



## Is the Market Efficient?

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*And, spite of pride, in erring reason's spite,  
One truth is clear, Whatever is, is right.*

*Pope*

After Marxism, no economic theory today may be as derided and despised as the hypothesis of **market efficiency**. Many have long decried it for denying the successes and personal autonomy of investors, and now it is being fingered as the ideology responsible for the recent financial crisis. Yet the hypothesis of market efficiency is much better grounded than Marxism (its opposite in principle) in clear analytical argument and evidence, and it even accords well with common sense, once one grasps it. But the idea is often misunderstood, sometimes willfully.

So what does "market efficiency" mean? Many of its detractors don't know.

### **The definition of market efficiency**

There are several closely overlapping meanings of "efficient" in the context of financial markets. One is that the prices of investments reflect all information relevant to their valuation. Another is that *changes* in prices reflect *changes* in relevant information very quickly. This is called "informational efficiency." And yet another is that prices reflect all relevant information *correctly*. This last meaning has the greatest implications for society and is the most problematic. It drags us from the purity of finance into the mud of politics and social theory.

Whether any of these meanings, especially the first, describes the actual behavior of market prices has enormous practical implications for how we should go about investing.

The father of the hypothesis of market efficiency, Eugene Fama, of the Booth School of Business at the University of Chicago, developed the hypothesis and conducted the initial



research that confirmed it in the 1960s. Ever since, the efficient markets hypothesis has been closely identified with the Chicago school of economic thought.<sup>1</sup>

The common sense that underlies the hypothesis is that, because numerous investment professionals and serious non-professionals, many of them intelligent and diligent, are constantly analyzing and judging each investment that is traded in public view, no single investment strategy or analytical style can prove more effective than the consensus for any length of time. As the investors trade, they move the prices of bonds, stocks, and so forth, toward what they collectively believe the investments to be worth. Anyone who discovers an advantage is quickly found out by the others, and the advantage disappears as all the competitors pile on and change the prices. It doesn't necessarily take many investment traders to create a highly competitive market.

Fama proposed that there might be three forms of the efficient markets hypothesis: the weak form, the semi-strong form, and the strong form. All three forms are variants of the first of the three aforesaid meanings, that prices reflect all information relevant to valuation.

The weak form of market efficiency is that the prices of all investments reflect or incorporate – the economists' word is **impound** – all information contained in past prices. What this means in practice is that you can't predict future returns from past prices, because the current price already reflects everything that can be learned from past prices. This is plausible, because past prices are the most readily available information about an investment, and therefore the most readily used by all interested investors. Charts of past prices are ubiquitous. This form of efficiency implies, therefore, that technical analysis is useless. (As we saw in an earlier [article](#), "technical analysis" is the name given to the esoteric practice of some analysts who do just this: try to predict future prices from patterns of past prices.)

The semi-strong form of market efficiency is that the prices of all investments impound all the *publicly-available* information in the world (but not private information). Semi-strong-form market efficiency subsumes weak-form market efficiency. Semi-strong-form market efficiency has a severe corollary: You can't forecast returns with any published information, and all investment analysis is useless. That means that not just technical analysis, but fundamental analysis of publicly-traded investments (the study of accounting data and economic conditions affecting investments) is a waste of the individual analyst's time.

The strong form of market efficiency is that the prices of all investments impound *all* the information in the world, private as well as public. Strong-form efficiency subsumes semi-strong-form efficiency. This means that no one can predict the future return of an investment in any way whatsoever.

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<sup>1</sup> The best popular account of the efficient markets hypothesis is the recent book by Justin Fox, [The Myth of the Rational Market: A History of Risk, Reward, and Delusion on Wall Street](#) (HarperBusiness, 2009), which provides the historical context, replete with character sketches, of the development of the idea. The book itself is balanced and belies the loaded word "myth" in its title.



The strong form of market efficiency is clearly false, because it implies that no one could profit by cheating, and if you have learned little else from Wall Street shenanigans over the last decade or two – and matters were, if anything, worse in earlier times – you know that insiders can guarantee themselves pots of money at the expense of others, sometimes even if they're caught at it. So let's forget about strong-form efficiency, and consider the other two forms of the hypothesis.

### **Consequences of the hypothesis**

Because there is no objective, God-given value for any stock, bond, or other investment, we are unable to test the hypothesis of semi-strong-form market efficiency by comparing known prices to known values of investments and seeing whether they unambiguously match. Investment values are fallible estimates made by each analyst or investor. Only prices are known with reasonable certainty. So tests of market efficiency rely on inference. One implication of market efficiency is that there is no point to picking stocks, or any other kind of investment, because you (or the investment manager you might hire) cannot *consistently* identify the investments that will be the winners except through an extraordinary run of sheer good luck. As a professor of mine at Chicago snarkily said, analysts cannot identify the winners and the losers, or if they can, they can't tell them apart. Therefore, if we can show that the past performance of investment analysts and managers doesn't predict their future performance, we have evidence that conforms to the semi-strong-form market efficiency.

Semi-strong-form market efficiency (which, in the interest of brevity, I will henceforth call simply "market efficiency") is a step – a big step – beyond a position at which we can arrive through mathematical reason.

