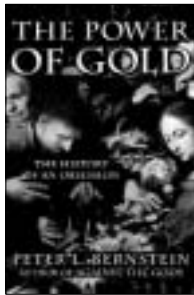


## *The Power of Gold: The History of an Obsession*

By Peter L. Bernstein. New York, NY: John Wiley & Sons, Inc. 2000. 432 Pp. \$27.95 hardcover.

Peter Bernstein, author of *Capital Ideas: The Improbable Origins of Modern Wall Street and Against the Gods: The Remarkable Story of Risk*, has done it again.



His latest book, *The Power of Gold: The History of an Obsession*, is fascinating to read, broad in concept, and highly informative. The author states at the outset: “. . .the story is neither a complete history of gold nor a systematic analysis of its role in economics and culture. . . . Instead I explore those events and stories involving gold that most appealed to me because they display the desperation and ultimate frustrations that have inflamed human behavior.”

Why is gold so desirable, initially as adornment and then as a form of money and then back to a status symbol or a store of value? Some of the reasons are the qualities of gold: malleable, imperishable, chemically inert, extraordinarily dense, soft as putty—and relatively scarce. Almost all the gold ever mined is still around, if you include shipwrecks at the bottom of the seas. Bernstein notes that, if you piled all this gold in one solid cube, you could fit it aboard any of today's great oil tankers; it would weigh about 125,000 tons, compared with the U.S. steel industry's ability to produce 120 million tons a year!

With that as background, Bernstein traces the uses of gold

through history—and a broad sweep it is! He starts with the Bible, which includes the use of gold as adornment, the golden calf, and the detailed description of use of gold in sanctuary and tabernacle. He then shifts to the use of gold in Greece, Rome, and Byzantium, initially as adornment but later as a medium of exchange. Gold coins and bars were developed as a standard with a known fineness and weight to facilitate trade and commerce, as described by the historian Herodotus. But a society that uses metal for money is constrained by the supply of that metal, which, Bernstein points out, can be resolved in one of three ways: suffer downward pressure on prices, import gold by plunder or trade, or debase the coin by using the same amount of metal to produce a greater supply. All three methods have been used, with greater or lesser degrees of sophistication, and these developments are described in broad strokes.

Then Bernstein describes the effects on European economies of the discovery of gold in the New World and massive gold imports by Spain, which enabled that country to wage a series of wars against their European neighbors. While this was going on, international trade was growing rapidly and economic relationships were developing with trading partners thousands of miles apart. Price inflation characterized this period, caused by rapid increase in the population and a slower growth in the supply of food. This increased the demand for gold but also led to the use of private money, or bills of exchange, to facilitate trade. Meanwhile, Asia became a sponge for European gold and silver as Europeans developed a taste for spices, tea, silk, and other luxuries. And China was the first country to use

printed banknotes, the value of which was sustained by the power of the state, i.e., anyone refusing to accept paper money was beheaded!

The story shifts back to England, where debasement of the currency led to standards for gold coins and ultimately to a currency backed by gold—the gold standard that was adopted by many industrial countries and lasted through the nineteenth century and well into the twentieth. The pre-eminence of gold was helped by the discovery of gold in California, Canada, Alaska, Australia, and South Africa in the nineteenth century. But accompanying these discoveries was the increased use of banknotes as well as other substitutes for gold that enabled the volume of business transactions to balloon far in excess of the increase in the supply of gold.

The ensuing description of the gold standard as a “Badge of Honor” indicates its impact on world economies and economic policies in the period between World War I and World War II. The attempt to maintain gold as a fixed standard of value led to “dear money,” with high interest rates, subdued business activity, and high unemployment. Bernstein cites with approval John Maynard Keynes' critical denunciation of maintenance of a gold standard. The stock market crash of 1929 intensified the damage. As with many European nations during the Great Depression, the United States halted the circulation of gold coins in 1933. While World War II did improve the general economic situation in the United States, the fate of gold did not improve. A grand plan for an international economic system was established in 1944 at Bretton Woods, with the dollar the centerpiece and convertible to gold at \$35 an ounce. But subsequent inflation in the

United States pulled down U.S. gold supplies until, in 1968, President Nixon closed the gold window and the dollar joined other currencies as a floating rather than a fixed exchange rate currency, where it remains today.

