

The development, accomplishments and limitations of the theory of stock market efficiency

The Development, Accomplishments and Limitations of the Theory of Stock Market Efficiency

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Abstract

The nature and extent of our knowledge of stock market efficiency are examined. The development of "efficiency", as a way of thinking about stock markets, is traced from Roberts (1959) and Fama (1965) onward. The early work successfully introduced competitive economic theory to the study of stock markets and paved the way for a flood of empirical research on the relation between information and stock prices. This literature irreversibly altered our views on stock market behavior. The theory and evidence of seemingly-rational use of information lay in sharp contrast to prior beliefs. It was associated with a widespread increase in respect for stock markets, financial markets, and markets in general, at the time. Researchers began developing and using a variety of formal models of security prices. Nevertheless, "efficiency" has its limitations, both theoretically (as a way of characterizing markets) and empirically (by stretching the quality of the data, the estimation techniques used, and our knowledge of price behavior in competitive markets). Extensive evidence of anomalies suggests either that the market systematically misprices securities or that the theoretical or empirical limitations are binding, or both. The less interesting research question now is whether markets are efficient, and the more interesting question is how we can learn more about price and transactions behavior in competitive stock markets. The concept of an "efficient stock market" has stimulated both insight and controversy since Fama (1965) introduced it to the financial economics literature. As a construct, "efficiency" models the stock market in terms of the reaction of prices to the flow of information. Like all theory choices, modelling the market in this fashion involved tradeoffs. The benefits included opening the literature to an abundance of high-quality researchable data, covering a variety of information, and the resulting insights obtained on the role of information in setting prices. The opportunity costs included temporarily closing the literature to alternative ways of viewing stock markets, for example by modelling public information as a homogenous good and thus ignoring factors such as differences in beliefs among investors, differences in information processing costs, and the "animal spirits" that might drive group behavior. The costs also included reliance on particular asset-pricing models of how an "efficient" market would set prices. Not surprisingly, the ensuing deluge of research has produced some startling evidence, for and against the proposition that financial markets are "efficient". Strongly-conflicting views and puzzling anomalies remain. The early evidence seemed unexpectedly consistent with the theory. The theory, and its implications, also seemed clear at the time. After a period that seems short in retrospect, the growing body of evidence in favor of the efficient market hypothesis emerged as one of the most influential empirical areas of economics. Fama's (1970) review described a flourishing, coherent and confident literature. This research had an irreversible effect on our knowledge of and attitude toward stock markets, and financial markets generally. It coincided with an emergence of interest in, and respect for, all markets among economists and politicians, and influenced the worldwide trend toward "liberalizing" financial and other markets. The research consistently appeared to show an unbiased reaction of stock prices to public information. The property of "unbiased reaction" to public information, which formed the basis of the early definitions of "efficiency", was seen to be an implication of rational, maximizing investor behavior in competitive securities markets (Fama 1965, p.4). Reduced to a basic level, the reasoning was that any systematically-biased reaction to public information is costlessly publicly observable, and thus provides pure profit opportunities to be competed away. Characterizing the market in terms of its reaction to information is only one of many feasible ways of modelling stock price behavior, but it introduced economic theory to the empirical study of stock prices, which had received little serious attention from economists prior to that point. Despite the subsequent spate of anomalies, the early efficiency literature not only adapted standard economic theory to provide the first formal economic insights into how stock prices behave, but it helped pave the way for an outpouring of theoretical and empirical work on stock markets and capital markets in general. Subsequent empirical research was not as consistent with the theory. Evidence of "anomalous" return behavior now is widespread and well-known. It generally takes the form of variables (for example, size, day-of-the-week, P/E ratio, market/book value ratio, rank of scaled earnings change, dividend yield) that are significantly but inexplicably related to subsequent abnormal stock returns. Much of this evidence has defied rational economic explanation to date and appears to have caused many researchers to strongly qualify their views on market efficiency. Disagreement has not been confined to the evidence. The literature has produced a variety of research designs, ranging from the "market model" of Fama, Fisher, Jensen and Roll (FFJR, 1969) to Shiller's (1981a,b) variance-bounds tests. The very term "efficiency" has engendered controversy: there is a modest literature on precisely what efficiency means, on the role of transaction costs, and on whether efficient markets are logically feasible. Making sense of this literature requires careful definition of "efficiency" in this context and careful analysis of the type of evidence that has been offered in relation to it. This involves an assessment of the strengths and weaknesses of both the theory of efficient markets, as a way of characterizing stock markets, and of the data and research designs used in testing it. Not surprisingly, a mixed conclusion emerges. While the concept of efficient markets was an audacious departure from the comparative ignorance and suspicion among economists of stock markets that preceded it, and provides valuable insights into their behavior, the concept has its limitations, in terms of both its internal logical coherence and its fit with the data. Section 1 of this survey sketches the development of the efficient market theory, reviewing the principal contributions in terms of their usefulness in guiding and evaluating empirical research. Section 2 addresses the limitations inherent in what is knowable about stock market efficiency, given the present state of theory about how security prices might behave in an "efficient" market. It argues that there are binding limitations in the theory of asset pricing, some of which are known and others of which are unknown or even unknowable. These limitations must be borne in mind when choosing whether to interpret the data as evidence of: (1) market efficiency, under the maintained hypothesis that a specific research design, including a specific model of asset pricing used to benchmark price behavior, correctly describes pricing in an efficient market; or (2) the ability of our models and research designs to encapsulate how prices behave in an efficient market, under the maintained hypothesis of efficiency. Against this background, section 3 then provides an assessment of the accomplishments of the theory of stock market efficiency, including an interpretation of the evidence. It focuses on the nature and influence of the evidence and does not attempt to provide a comprehensive literature taxonomy. The final section offers conclusions. The principal conclusion is that the theory of efficient markets has irreversibly enhanced our knowledge of and respect for stock markets (and perhaps for all financial market or even for markets in general) but that, like all theories, it is fundamentally flawed.

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