In an earlier essay, I pointed out that very roughly half of all the people and institutions who are choosing investments must do worse than the market, because the return on the market is the average of all the returns of all the investments it contains, and more than half the investment analysts and managers can't beat the average.<sup>2</sup> But of the approximate half who do get results better than the total market's, a large proportion must be simply lucky. Stock-picking (or any other investment-picking) is not like a sports league, where rank is what it is, and corresponds roughly to the skill exhibited in the current season versus the other individual players or teams. The ball being pitched toward you in the investment markets, in contrast, wasn't hurled by one of your fellow investment analysts in a regulated game; it was hurled by the entire world of nature and mankind, in an arena where many may not abide by what few rules do exist. Accounting rules may be ignored or bent. Important executives can die or be hired away without notice. Oil rigs can

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<sup>2</sup> *Ibid.* There is a long footnote that qualifies this statement, pointing out, among other things, that half the dollars invested, rather than half the investors, underperform, but it is still roughly true that about half the people responsible for investing cannot outperform the market. Those who don't choose particular investments, but instead invest in market index funds, are right at the average, less the modest fees that they pay.



burn and collapse. Volcanoes can disrupt transportation. So at least a large proportion of those investment managers who do better or worse than the market, over any span of time one might select, should ascribe their fortune, good or ill, to pure chance.<sup>3</sup>

The hypothesis of market efficiency goes beyond this argument to imply that nearly all of the remainder of investment analysts and managers, the ones who appear to be successful, are also merely lucky. (No one, not even Fama, goes so far as to deny that someone might have the skill to achieve returns that are superior to the market's.) Thus, regardless of the validity of the efficient markets hypothesis, it must always be the case that only a minority of investors can get better returns than the financial markets through their skill, and if the financial markets are efficient, then this minority is very, very tiny.

### **Empirical tests of the hypothesis**

Market efficiency is, in the first instance, an hypothesis, not an ideology, and it would be of little practical concern if there were no evidence for it. As academic researchers investigated, following Fama's lead, they did find, and they continue to find, plentiful statistical evidence to support it. And much of this evidence has been in the form of investment managers' results. For example, a researcher can rank all investment managers of U.S. stocks by their performance in a given year, and then divide them into four groups: the top quarter, the second quarter, the third quarter, and the bottom quarter. Then, using the methods of statistical analysis, the research finds that the manager in one group is as likely in the next year to turn up in any of the other groups as to remain in her current group. In short, past performance provides no indication of future performance. This has been shown over and over.

Another testable consequence of market efficiency is that the returns of securities should move randomly. (This idea actually long antedates the development of the efficient market hypothesis, and goes back to 1900.<sup>4</sup>) This idea is frequently misunderstood. First, it's *returns*, which are changes of price, not prices themselves, that are suspected of being random. (If returns are random and average to 0, then your best estimate of the future price is the current price.) And the randomness doesn't imply that returns are without reason. If prices currently impound all publicly available information, then only unexpected news can change them, and the unexpected is random; if it weren't random, you'd learn to expect it, wouldn't you? Of course, the returns are not entirely random; there's a slight upward drift, because, as history teaches, the market sets prices that will produce on average, and over time, a positive return, but over most periods, this slight upward drift is barely detectable. Therefore, the most accurate prediction of the future price of an investment is the current price, or the current price plus a tiny increase. Economists have

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<sup>3</sup> One instance of spectacular luck of either sort can, through the mathematics of compound returns, produce effects that persist in the average return over long spans of time. One might argue that the skilled analyst responds more appropriately to surprises than the less skilled; perhaps so, but I think we can agree that not everyone whose investment results are above average has skill.

<sup>4</sup> Louis Bachelier, [\*Louis Bachelier's Theory of Speculation: The Origins of Modern Finance\*](#), trans. Mark Davis and Alison Etheridge (Princeton: Princeton University Press, 2006).



found that what is known as a “generalized Wiener process” produces a fairly accurate mathematical representation – not prediction – of the random nature of changing investment prices over time.

So another way of testing the efficient markets hypothesis has been through efforts to detect regular patterns in returns. If regular patterns exist, then one might successfully make predictions from them, and both weak-form market efficiency and semi-strong-form efficiency would be rendered false. Note that I said “regular” patterns. Many who are unfamiliar with the escapades of randomness don’t realize how they create meaningless patterns to which the mind readily attributes meaning, the way we can recognize familiar patterns in the shapes of individual clouds. But again, research has failed to find much in the way of financially exploitable regularities in the patterns of investment prices or returns.<sup>5</sup>

Yet another test of market efficiency is of the validity of the second definition that I gave earlier, that changes in prices reflect changes in relevant information with great rapidity. So researchers choose a kind of event that takes place at a single instant, like the public announcement of a corporate merger or a takeover, and see how quickly prices respond (regardless of whether the direction is up or down). These are called **event studies**. And the upshot is that prices respond very, very quickly, almost instantaneously, as market participants rush to trade on the new information. The alternative would be that the prices show a recognizable drift over hours, days, or weeks, creating regular patterns that could be exploited; but they don’t.<sup>6</sup> Market participants aren’t so careless as to permit investment gains to lie about for any length of time. Cupidity is too strong a force.

