

Adaptive market hypothesis and behavioural finance



An Essay on the Relationship between Andrew Lo's Adaptive Market Hypothesis and Behavioural Finance

1. Introduction

When in 1936, Keynes compared financial markets to a beauty contest where competitors had to guess who the most popular choice would be, he did not imagine that economists would become fascinated with the contest for explaining the efficiency or inefficiency of that market. Indeed, the global financial crisis of 2008 brought to bare the bitter rivalry between traditional finance theorists and their behavioural counterpart over the realism of assumptions explaining competitive market equilibrium, rational choice theory and rational expectations. Prior to the crisis, the dominant view in mainstream economics and finance (as exemplified in the assumptions of efficient market hypothesis) had been that: individuals are broadly rational, risk averse, maximize their expected utility of wealth, and follow the tenets of subjective probability theory. Hence, the capital market is seen as perfect and generating financial returns which are unforecastable. To put it more aptly in the words of Fama (1970), “ prices fully reflect all available information”, an idea that has come to be known as market efficiency. However, the fallout from the financial crisis saw a burgeoning interest in behavioural economics due mainly to the failings of traditional economic theory to explain many observed market anomalies.

Behavioural economists pointed out a number of basic logical mistakes in the efficiency reasoning, which they attributed to behavioural biases and cognitive limitations, which are universal to human decision-making under

uncertainty. Some of the documented biases cited in Lo (2004) include overconfidence, loss aversion, overreaction, psychological accounting, herding, miscalibration of probabilities, hyperbolic discounting and regrets. Accordingly, the behaviourists opine that these biases provided evidence that markets are not only inefficient, but that its participants are often irrational. Herein lies the intellectual crux of the debate, which has continue to shape the study and practice of economics and finance. Indeed, while some economists may want to uphold their firm beliefs in market efficiency and rationality, others may as well seek alternative approaches in behavioural finance. Between these two approaches, however, there may be economists who seek for a compromise. This is where Andrew Lo classic work on the adaptive market hypothesis readily falls in.

This essay proceeds as follow; section two explain the Adaptive Markets Hypothesis, its theoretical postulations and relationship with behavioural finance, section three critically examine this relationship, and section four concludes the essay.

2. 0The Adaptive Markets Hypothesis (AMH) Explained

Andrew Lo's adaptive market hypothesis was based on evolutionary principles of competition, mutation, reproduction and natural selection in biology. Lo, in his 2004 seminal article on the Adaptive Market Hypothesis, suggests that " individual makes choices based on past experience and their ' best guesses as to what might be optimal, and they learn by receiving positive or negative reinforcement from the outcomes, (and) if they receive no such reinforcement, they do not learn." Thus, the AMH implied that

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investor behaviours such as overreaction, loss aversion, overconfidence, and other behavioural biases are constructed and shaped by a dynamic interplay between investors' internal cognition and their external environment that then produces evolutionary traits, in which heuristics develop, transform, boom or die out depending on the market settings.

As an example, if a market setting is stable, heuristics is likely to yield an optimal or rational choice for investors. While an unstable market environment characterized by risks and uncertainties, yield various forms of behavioural biases. In such instances, 'rational' decisions are always evolving as investors' develop a new set of heuristics in reaction to a changing market environment. These views was developed further by Lo (2005), where he highlighted the main propositions of the AMH to include that:

1. Individuals act in their own self-interest.
2. Individuals make mistakes.
3. Individuals learn and adapt.
4. Competition drives adaptation and innovation.
5. Natural selection, shapes market ecology.
6. Evolution determines market dynamics.

In this context, Andrew Lo's AMH can be said to revolve around three main processes of heuristics development, learning, and an adaptation process of decision making, whose combined impacts on financial institutions help determine market efficiencies, and the waxing and waning of investment

products, industries, and even individual and institutional fortunes (Lo, 2005).

2. 1The Adaptive Market Hypothesis and Behavioural Finance

The uncertainty associated with efficient market hypothesis had led behavioural finance scholars to offer a departure from fully rational behaviours in finance models to behavioural biases or heuristics amongst investors that arguably explains human decision makings under uncertainty. Indeed, most empirical literature on behavioural finance have explained well-recognised market anomalies which contrast standard finance theories.

Some of these studies include Kahneman and Tversky (1979), Bernard and Thomas (1990), Benartzi and Thaler (1995), Mehra and Prescott (2008), etc. however, none of this literature was able to present a coherent alternative model that could match the dominance of standard finance literature. Fama (1998) aptly capture this non-coherence in their arguments when he said, “ a problem in developing an overall perspective on long-term return studies is that they rarely test a specific alternative to market efficiency, instead the alternative hypothesis is vague, market inefficiency.”

