Towards a new framework on efficient markets

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ARTICLE INFO

ABSTRACT

Academic research on the efficiency of financial markets goes back several decades. Empirical evidence is mixed and academia is torn between two opposing convictions: the efficient market hypothesis (EMH) vs. behavioural finance. The recent Nobel Prize awarded to scholars from both sides of the debate confirms the stalemate. We apply multiple state-of-the-art efficiency tests in rolling windows of one year to leading global stock market indices to test the adaptive markets hypothesis (AMH), a proposed reconciling framework. We find the idea of dynamic and time-variant efficiency to be valid. Also the theoretical pattern of efficiency predicted by the AMH is in line with our results. Furthermore, we find that the effect of the most recent financial crisis on weak form market efficiency is most prominent on the U.S. stock market. The European and Japanese markets appear more consistently efficient over the course of the last 15 years.

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1. Introduction

For more than 40 years, researchers have been debating about the informational efficiency of stock markets. Even during the 2013 lectures for the Nobel Prize in Economic Sciences, Fama and Shiller, representing respectively the efficient market hypothesis (EMH) and behavioural finance end

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of the spectrum, presented opposing evidence on the efficiency of stock markets. Given the renewed appraisal of research on stock market efficiency and the remarkable situation in which two opposing views seem to be irreconcilable, we expand upon earlier empirical work testing an alternative framework on efficiency using a series of tests across the global developed stock market.

Fama (1970, p. 383) defines an efficient market as "a market in which prices always fully reflect available information" and makes a distinction between different types of efficient markets based on three concretions of the concept "available information" i.e. weak form efficient markets (historical price information), semi-strong form efficient markets (all publicly available information), and strong form efficient markets (all information, both public and private). Following the establishment of the efficient market hypothesis (EMH) by Fama (1970), two schools of thought started to form. On the one hand, proponents of the EMH argue that financial markets are perfectly capable of aggregating information of all investors, which in turn leads to efficient markets. If the price of a stock would appear to be too high given past price information, rational investors would bid the price down to make a profit and vice versa. On the other hand, some researchers started looking into the psychology of investors. In close collaboration with psychologists, the field of behavioural finance was established. Proponents of behavioural finance believe that investors are not always fully rational and therefore are not able to force the stock market to be efficient at all times (e.g. Shefrin, 2000). The debate between these two schools of thought is still going on. The U.S. housing bubble, which eventually triggered the current sovereign debt crisis, sparked newfound interest in this matter. Behaviourists even argue that the EMH can be considered one of the causes of the current financial downturn as policy makers, banks and investors were blindly following the bullish market, while irrational exuberance was building up underneath (Shiller, 2000). More recently, the shared 2013 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel between scholars with opposing views on efficiency indicated that the debate is far from settled.

We believe that the lack of an alternative theoretical framework is one of the main reasons why the debate on market efficiency yet remains to be settled. One could argue that being critical of an existing theoretical framework is somewhat straightforward. Indeed, a theory is supposed to be imperfect since it is only a framework to describe reality. However, coming up with a new and improved theory is far less evident. Thus far, advocates of behavioural finance have failed in coming up with such a new theory that could replace the EMH, although several biases of behavioural nature have been documented in the academic literature. Following the construct of a time-varying degree of market efficiency (Campbell et al., 1997) and trying to reconcile theories of the EMH and behavioural finance, Lo (2004, 2005) came up with the adaptive markets hypothesis (AMH). Starting from the concepts of bounded rationality and satisficing[1], and the notion of biological evolution, he argues that many of the biases found in behavioural finance follow a certain evolutionary path, in which individuals try to learn and adapt to new market conditions. This learning and adaptation process is driven by competition among investors, and natural selection determines the new market ecology, with some investors being driven out of the market and some investors remaining in the market. The process of natural selection and competition also shapes the evolutionary dynamics that occur in the market, which are mirrored in the degree of efficiency of the market. As long as there is no shock that causes market ecology to change, stock markets are fairly efficient. Once a certain event triggers the process of competition and natural selection, markets become temporarily less efficient. When the new market ecology is formed, efficiency of financial markets returns to pre-shock levels. Several elements of Lo's theory can also be recognized in the development of the 2008 financial crisis.

Although potentially inadequate, we cannot help but notice that, to this day, the EMH is still standing. Every introductory course to financial markets still covers the EMH, while alternative theories like the AMH remain underexposed. The AMH was also not discussed by Fama and Shiller in their Prize Lecture on December 8th, 2013 in Stockholm, Sweden. One of the reasons for this might be the limited extent to which the AMH has been tested empirically. Computing rolling first-order autocorrelations of monthly returns as a measure of market efficiency, Lo (2004, 2005) finds a cyclical pattern through

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[1] Humans do not have the information, nor the methodology to always optimize in a rational way. Consequently, they use some rules of thumb or heuristics to find satisfactory results that are not necessarily rational (Simon, 1955).