It is this definition of market efficiency that is parodied in the well-worn joke that two Chicago economists were walking down the street, when one suddenly said, “Look, there’s a twenty-dollar bill.” The other replied, “There can’t be. If there were, someone would already have picked it up.”

(Several years ago, I was walking through Harvard Square with an economist friend when he suddenly stopped short. I followed his gaze, and there, on the pavement in front of us, was a five-dollar bill. Neither of us said anything; we just turned to each other and grinned. Then, because he was trained at MIT whereas I was trained at Chicago, he pocketed the bill.)

In short, the evidence of rigorous statistical research into the financial markets, as distinct from casual observations and anecdotes, overwhelmingly supports the hypothesis of market efficiency.

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<sup>5</sup> I did briefly mention in the *Newsletter*, issue 6, *loc. cit.*, that there is some research pointing to short-term exploitable patterns.

<sup>6</sup> This is not strictly true. In the 1990s, “quants” successfully exploited strategies based on delayed reactions to earnings forecasts and announcements. I don’t know whether such models are still being found useful. In any case, they resulted in very high rates of turnover of investment holdings, and could therefore be exploited only if transaction costs were extremely low and if the investments were tax-free.



And yet, credible, even undeniable, evidence against the purest market efficiency began to appear almost from the outset of this research program. Some of the exceptions have become well known even to those for whom investing holds no special fascination, such as the tendency of stocks to have their largest returns in January, and the tendency of the stocks of smaller companies to have greater returns over the long run than stocks of larger companies. These exceptions aren't the spawn of anecdotes or professional mythology; they're demonstrable with rigorous statistical methods to the satisfaction of the most critical researcher. Such exceptions – and there are many others – are dubbed **anomalies**. Other violations of market efficiency have occasionally been seen, such as the stock of one company selling for different prices in different markets at the same time. But the proponents of the efficient markets hypothesis remain unperturbed, because with hardly any exceptions – the main one being the small-company effect – these anomalies cannot be exploited for investment gain. In the case of most anomalies, the costs of buying and selling stocks (the transaction costs, mainly brokerage costs), would wipe out any possible gain. Other anomalies are very special cases that can produce only small gains from time to time, or can't practically be exploited for reasons other than transaction costs.

The exceptions therefore proved or tested the hypothesis but didn't discredit it.

### **No testing without risk**

But tests of the efficient markets hypothesis have an Achilles' heel: risk. I find it odd that those who disparage the theory seldom raise this point, which is so critical to an understanding of market efficiency. Perhaps it's because so few appreciate how inseparable risk is from return.

Recall from my previous essay that the value of an investment depends upon estimates of the cash flows it will generate and the discount factors that convert those future cash flows into their value in today's dollars. We multiply each future cash flow from an investment by its appropriate discount factor and sum the results to find the value of the investment today. And recall also that each discount factor is itself the sum of components that consist of a base and one or more others that compensate for different kinds of investment risk. But as we have also [seen](#), not all risks are compensated by return. In particular, you shouldn't expect compensatory return for a risk that is easily avoided. The analogy I used was of driving drunk: Unlike driving above the speed limit, driving drunk introduces risks that aren't compensated by, say, arriving sooner. So, as markets value investments during their back-and-forth buying and selling, buyers won't receive a discount for some risks that they can easily avoid.

Consequently, the financial scholars who test the hypothesis of market efficiency don't look at just the historical volatility of returns, for two reasons. First, as we [saw](#) way back when we first considered risk, simple volatility doesn't equate to risk, and second, not all the risk



represented by volatility is relevant to an evaluation of return. So researchers make use of **risk models**.

### How Risk Models Work

Risk models are highly refined abstractions, but here's a simple example that, though it doesn't render the abstract concrete, should at least make easy sense. [Recall](#) that, at least in theory, to calculate an investment's value, you multiply each of its forecast cash flows by an appropriate discount factor, which takes into account the risk to the cash flow, and then you sum up the discounted cash flows. And each discount factor consists of a basic component that applies to all investments, even the least risky, plus one or more components that reflect the risk of the particular investment. The point of a risk model is to calculate this other component, or components. Let's postulate, for example, that there is only one other component and therefore only one **risk factor** that creates investment risk for stocks. You may ask what this risk factor is. Well, we know that individual stocks tend to move up and down as the entire market moves up and down, so let's identify our single risk factor as being the movement (the return, that is) of the entire stock market. Each stock has its characteristic way of responding to the movement of the market; that is, each stock has a particular **exposure** to the stock market risk factor. So our one-factor risk model for stocks might look like this:

$$S = d + (b * D) + e$$

**S** is the discount factor for a future cash flow produced by our stock, which is what we want to know. **d** is the most basic discount factor that applies to all investments, even the ones that have no risk at all. **D** is discount factor that corresponds to the risky return of the stock market. **b** is the exposure of our stock to the risk of the entire stock market, say, 50% or 98% or 132%, and **e** represents something I'll explain in a moment.

Note well that, although they're both "factors," discount factors and risk factors are very different concepts.