Thus, Andrew Lo’s AMH was one main attempt at providing a philosophical and theoretical foundation for behavioural finance. Indeed, one stated objective in Lo’s 2004 classic article was to reconcile understandings from efficient market hypothesis with behavioural finance and psychology. Like behavioural finance, AMH explains loss aversion, equity price premium, overreaction, momentum based trading strategies, and other heuristic driven biases by the fact that in a dynamic market environment, investors develop

new sets of mental frames or heuristics to solve various economic challenges. Specifically, using Herbert Simon's notion of bounded rationality, Lo (2004) pointed out that the presence and persistence of behavioural biases can be best understood when we appreciate the fact that cooperation, competition, market-making behaviour, general equilibrium, and disequilibrium dynamics are all adaptations designed to address certain environment challenges for the human species and then view these forces from the lens of evolutionary biology.

Besides, Lo posits that fear and greed – which behaviourists often cite as a basis for irrational decision making are the products of evolutionary forces and adaptive behaviours that enhance the odds of survival. In this situation, emotions may be seen as an incentive system that determines investors' behaviour and prompt them to engage in a cost-benefit analysis of various investment plans available to them. Consequently, there are no fixed rules for evaluating trading strategies as depending on market conditions, investors can engage in trade; truncate it at various points and observe the consequences of their actions. For example, where investors are timely in their investment decisions, they come back and dominate the market; if on the other hand, they are poor in market timing, they are easily eased out of the market. Hence, according to Lo supposition, market efficiency can-not be appraised in a vacuum, because is extremely context dependent and dynamic, thus resulting in a cycle of a mental frame selection process in which investors grow, mutate and thrive or face extinction (Lo, 2004).

Moreover, under the AMH, market strategies evolve to adapt to an ever changing market environment, and is driven by profit opportunities, which

according to Lo, is the main source on which market participants depend for their survival.

One other main aspect of behavioural finance which the AMH shed light on is the existence of arbitrage opportunities. According to Lo, arbitrage opportunities appear and disappear due to adaptive responses to a changing market environment. In this fashion, investors adapt to match new economic challenges, by developing new heuristics that are necessary to evaluating any investment strategy and which in turn depends upon its survival value. Although profitability and risk reduction values are also important factors to consider, Lo pointed out that these factors come after investors have undergone this fundamental market test.

So what are the implications of the AMH for efficient markets and behavioural finance? Lo (2004) briefly outlines these implications to include that

1. The equity risk premium are non-constant over time, but changes according to the recent path of the stock market.
2. Risk/reward relations are nonlinear and non-stable.
3. Arbitrage opportunities exist from time to time
4. Investment strategy, waxes and then wane depending on the environment
5. Adaptation and innovation are keys to survival
6. Survival is the only objective that matters.

3. OAMH or EMH? An evaluation

Fama (1998) emphasize that any alternative model to market efficiency ought to follow standard scientific rule, and should itself be potentially rejectable by empirical tests. Thus, in evaluating the relationship between AMH and behavioural finance, it is essential to consider an empirical test of how AMH differ significantly from the efficient market hypothesis (EMH), which the behaviourists seek to discard. While various tests of market efficiency had been designed over the years using standard financial models in EMH, tests of AMH are relatively few given that the hypothesis has yet to become part of the mainstream of financial economics. However, an increasing number of studies had reported results which seems consistent with the AMH. Some of these studies include Neely, et al (2009) and Kim, et al (2011). Whereas Neely, et al (2009) found some regularities in profit opportunities that appear and disappears in a foreign exchange market, Kim, et al (2011) found strong evidence that return predictability is driven by changing market conditions. These findings implied that testable implications of AMH can be done by testing how the level of efficiency in a market varies significantly over time.

Furthermore, another possible way to conceptualise a test of the AMH may be to investigate whether investment decisions are made based on selectivity and market timing since evolutionary principle implied that natural selection shapes market ecology. In this context, Hoffman, et al (2013) found some evidence of market learning during the financial crisis. As a matter of fact, conventional econometric tests for market efficiency using formal asset pricing models such as Sharpe 1964 CAPM and Merton's 1973 discrete time version of ICAPM would have been relevant alternative models

to investigate these testable implications of AMH. Therefore, rather than see Lo's AMH as a behavioural alternative to market efficiency, it is better regarded as another strand of efficient market hypothesis.

4. Conclusion

This essay has discussed the adaptive market hypothesis and examined its relationship with behavioural finance. We conclude that whereas the AMH offers a philosophical foundation for analysing various behavioural anomalies described by behavioural finance, its theoretical underpinning however, reflects that of the efficient market hypothesis.

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