# A review of efficient market hypothesis—from the point of view of current financi...

Finance, Market

1 Introduction

Since Fama (1970) published his paper " Efficient capital markets: A review of theory and empirical work" summarized the basic Efficient Market hypothesis (henceforth EMH) content and the tests based on it, the economics professors has never stopped to debate on it. According to Fama (1969), EMH is an interpretation about how do stock prices relate to the market information. EMH states that the security prices already incorporate and reflect all relevant information. Currently the whole world faces massive financial crisis while EMH and other theories based on it has faced opprobrium and questioning.

This paper includes an overview of EMH and discussions about the strength and limitations from point of view of the current financial crisis. There are three parts in this paper. In the first part, I have summarized the EMH including the definition and three forms of efficient markets. In the second part, I have evaluated the strengths, and limitations of EMH from the point of view of current financial crisis. In the third part, I have given my own conclusion about EMH.

2 Overview of EMH

## 2. 1 Definition

According to Fama (1969) and Jensen (1978), EMH can be described as the text and mathematic formula as the following.

### 2. 1. 1 Descriptive Definition

As Fama (1969) has stated, Efficient Market Hypothesis is an interpretation about how do stock prices relate to the market information. EMH means that the security prices already incorporate and reflect all relevant information. So it is impossible to beat the market to obtain extra profit. As Malkiel (2003) described “ Markets do not allow investors to earn above average returns without accepting above-average risks”.

### 2. 1. 2 Formulated Definition

Jensen (1978) has stated the formulization and model concepts of market efficiency. The joint distribution established based on the information consistent with the joint distribution of future price, the specific formulation is as (1. 1).

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indicates the joint density function of the correct future prices, while (|) indicates the joint density function of future security prices based on all the available information at the time point t. Then we can rewrite the formula as (1. 2).

= (1. 2).

In this formula, indicates the expectation of true yield stock j at the time point t. indicates the estimated expectation at time point t, which is equilibrium yield. That means the return expectation which is obtained from an economic activity is equal to its marginal cost. That is, when there is no cost of information collection, the return expectation should be 0.

## 2. 2 Main points of EMH

### 2. 2. 1 Main points from microeconomic perspective

From the microeconomic perspective, EMH is under the assumption of " economic man" which is from Adam Smith. It means people are rational and self-interest. Similarly, in the stock market, the people who trade stock are also this kind of " economic man". In the financial market, every stock represents its company which is under strict surveillance of rational and self-interested people. They conduct fundamental analysis; estimate the company's future profitability to evaluate the company's stock prices, then discount future values to present value, cautiously choose between risk and return trade-offs.

EMH shows the balance between demand and supply in markets. For every stock, the number of people who want to sell is equal to those who want to buy, that is, the number of people who think the stock is overvalued is equal to those who think the stock is undervalued. If somebody finds that it is unbalance between those two kinds of people, in other words, if there is a possibility of arbitrage, rational traders will immediately buy or sell stock to make them equal. This is the basic theory of supply and demand in economics. On the one hand, any fluctuation on the prices of commodities is a result of supply and demand changes. On the other hand, prices impact the relationship between supply and demand.

### 2. 2. 2 The preconditions of EMH

As Fama (1970) has stated the efficient market is based on three preconditions. Firstly, the cost of information is 0. Secondly, the market is perfectly competitive market. Thirdly, all investors are rational.

Firstly, according to the definition of Fama, the market is inefficient. Grossman and Stiglitz (1980) have proofed that no cost of information is the sufficient condition for efficient market. This condition exposes on questions on the market structure. It is unrealistic if transaction costs and taxes are 0. On contrary, huge transaction costs may hinder the possibility of arbitrage in real world. That may cause the stock prices do not increase with good information and information is not reflected in the price. The second precondition of EMH is the perfectively competitive market that leads to each investor can accept the price. However, under the situation that information costs exist, there is bargaining behaviour in market. Therefore, the market participants are not price-taker. For the third precondition, investors are rational and they can evaluate the securities rationally. Shleifer (2000) improves the three levels of rational market participants. The investors at the first level are perfectly rational. The ones at the second level are even if some of the investors are irrational; their trade generated randomly and can be cancelled out. For the third level, if irrational investors' behaviour is not random, arbitrageurs can eliminate noise traders' influences on prices. Shleifer (2000) has argued that " With a finite a risk-bearing capacity of arbitrageurs as a group, their aggregate ability to bring prices of broad groups of securities into line is limited". That suggests the risk-free

arbitrage opportunities may exist, but they cannot be the direct evidence of market inefficient.