It's much easier to deal with actual returns, which we can see, than with discount factors, which we can't, so in practice, our risk model should look like this:

$$S = r + (b * R) + e$$

**S** is now the return of our stock (per some unit of time, let's say a year). **r** is the most basic return that is produced by all investments, even the ones that have no risk at all (also per year). **R**, our risk factor, is the return of the stock market above that most basic return (also per year). **b** is the exposure of our stock to stock market risk, say, 50% or 98% or 132%. **e** represents the extra return, positive or negative and of various sizes, that in any given period (in this case, a year) our



stock in all its glorious idiosyncrasy produces beyond the return that compensates for risk. It represents all the unpredictability in the stock's return.

If our risk model fully comprehends all the risk that is compensated by return, and if the stock market is efficient, then  $e$  will average to 0 both over time and over all the stocks bought by my investment strategy or investment manager. If, when we calculate the values of these variables in actual practice, we find that  $e$  does not average to 0, then our risk model is no good, or the market is not efficient because my strategy (or manager) has discovered a predictable component of return that is independent of risk, or both.

### Typology of risk models

Risk models fall into two main categories: models of the world that derive from first economic principles, and *ad hoc* models that plausibly fit accounting and economic data. There are really just two instances of the former, the **Capital Asset Pricing Model** (CAPM, pronounced "cap-em"), which was independently invented by several economists around the time that Fama began his exploration of market efficiency, and the **Arbitrage Pricing Theory** model (known as APT, no blood of mine, and pronounced "ay-pee-tee.") APT is really a class of very similar models with differing risk factors rather than a single model. The *ad hoc* models, some of them born of academic research, others born of financial services businesses – I once worked for one such firm – serve several purposes, but mostly the correct apportionment of investments for the creation of a portfolio, rather than risk analysis. What really distinguishes the two categories at the conceptual level is that the risk factors in the *ad hoc* models aren't necessarily compensated by return in the long run, even though they're associated with return in the short run. In the global models, return is commensurate with risk in the long run.<sup>7</sup> (In deference to their investment management clients, the commercial vendors of the *ad hoc* models tend to be agnostic about returns and therefore about market efficiency.)

### Efficiency and risk models intertwined

The upshot, then, is that nearly any test of the efficient markets hypothesis is simultaneously a test of a risk model required for evaluating the investment returns. Let's say, by way of illustration, that you're investigating the performance of mutual funds, and you find a group of funds that had better performance than the market. You calculate the exposure of their portfolios to risk using a risk model that has, let's say, two factors, one representing the risk associated with the company size, the other representing the risk associated with the price-to-earnings ratio. You find that this group of money managers had portfolios consisting of the stocks of companies that were small and had low price-to-earnings ratios. It happens that these two factors were associated with returns that were

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<sup>7</sup> Fama and Kenneth French, another academic who was a student of Fama's, have created a model that is a variant of the CAPM and somewhat resembles the *ad hoc* models, but in which the extra risk factors are compensated by return in the long run. Incidentally, the simple one-factor risk model that I presented above is the CAPM, but here I simply posited it in a sentence without explaining all the subtle reasoning that makes it so wonderful.



superior to the stock market's during the test period. After adjusting the actual returns to take into account the risks as defined by the two factors, you find that the leftover returns, the **residual returns** ( $e$ , in our equation above), were worse than the market's. Hence, no contradiction of the efficient markets hypothesis.

By yoking hypothesis to model we are *not* ensuring that the team succeeds. Some tests of market efficiency fail, and then one faces a choice: rejection of the efficient markets hypothesis, or rejection of the risk model. To put it another way, if you think you've found an investment strategy or an investment manager who beat the market, either it or she really did, and the market isn't entirely efficient, or you didn't use the right risk model to correct the observed returns. It is now universally agreed that the CAPM and the efficient markets hypothesis cannot both be true. (The small-company anomaly is one of the reasons for this.) This is tragic, both because market efficiency appeals to reason on a *priori* grounds, and because the CAPM is one of the most elegant models in finance.<sup>8</sup> That is, "elegant" in the sense used by mathematicians and physicists, to reflect the aesthetic response to a consequential proof or model of great conceptual simplicity and internal consistency that draws together seemingly disparate threads. "How happy could I be with either, were t'other dear charmer away."

Some researchers try to explain away the market anomalies by designing ever more refined risk models, like, say, a model according to which investment risk increases in January, to explain the January effect. This may leave you with a dizzy sense of running in a circular argument, but I can assure you the researchers aren't (necessarily) making this elementary mistake. The identification of risk factors requires rigorous statistical methods and is independent of doing whatever it takes to save the efficient markets hypothesis.

There is no question, though, that the case for market efficiency is tender in its dependence on risk models. And there are further weaknesses. Nearly all risk models treat investment risk as a form of volatility, and, as we've already seen, volatility (as commonly understood by statisticians), though useful, is an incomplete measure of true investment risk. There is a more profound problem: Even if God were to tell us that we'd discovered the true model of risk, we would have only the form of the model, not the actual values of the factors and exposures that obtained for the time intervals during which we were evaluating investment strategies and managers. That is, for example, we would be told that the equation I gave earlier was true, but we wouldn't know the actual values of  $b$ . We estimate these values from historical data, using well-established mathematical methods from statistics, but they are still only imperfect inferences of the true values, unless God were to give us the numbers, too. That would be asking too much.