This summary of the book can provide only a glimpse of the subjects covered; it does not do justice to a wonderful historical narrative of complex global relationships over many centuries. And the author manages to hold your interest throughout. The business economist will find the book informative, entertaining, and a refresher course in economic history. While its characteristics will maintain gold's role as a store of value, Bernstein concludes "[the return of gold] to its traditional role as universal money is unlikely, however, unless the time should come when the dollar, the euro and the yen have all failed to function as an acceptable means of payment across international borders."

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### ***The Invisible Heart: An Economic Romance***

*By Russell Roberts. Cambridge, MA: MIT Press. 2001. 271 Pp. \$22.95 hardcover.*

The title, *Invisible Heart*, is a play on words from Adam Smith's invisible hand. The subtitle, *An Economic Romance*, refers to both love by an economist for a woman and his love of economics. Sam Gordon teaches economics at an



exclusive prep school in Washington, D.C. The romance begins when he meets Laura Silver, a new poetry teacher at the same school. The school is located halfway between the National Cathedral and the Zoo—between the angels and the animals. In its early days, teachers used this proximity to remind students that man lay between the divine and the profane, and it was the school's job to push students in the right direction. Now the school's job is to push them into the Ivy League.

Sam is very market oriented and sees the world as a positive sum game, where on balance everyone is made better off by the economic system. For Laura, the economic world is at best zero sum, with the poor being poor because of the rich. He wants much less government, and she wants much more. Love blooms as they explain their beliefs to each other. While private love is blooming at school, the public is viewing an explosive drama on Capitol Hill.

Erica Baldwin is the crusading head of a Federal agency that is exposing Charles Krauss, a corporate executive, as a miscreant of the first magnitude. Erica is the attorney and fighter that Laura aspires to be, while Krauss is the personification of corporate evil. The agency, its supporters in Congress, and the corporation all jockey for position in preparation for the explosive Congressional hearing, where the villain's misdeeds are to be exposed. How these two parallel stories intertwine and are resolved is part of the entertainment of the book, but there is more.

Not to let the cat out of the bag, but a book being reviewed in *Business Economics* and published by the MIT Press is not your usual romance novel. It is actually well written dialogue between an economist and a fair-minded but unconvinced humanities teacher. What is

unique is using the romance novel as a vehicle for give and take between the two protagonists. Not surprisingly, since the book is written by an economist with an endowed position at a major university, the economist seems to win the intellectual tug of war. However, Sam's life is enhanced by the literary world opened to him by Laura. Apparently we learn that romance is a positive sum game. Equally important, the reader learns some important economics; and that is the objective. The book is bound to find a home in most economics departments, either as assigned reading or being shared among faculty members. If you know about *Murder at the Margin*, *Fatal Equilibrium*, or *Deadly Indifference*, you get the idea.

As budding novelists know, there has to be a "hook" in the very early part of the book. We meet Sam as he walks into his new class and writes on the board 531,000,000,000 and 16,500,000,000. "The first number, 531 billion, is the amount of crude oil, measured in barrels, that's still underground. They're called reserves. The second number is the world's annual consumption of crude oil. Here is the quiz: when will the world run out of oil? You have one minute." That was it for me. Hooked!

While most of the class attacks the question as a problem in long division, Amy, the attractive daughter of a U.S. Senator, is more cautious. We learn more about them later. Sam concentrates on explaining the impact of higher energy prices on the demand and supply of oil. In another class he asks why whales are endangered, but not chickens. This example is used to introduce the issue of property rights and some of the innovative programs in Africa where local villagers are given the property rights to the elephants. Later he presents the horrendous death rates for convicts being trans-

ported to Australia in the 1790s. In the first twenty-six ships, the death rate was twelve percent, with one ship, the Neptune, resulting in a thirty-seven percent fatality rate. Ship captains were paid by the number of convicts who embarked on the ship. Apparently, there was considerable effort made to persuade the captains to be more humane, but to no avail. Then the payment system was changed. "In 1793, three ships embarked for Australia under the new system of paying contractors according to how many convicts got off the boat. Of the 422 convicts transported, only one died en route." This example is used to introduce the idea of incentives. It comes from Batson's, *The Convict Ships*, and is cited in the book's more detailed appendix. Most of the subject matter is cross-referenced in the appendix. In these examples, the author not only gives references for his beliefs, but he cites others and gives cautionary notes that others have different views.

