing Model, the Black-Scholes formula

Modern portfolio theory, post-modern portfolio theory

An enormous literature on the mathematics of arbitrage, options, derivatives, financial math, financial engineering

Behavioral finance: Study “cognitive biases” of “investors”

The behavioral finance folks seem to be experts at explaining why you lost money last time

Big controversy about whether or not the EMH is valid

My advice to us little people: Treat the EMH as irrelevant

A future pension report: “Dear Shareholder, in proving that the EMH is valid, we’ve lost 100% of *your* funds ...”

I’m no fan of financial engineering (ditto for Graham, Buffett, Whitman, Tweedy-Browne, Lowenstein, Klarman)

Still, I’ll mention four problems which academics can address and which are of interest to real-world managers

I will pose the problems in a broad way; I’m not after research papers

Hidden Markov models

A simple Markov chain model for the weather

We tracked the weather for 5 years and noticed a pattern:

		Tomorrow	
		Good	Bad
Today	Good	65%	35%
	Bad	45%	55%

This called a *transition matrix*

Question: If the weather on 12/1/06 is good then what is the chance that the weather will be good on 12/21/06?

Solution: Multiply the transition matrix by itself 20 times

Question: What are the *transition probabilities* which will take us from 12/1/06 to 12/1/26?

Replace “weather” by “stock market”, “good” by “up”, “bad” by “down”

Bad news: This method is too simple to do well for the stock market

There are too many “exogenous” events which affect the stock market

The stock market has long-range memory (its behavior on days three months apart can have high “correlation”)

Hidden Markov models: A generalization of Markov models

Invented to model data which have long-range memory and where “hidden” decisions which influence the data

A large corporation decides to acquire a smaller competitor, but the news was leaked (insider trading?), causing abnormal stock price fluctuations

In a hidden Markov model, we have a transition matrix, a finite set of “states,” and a set of observed outcomes

We can see the actual outcomes of the process, but the states are hidden from us

Problem 1: Develop a hidden Markov model approach which matches the S&P 500 over moving 5-year periods after taxes, commissions, and stratospheric manager salaries

Restrictions: No short-selling, leverage, or arbitrage

No trading of puts, calls, options, synthetics, derivatives

Match Buffett over moving 5-year periods (good luck!)

Buffet's headaches from dealing with derivatives (Mark Twain)

Edgar Peters: Chief investment officer of PanAgora Asset Management

“Chaos and Order in the Capital Markets” 1996

“Patterns in the Dark: Free Markets, Complexity, and the Need for Uncertainty” 1999

We all want to know if and when the stock market might crash

The River Nile: Floods are truly a life-and-death matter for residents of the Nile River valley

For us mutual fund clients: If we lose all our money, hey, it's only paper!

“Chaos and Order”: A model based on calculating the Hurst parameter for the stock market

Peters’ approach uses all data going back to the 1950’s

It should be possible to *estimate* the parameter more efficiently and as accurately using random sampling

Problem 2: Find more efficient schemes for carrying out Peters’ calculations

Peters' comments:

The “overall investment philosophy at PanAgora is that market inefficiencies occur because ... people overweight information which they believe they understand, and they underweight information which they don't understand or that doesn't fit in with their concept of how things are. A good example of this is the recent tech bubble. ...”

Note carefully: Peters feels that the EMH is invalid and states that PanAgora's investment philosophy exploits that invalidity

Peters and his group did just fine during the turbulent times of 1999-2003

James R. Thompson, et al. “Models for Investors in Real World Markets,” 2003: An intriguing book

Perform a fundamental (Graham-style) balance sheet analysis of a company

Use novel methods to estimate the company’s future earnings

Apply stochastic differential equations to predict its future stock price, likelihood of dropping sharply during short-term market downturns

Problem 3: Improve on Thompson, et al. with no increase in the complexity of the mathematical techniques used therein?

Joel Greenblatt, “The Little Book that Beats the Market”

Another intriguing book: Written for 12 year-old children

Rank all U.S. stocks by return on capital (x) and by earnings yield (y). Then rank all stocks by $x + y$

Is $x + y$ too simple to work well?

Greenblatt provides evidence that the formula will return about 17% compounded annually over 10-year periods.

Problem 4: Is there a better ranking based on x and y only?

Your ranking should be a simple function of x and y ; no calculus; simple enough for 12 year-olds.

Buffett's historical record: Ignore it at your peril

What should we do starting here and now? Buy Google?

My advice: Find managers who follow Graham's principles

Where do we find such people?

Tweedy, Browne's article: [What has Worked in Investing](#)

Buffett's article, "The Superinvestors of Graham-and-Doddsville" in an appendix to "The Intelligent Investor"

The results of a group of investors who follow Graham and Dodd

I found the group's long-term compound returns remarkable

I was more fascinated by how they avoided losing money

They lost money (temporarily) only when the rest of the market went crazy

Richards' Theorem: Any time is almost always a good time to buy shares in true-blue value funds. A terrific time to buy shares in those funds is when they report unrealized losses!

Corollary: Almost anytime is a bad time to sell shares in true-blue value mutual funds.

And where do you find these true-blue value funds?

Louis Lowenstein, professor emeritus of finance and law,
Columbia Univ.

“Sense and Nonsense in Corporate Finance” 1991

“Searching for rational investors in a perfect storm”, J.
Corporation Law, 30 (2005), 539-565

Which mutual funds avoided the boom/crash years of '99-'03?

Nicholas-Applegate Global Tech Fund: Up 325% during
1/1-11/17/99; terrible losses in '00-'03; now defunct

Lowenstein asked Robert Goldfarb of the Sequoia Fund for a list
of 10 true-blue, Graham-style, value mutual funds

Goldfarb's off-the-cuff list:

Clipper Fund	Mutual Beacon
FPA Capital	Oak Value
First Eagle Global	Oakmark Select
Longleaf Partners	Source Capital
Legg Mason Value	Tweedy, Browne American Value

Richards' off-the-cuff additions to Goldfarb's list:

Cundill Value	Third Avenue Value
Sequoia Fund	Vanguard Windsor II
Davis Funds	Wintergreen Fund

None of these 16 funds suffered permanent losses in '99-'03

They did this by using plain-vanilla Graham-style principles

Investing is about commonsense, ethics, morality, accounting, not high-level mathematics

Also important: An appreciation of the classics

Buffett: “Once you have ordinary intelligence, what you need is the temperament to control the urges that get other people into trouble in investing.”

See “The Intelligent Investor”