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<sup>8</sup> CAPM also shows logically why a representative sample of the entire market ought to be part of your portfolio, which is more intellectually gratifying than it's just being the default investment after market efficiency rules out the possibility of adding value through picking individual investments.



All the same, and even after acknowledging the imperfections of our base sublunary economic world, the evidence for the efficient markets hypothesis continues to be overwhelming, and the evidence for contradictions very weak and elusive. And this comports well with our regard for the economics of the free market.

### **Efficient markets and free markets**

For, what are the financial markets but very nearly the ideal of free markets, where all the participants have ready access to all pertinent information and can transact quickly and at very low cost? Indeed, if the financial markets are inefficient, what hope can there be that markets where transactions are less public and more costly, and where information is more sparse, like the markets for labor and housing, can allocate resources reliably on their own? Yes, plausibly, the financial markets might experience short-term deviations from true value that would not be inconsistent with virtuous free markets. But many who claim success in beating the market aren't short-term traders but long-term investors who hold their investments for very long periods.

For some believers, therefore, market efficiency often transcends trust in the empirical evidence into an ideological belief that the markets always price investments appropriately. It is this apotheosis of the efficient markets hypothesis that has been blamed by many for the late financial crisis. It expands beyond a plausible and testable hypothesis to become an all-encompassing theory.<sup>9</sup> It begins with two observations: first, that the empirical evidence for the hypothesis in individual markets, in particular, the stock market, is extremely persuasive, and second, that there exists no objective standard of correct valuation of an investment. Analysts' and investment managers' analyses are always fallible inferences from incomplete and obscure data, however careful and rigorous their work may be. They can be proven correct only if the market subsequently agrees with them. If the market never reprices an investment in line with an analyst's judgment, then *ipso facto*, that judgment was wrong. Given the strong evidence that one can't do better than the market in pricing individual stocks and bonds, one might further infer or extrapolate that one can't get ahead of the market in pricing entire subclasses and classes of assets. The market itself is the keeper of the hidden correct analyses.

So there is a politico-economic aspect to belief in market efficiency. This belief has deeper roots than mere personal inclination, though temperament and inclination surely account for some of its tenacity. The efficient markets hypothesis bears a close resemblance to **rational expectations theory**, whose bailiwick is macroeconomics (the economics of nations and other political entities, as distinct from microeconomics, which covers the interactions of individuals and businesses). The resemblance is so strong that some of the opprobrium directed toward the efficient markets hypothesis is probably intended for rational expectations theory instead. According to this theory, which originated in the 1960s but blossomed under the ministrations of Robert Lucas, of the University of Chicago, in the 1970s (and has roots deep in the history of economic thought), citizens are rational actors who reasonably anticipate, in their economic behavior, the consequences of

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<sup>9</sup> In my first sentence of this essay, I knowingly blurred the distinction between a theory and an hypothesis.



future economic actions. For example, if they know that taxes will rise at some point in the future, they will appropriately adjust their saving and spending to reflect this. This theory underlies the insistence by John Taylor, of Stanford, and by many other economists of the political right, that the recent recession should have been addressed by permanent, not temporary tax cuts, because consumers would anticipate the end of temporary tax cuts and would therefore increase their spending comparatively little. Rational expectations theory, though still influential, is no longer in its heyday, and it is beset by a number of logical and economic paradoxes. For example, if every recession is fixed with a permanent tax cut, won't taxes eventually fall to 0 (if the cuts are fixed percentage points) or won't the cuts become negligibly small, with little impact (if they are fixed percentages)? Unless, of course, through cutting taxes we arrive at a Utopia that banishes recessions. Naturally, the economists working on rational expectations theory and those working on the efficient markets hypothesis knew each other and traded ideas, so the resemblance between the two constructs is not accidental.

Please indulge me while I lapse from logical argument into sweeping generalizations. I don't believe that anyone on the true left – and few Americans these days are on the true left – cares one whit about market efficiency, because a socialist presumes that free markets usually produce suboptimal outcomes. In his view, the question of market efficiency is of no interest. In the political center, of both right and left tendency, there was for a time some sympathy with the hypothesis of market efficiency, but also skepticism. It confirms, for example, a lingering suspicion that mutual fund salesmen are shysters, because they're selling enticements of investment performance that will only disappoint the buyers, and for high fees. Among those at the center, there are steady calls for government regulation or industry reform that will increase transparency to make markets more efficient (in the informational sense). But those in the center also think that free markets sometimes get things wrong, and after the recent financial disaster, many at the political center who were unfamiliar with the academic roots of the theory came to identify the hypothesis with the political forces that loosed all restraints on greedy Wall Street. What I find curious is the bifurcation on the political right. On the one hand, there are those, free marketers all, especially of the Chicago school, who consistently argue that the financial markets are at all times efficient and price investments appropriately. But on the other hand, some of those who have for so long most vehemently rejected the efficient markets hypothesis are also on the political right, which seems inconsistent with their avowed belief that free markets produce optimal economic outcomes. I write this down to their sense that if markets were efficient, then Society would be denying their personal autonomy in the choice of superior investments.