Actually these classroom sessions are a small part of the economics in the book. Most of the economics is in the dialogue between Sam and Laura about policy and social issues. They discuss air bags, teacher salaries, unions, minimum wages, the economy as an ecosystem, inflation and the standard of living, private charity and public welfare, school vouchers, pollution, and the social responsibility of business. Most business economists would benefit from the dialogues and thinking about what they might say.

A confluence of events makes it look like Sam will be forced to leave the school. In a touching exchange, Sam explains why he is not prone to use the governmental protections he hates to retain his job. Laura, whose instincts are to crusade like attorney Erica Baldwin, uses every argument

to keep Sam at her side.

*The Invisible Heart* could be a blockbuster movie. In my movie, Barbra Streisand would be the perfect Laura who could also sing the song that is the climax of the book. Woody Allen would be the socially inept and shy, but single-minded Sam. Type casting, but an Academy Award winner for sure. It is also a winner as a unique way to present policy-based economics.

Gerald L. Musgrave  
*Economics America, Inc.*

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### ***Non-Linear Time Series Models in Empirical Finance***

*By Philip Hans Franses and Dick van Dijk. 2000. New York: Cambridge University Press. 296 Pp. \$90.00 hardcover. \$31.95 softcover.*

Forecasting the values of financial variables has been an aim of all professionals who have ever had anything to do with financial markets. In fact, the field of econometrics owes to a large extent its existence to the aspiration of a publishing magnate and financier, Mr. Alfred Cowles. His objective was to establish a scientific basis for forecasting stock market movements. This was to be accomplished through the Cowles Commission, consisting of a group of eminent economists and statisticians, which he established in the 1930s. These scientists decided that, to forecast stock market movements, it was first necessary to forecast the values of major economic variables. This led to the development of simultaneous



equation models and served as the foundation of modern econometrics. (Incidentally, the members of Cowles Commission never got around to stock market forecasting!)

The lack of success of economic modelers in forecasting stock market prices led in the last twenty years or so to focusing attention on uncovering systematic patterns in financial data by using purely statistical methods of time series analysis. The motivation has been the hope that the persistence of these patterns will help in forecasting. The book under review is a classical example of this approach, distinguished from other books in empirical finance only by its concentration on univariate nonlinear time series models. This concentration is--according to the authors--needed to capture certain stylized features of financial series that linear models are not capable of capturing. In particular, the authors note that financial data display asymmetric behavior in that large negative returns appear more frequently than large positive returns, and that large negative returns are more often followed by a period of substantial volatility than large positive returns. Also, the assumption of normally distributed data that goes hand-in-hand with linear models is often empirically refuted.

The book has its origin in a course for graduate and advanced undergraduate students at the Erasmus University in Rotterdam. The prerequisites for this course were a solid training in mathematics and econometrics and some knowledge of basic time series analysis. It is a clearly written textbook that explains and digests a large amount of literature on nonlinear time series models. The bibliography contains almost 400 entries. The authors provide an in-depth treatment of recently developed and "currently most relevant" models, whose nonlinearity stems

from regime switching, and models represented by artificial neural networks. The focus is on uncovering dynamic patterns of financial time series and on out-of-sample forecasting. The models are illustrated by the use of data consisting of indexes of eight major stock markets and of eight exchange rates relative to the US dollar. The sample period for the stock market indexes runs from 1986 through 1997 (3,127 daily observations) and for the exchange rates from 1980 through 1997 (4,521 daily observations). A web site for downloading all the data is provided.

After the first chapter that outlines the aims of the book and briefly describes the content of the following chapters, the authors start with an introduction to the basic concepts of time series analysis, especially emphasizing linear autoregressive (AR) models. An out-of-sample forecasting experiment based on daily returns and involving AR models of different lag length leads to the conclusion that more elaborate linear models do not improve much upon random walk forecasts.