### **“Fortune's always hiding / I've looked everywhere”**

Among those who continue to cleave to the comprehensive theory of market efficiency, **bubble** has become a foul word. “Bubble” is bandied about by the press and the public with little regard to meaning. There was the “dotcom” or “tech bubble,” the “housing bubble,” the “commodities bubble,” and now a new fear that investor fads and government



policies are creating more bubbles. Is gold in a bubble? U.S. government bonds? I'm bemused at having recently heard a well-known analyst's address in which he forecast where the next bubbles are going to be, even though they're not bubbles now. Some efficient market purists, in contrast, deny even that there can be such a thing as a bubble, while others say that if bubbles exist, they can be identified only after their bursting. As the economist Peter Garber wrote in 2000, "Bubble is one of the most beautiful concepts in economics and finance in that it is a fuzzy word filled with import but lacking a solid operational definition."<sup>10</sup> In the book where Garber wrote those words, first he picks apart the semantics of "bubble," then he presents historical research to demonstrate that several of the most famous bubbles, such as the Dutch "tulipmania" of the mid-seventeenth century, were not, in actuality, bubbles, but price rises explicable by rational economic fundamental analyses. In 2007, Garber was still denying that housing prices were in a bubble. If you are inclined to scoff, reflect more broadly. Recall Alan Greenspan's famous expression, "irrational exuberance," which he introduced in a speech he delivered on December 5, 1996.<sup>11</sup> On that date, the S&P 500, a broad measure of the U.S. stock market, closed at 744.38. Apart from some fluctuations over the next few days, the market did not again descend to that level until the recent financial crisis. On March 9, 2009, at the depth of the market crash, it stood at 676.53. But because of dividends paid out by the stock market over the twelve years and three months following the speech, the market actually returned nearly 20%. That's only about 1.5% per year, not enough to keep up with inflation, but measured to the depths of a tremendous market crash more than twelve years later, it hardly bespeaks a bubble. Perhaps bubbles aren't so obvious, after all.

"Bubble" is used more often to refer to rapid rises in the price of entire asset classes than to rapid rises in the price of individual investments (although one might have spoken, for example of a bubble in the stock of Taser International a few years back). If there are, indeed, bubbles, whatever they may be, in asset classes, would this not falsify the efficient markets hypothesis? Not necessarily; not in all its versions. Although the efficiency of the pricing of asset classes has not been demonstrated with anywhere near the persuasiveness that the efficiency of pricing individual securities within an asset class has been, this is because tests of the efficiency of pricing entire asset classes are much more difficult to design and execute. You may be assuming that if all the assets within an asset class are priced efficiently, then the entire asset class is, as well. But this need not be the case. The market could price all the assets correctly with respect to each other while still getting something systematically wrong for all of them. For example, a fantastical economic forecast might infect the forecast cash flows for all the investments in an asset

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<sup>10</sup> Peter M. Garber, *Famous First Bubbles: The Fundamentals of Early Manias*. (Cambridge: The MIT Press, 2000), p. 4.

<sup>11</sup> Greenspan did not actually say that the market was then in a bubble. He would never have spoken so bluntly, and besides, he didn't believe that he could identify a bubble until after the fact. But perhaps because many already feared that the market had risen too far too fast, it was widely believed at the time and ever after that he was suggesting that we were then experiencing a bubble, and surely he knew that his words would be interpreted that way. *The Wall Street Journal* excoriated him the next day for undermining confidence in the market. His actual words were, "But how do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan over the past decade?" He added that "We as central bankers need not be concerned if a collapsing financial asset bubble does not threaten to impair the real economy, its production, jobs and price stability."



class, like mortgage-backed securities, or perhaps the discount factors might all reflect an underestimate of the risk of unfortunate outcomes. So, regardless of whether “bubble” is a useful descriptor, the market could get an entire asset class wrong while still being better than any investor at judging the prices of distinct investments within the asset class. The validity of only the transcendent theory of the efficient markets hypothesis would be cast in doubt.

### **The crisis of the hypothesis**

But there is something else awry with the view that the financial markets are always correct. Inasmuch as there is no objective standard for right and wrong investment valuations, the market can no more be correct than it can be wrong. Except for one thing: Every time the price of an investment changes, the market is tacitly acknowledging that the earlier price was wrong. Usually, the error appears only in the light of fresh information. But, although some efficient market purists may deny it, the market can acknowledge an incorrect analysis as well as incorrect or incomplete information; that is, the market participants, the ones setting the prices with their buying and selling, may conclude, even without new information, that their previous analyses were wrong. Or they may collectively change their demand for the amount of return that compensates for risk.

The recent financial crisis, and in particular, the dramatic fall in the prices of financial assets, presents an immense challenge to the believers in the transcendent theory of market efficiency. The market radically repriced investments with virtually no significant new information. And to save the notion that the markets are always correct, some of the Chicago school, normally clear-eyed and hard-nosed when explicating the workings of the free market, have become casual and flaccid in explaining how we could have had this terrible crash.

Fama, for example, has offered the deeply unsatisfying explanation that the recent financial crisis was caused by the Great Recession, rather than itself being a cause of the recession, and that no one knows what causes recessions.<sup>12</sup> There’s something to be said for the first half of this proposition, but I’m far from sure that it would be dispositive, or even as persuasive as the case for efficiency at the level of individual securities.

And John Cochrane, also of the University of Chicago (and Fama’s son-in-law), has said:

The market crashed, to which I would say, we had the events last September in which the President gets on television and says the financial markets are near collapse. On what planet do markets not crash after that?<sup>13</sup>

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<sup>12</sup> Eugene Fama, interviewed by John Cassidy in “After the Blowup,” in [The New Yorker](#), January 11, 2010, p. 30.

<sup>13</sup> John Cochrane, quoted by John Cassidy, [Ibid.](#)



I'm quite sure that I'm not naïve in thinking a television address by George W. Bush is one of the least persuasive explanations of the collapse of the stock market and credit markets, even when considered as unexpected information for the markets to digest.

Inefficiency at the level of asset classes has important implications for public policy that are beyond the scope of this essay. The implications for investors, though, are worth consideration, but no clearer for that. As the example of "irrational exuberance" teaches, it is by no means obvious when an asset class is grossly overvalued and headed for a fall. In the case of housing prices before the recent financial crisis and the mortgage-backed bonds whose values depended on those prices, a number of analysts correctly calculated that they were grossly inflated, and they took advantage of this, as recounted by Michael Lewis in [The Big Short](#). The hedge fund manager John Paulson was another of these analysts. They were out ahead of the rest of the market in their analyses, and won big for themselves and their clients when the market caught up with them.

### **Popular misconceptions about market efficiency**

This exemplifies a misconception about market efficiency, which is that it rules out the possibility that an analyst can correctly anticipate a change of price and make money by doing so. It is this possibility that trips up both proponents and detractors of the hypothesis. It is indeed possible for an analyst to anticipate correctly, through thoughtful analysis of valuations, returns in stock prices or the prices of entire asset classes, yet not violate the hypothesis. Always, some investors are ahead of the averages, and others are behind the averages when prices change, even after adjusting for risk. Only an ungenerous curmudgeon would insist that every last one of those who wins is merely lucky. The hypothesis rules out only the possibility of *repeated* investment success (after allowing for risk).

The point of the efficient markets hypothesis is that these analysts can't make their calls *consistently*, in a way that would permit statistical proof that they had investment skill. Financial economists rely on statistical proof. This isn't airtight, like mathematical proof which relies on the logic of deduction and induction, but it can be sufficiently convincing to allow for predictions. I'm an historian, and I therefore know that one *might* be able to construct convincing narrative explanations for any given instance of investment success, but not for all instances. Unlike statistical proof, though, which builds upon repeated observations, narrative explanation doesn't confer any predictive ability. So, while I may be able to explain why someone made a correct investment call once, or more than once, I can't thereby infer that he'll be successful in the future. It is a misconception of the efficient market purists, who think exclusively in statistical analyses, that anyone's investment success is either luck or indistinguishable from luck.

Here are three more common misconceptions about the efficient markets hypothesis.



First, there is the opposite misconception, that a string of investment successes necessarily bespeaks investment skill. There's nothing like repeated investment success to foster the illusion that a manager is brilliant, and no one labors under this illusion more than the successful manager himself. But as I've already [written](#), "Any mountebank or fool can achieve returns better than the stock market's by a combination of 1) taking on more risk than the stock market's own risk, and 2) being lucky." First, of course, you have to adjust the manager's returns for risk, preferably by using a risk model. That may explain away the apparent success. Consider the case of Bill Miller, the manager of the Legg Mason Cap Mgmt Value Fund (ticker symbol LMVTX). He became famous for beating the S&P 500 every year for fifteen years from 1991 to 2005. But his performance over the next three years wiped out nearly all his gains. Furthermore, only those investors who got into his fund before 1994, when he had less than a three-year record, would have achieved any positive incremental return at all.<sup>14</sup> He had a very good year in 2009, but he has very far to go if he is to regain his credibility.

Consistency is a matter of degree. Apart from Bill Miller, another investment professional with highly consistent results was Bernard Madoff, and his consistency should have been a tipoff that his returns could not be converted into real money. Although there is no mathematical prohibition against an investor's achieving superior results every month or every year for two decades, it's about as likely as a batter hitting 1.000, which itself is not precluded by the laws of physics. It won't happen. The few genuinely successful investors go through bad patches, the consequence of making investment choices that bear fruit only after a patient wait for the market to catch up with the investor's prescience. (How to infer skill from an investment manager's past returns is a fraught subject that I'll address in a future essay on investment performance.)