The subject of the third chapter is a presentation and analysis of regime-switching models for financial returns. The regime-switching process, engendered by events such as intervention of monetary authorities in foreign exchange markets or periods of low and high volatility in the stock markets, are considered to be stochastic. In each regime the dynamic behavior of the series is assumed to be adequately described by a linear AR model in which the parameters depend upon the regime. The regimes either can or cannot be characterized (or determined) by an observable variable. The first class of models is represented by "threshold autoregressive models" (TAR) in which the regimes are determined

by the value of a specified variable (typically one of the lagged values of the dependent variable) relative to a specific threshold value. The transition from one regime to another can be either abrupt, leading to a "self-exciting" (SETAR) model, or it can be smoothed by a transition function (typically a logistic one) leading to a STAR model. The second class of models is represented by a Markov-switching model in which different regimes are assigned different probabilities of occurring. Both classes of models are illustrated by examples. An application of the STAR model to forecasting Dutch guilder exchange rates shows that "there is not much to be gained by using the STAR model" although "occasionally the nonlinear model renders superior forecasts, especially 4 or 5 weeks ahead."

The fourth chapter deals with the regime-switching models for volatility. The motivation is based on the common observation that in financial data periods of large movements in prices alternate with periods of little change. The whole chapter revolves around various extensions of the autoregressive conditionally heteroskedastic (ARCH) or generalized ARCH (GARCH) models to allow for the observation that negative shocks affect volatility quite differently than positive shocks of equal size. (Incidentally, this is the only instance in the book where a theoretical justification--in the form of a "leverage effect"--is given for a regularly observed phenomenon.) Empirical tests provide "ample evidence for (the appropriateness of the) nonlinear ARCH" model. With regard to forecasting, the results for volatility on the Tokyo stock market show that the forecasts of out-of-sample returns for linear and nonlinear GARCH models are not much different, and that the

models "explain only a small fraction of the variability in the conditional variance of the returns."

The final substantive chapter involves "currently fashionable" artificial neural network (ANN) models for financial returns. These models, represented by a rather complicated function (a chain of logistic functions) of the lagged values of the dependent variable, "have been shown to be able to approximate almost any nonlinear function arbitrarily close (to any desired level of accuracy)." The ANNs are explained in some detail, including a special nomenclature. The drawback of these models is that their parameters are difficult to interpret, and that there is a danger of "overfitting", i.e., fitting irregular and unpredictable noise specific to the sample at hand. In an example dealing with an application of ANN to weekly returns on Japanese yen/US dollar exchange rates and to absolute returns on the Frankfurt stock index, the results show that "there is not much to be gained using ANNs in terms of predicting the direction of change" when compared with linear AR models.

The concluding chapter contains a brief summary of the preceding chapters, and a list of topics such as seasonality or stochastic volatility not covered in the discussion. The concluding paragraph at the end of the text of the book presents an overall assessment of the presented results and is rather telling in that it recognizes the meager, if any, success in coming up with practically useful forecasts of stock market prices and/or exchange rates. The authors' explanation is that "having reliable forecasts at hand can be rather important, but still the question remains open whether one learns anything about the underlying economic process." Concerning the

latter, the authors proclaim: "we do believe that the empirical evidence should be taken seriously when considering, for example, Value-at-Risk, option pricing and portfolio management. Much too often it is assumed that returns have a symmetric distribution (and often unconditional normal) around a constant mean with a common variance. The empirical finance literature provides ample evidence that this assumption is not even close to being valid."

The closing paragraph of the book gives a fair assessment of the state-of-the-art concerning time series analysis of financial data, namely its success in capturing observed dynamic patterns and its lack of success in reliable forecast-

ing. It is also clear that no success in reliable forecasting can be forthcoming as long as the reasons for the existence of the observed patterns are not theoretically determined. Until then the statistical analysis of financial time series will remain what it is today--a potentially interesting and certainly clever academic activity. Quantitative business economists will find the book useful in keeping up with current research, and practitioners will find it useful in understanding why the original objective of the Cowles Commission remains unfinished. ■

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#### EDITOR'S NOTES

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