Second, there is a common mistaken belief that some sectors of the stock market are more efficient than others. I have often heard investment managers say that they exploit inefficient sectors of the market, by which they invariably mean the stocks of smaller companies. This is marketing guff, but it is believed even by those who speak it. It elides the distinction between two meanings of market efficiency. Recall that I said that there are three interrelated meanings of the expression "market efficiency." Most of this essay has been about the one according to which prices reflect all publicly available information about an investment. But there is also the meaning that changes in prices reflect changes in relevant information very quickly. This is the version parodied by the joke about the two economists and the twenty-dollar bill. No one has established a criterion for "very quickly." Yes, there are some stocks, mainly the numerous small ones, that get less attention from professional analysts than others do. If it takes a while for their prices to reflect relevant information, perhaps the prices are in a torpor until they jump up or down. Consequently, perhaps, the stocks of small companies should have bigger returns, but also more volatility. But we already know that the stocks of small companies have bigger returns. The question, then, is whether someone trawling the waters of supposedly inefficient

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<sup>14</sup> See William J. Bernstein, [\*The Investor's Manifesto: Preparing for Prosperity, Armageddon, and Everything In Between\*](#) (New York: John Wiley & Sons, 2010), pp. 52-54.



sectors of the market can achieve better returns than the ensemble of all stocks of small companies. My guess is, usually not.<sup>15</sup>

Third, many business and economics students, when first introduced to the efficient markets hypothesis, are captivated by the thought that, if everyone believes that the stock market is efficient, then everyone will hold a representative sample of the entire market, and no one will buy or sell, and the market will seize up. It's not going to happen, any more than state lotteries will be unable to sell tickets once the public realizes that they're a losing proposition. But furthermore, if prices were to cease to change and thereby disconnect from estimated value, immediately investors would step in to buy and to sell and reconnect perceived values and prices. And besides, there are numerous non-investment reasons for buying and selling, like cashing out a pension for money to spend.

## Conclusion

You may at this point wonder where I stand on the matter of market efficiency, because this essay has not been unambivalently either for the hypothesis or against it. That's an accurate reflection of my views. At the level of individual securities within an asset class or subclass, I believe that the evidence for the semi-strong form of the efficient markets hypothesis – and I ask you to take my word for this – is compelling. At this level, the hypothesis commands the respect, if not always the complete assent, of nearly all academic financial economists and even many “quants,” the investment professionals who have a strong grasp of probability and statistics. That's not to say that no one has the skill to beat the market, and even Eugene Fama concedes this. Everyone knows about Warren Buffett, though we don't know if he still has the ability. Some mutual funds, like the Dodge and Cox funds, and some hedge funds seem to reflect real skill in anticipating the markets. I have, myself, observed analysts at work and measured their performance, and I am convinced that they had real investment skill, though because of the way their insights were dissipated through the construction and marketing of the mutual funds that employed them, the customers didn't gain the benefit of their skill. But beware of investment advisors who talk confidently of their results or make investing seem easy. Far more likely than not, they have taken risks they don't understand and have mistaken their luck for intelligence. Investment skill is rarer by far than the claims to possess it.

At the level of entire classes of assets, though, I am less persuaded of the efficiency of markets. The case for market efficiency among asset classes is more theoretical than empirical. Clearly, however, droves of investment professionals are *not* beating the market by selecting asset classes, and, on average, they can't. The recent crisis has turned up some convincing examples of analysts who did correctly anticipate what would happen, but will they be, in effect, the financial equivalents of one-hit wonders, like Margaret Mitchell or Screamin' Jay Hawkins? The market may be inefficient in pricing asset classes

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<sup>15</sup> There's also the possibility that, while waiting for the prices of neglected stocks to change, the buyer is missing out on returns elsewhere in the market, the “opportunity cost.” Perhaps this effect exists, but it's overwhelmed by whatever makes the stocks of small companies have higher returns.



more in the sense that the aggregate prices can be seriously awry and therefore subject to drastic correction without radically new information entering the public domain, than in the sense that many professionals can repeatedly call the asset class returns correctly; this may be observable. Cassandra's problem wasn't that she was wrong.

And I think we would all do well to avoid the word "bubble," which serves no useful semantic purpose. If I believe that something is priced far below or above its value, I'll say so and why, and we can then have a productive conversation.

### **Counter-conclusion**

But the age-old belief in easy money from investing (or, rather, easy extra money) is immortal; it is too deeply embedded in the subconscious of even the most perfervid exponent of market efficiency. John Cochrane, one of the staunchest defenders of the efficient markets hypothesis, said in a recent [interview](#), "But there is always a silver lining in every cloud. ... In fact, one outcome of the financial crisis is that if you are 25, you get to buy stocks a lot cheaper than I bought them." There is only one sense in which stocks can be cheaper: Their prices are lower with respect to their intrinsic values. And this can't be, if the efficient markets hypothesis holds.

And Edward C. Prescott, of Arizona State University, wrote in *The Wall Street Journal* in justification of the privatization of Social Security, "The beauty of individual savings accounts is that each person decides how his money will be invested and, with the advent of the Internet, he can then monitor those investments at any time and easily make changes to react to changing investment news,"<sup>16</sup> as if the average citizen can readily take financial advantage of new investment information.

Did these economists hear what they were saying? Evidently, we are, all of us, too confident in our ability and even in others' ability to select superior investments ever to believe unwaveringly in the efficiency of markets.

The specter haunting the financial markets is not the efficient markets hypothesis.

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<sup>16</sup> Edward C. Prescott, "[Why Does the Government Patronize Us?](#)" *The Wall Street Journal*, November 11, 2004. To be fair, although Prescott is famous in some circles for his exposition of the "equity risk premium paradox," I haven't seen comments by him on the efficient markets hypothesis, but it's a reasonable presumption, given his other policy positions, that he's in sympathy with the Chicago School.



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