## 2. 2 Three Forms Efficient Market and Their Test

Based on the different types of investment approaches Fama (1970) defined the efficient market to three forms—weak-form efficiency, semi-strong form efficiency and strong-form efficiency.

### 2. 2. 1 Weak form efficient market and its test

As the description in Fama's (1970) paper, a weak form efficient market is a kind of market in which the shares' prices fully reflect the historical information. So in weak form efficient market, investors cannot make a strategy to obtain extra profits through technical analysis. It is useless to analyze historical information to predicted future price, because the current market price has already contained all the information which acquired by technical analysis.

The tests for weak form market include two methods. The first is the random walk model while the second is the filter approach. The first method is focus on whether the fluctuation of stock price is random which is first published by Osborne (1959). The filter approach can be described that in an efficient market, if there is no new information released, the price would randomly fluctuate between the resistance lines.

### 2. 2. 2 Semi-strong efficient market and its test

As Fama (1970) has stated the semi-strong efficient market refers to the market in which the current stocks' prices reflect not only historical price

information but all available public information related to security companies. If the market is efficient in this sense, then it will not be possible to acquire abnormal profit through the analysis of a company's balance sheet, income statement, changes in dividend, stock split announcement and any other public information.

The tests for the semi-strong efficient market mainly focus on determining the speed of share prices adjust to new information. Scholars have conducted a variety of tests. The most famous one is " Event Study" which firstly published by Ball and Brown (1968). An event study measures the cumulative performance of stock from a specific time before and after information released.

The semi-strong efficiency of market attracts a lot of studies to test it. Some empirical studies proof that the US stock market is a semi-strong market. Fama (1969) investigate 115 companies stocks and prove that the US stock market is semi-strong.

### 2. 2. 3 Strong form efficient market and its tests

As Fama (1970) has stated the strong form efficient market is a market in which the share price reflect all the information includes the inside information. That means in strong form efficient market nobody can obtain abnormal profit even the insiders.

The tests of strong form efficient market focus on the company insiders, stock exchange brokers, securities analysts and mutual fund performance, in order to verify whether they can earn extra returns. Some studies have

showed that several markets are close to strong form. Maloney and Like several files on the professional investment managers study showed that after deduct the expense of trading, the randomly selected securities and index without conduction were nearly at the same return level with carefully analysis. Mulherin (2003) has conducted the analysis of the Challenger Crash and declared it supports the strong form efficiency. While the other scholars argue that the strong form efficient market will never exit in reality.

3 Discussions of EMH from the current Financial Crisis

The following chapter provides analysis of EMH from the point of view of current financial crisis. The first section provides a review of current financial crisis evolution; the second section gives the critical analysis of the challenges that EMH faces, particularly from the view of information dissemination, information quality and the role of self-regulation of stock market; the third section provides suggestions to avoid financial crisis.

## 3. 1 The Evolution of Current Financial Crisis

The current financial crisis has root in credit crisis which is a financial storm along with bankruptcy of subprime mortgage lenders, close of investment funds and the turbulence stock market in the United States. As Tylor (2009) has described, the evolution of financial crisis were as follows. First, the U. S. commercial banks issued a large number of high-risk real estate mortgage loans (i. e. subprime mortgages), then sold these subprime mortgages to Fannie Mae and Freddie Mac in order to transfer the potential risk of mortgages and return the funds as soon. Fannie Mae and Freddie Mac

created subordinated bonds through asset to security approaches, sold bonds to investment banks like Merrill Lynch. Investment banks seek for high returns create financial innovations by complex means and make subprime lending which under investment grade (BBB / Baa) into a so-called " structured products" to attract the risk-interested investors. These typical derivatives finally have been sold to financial institutions and investors through their marketing network all over the world. When the original debtor cannot repay the mortgage on time, the financial crisis broke out and rapidly spread to whole world by the chain which is also the risk transfer line. We can illustrate this process as graph 1.

Graph 1 Evolution of Financial Crisis

## 3. 2 What does EMH faces in the financial crisis?

The financial crisis has proved that the precondition of EMH is too far from reality. In graph1, there is a stream which contains risk, information and cash transferred between people and market. If the original debtors are also investors, an information circulation mechanism has been established. Ding (2005) interprets in this process, as investors not only analyze the information in the market, but also think about other investors' potential activities in response to these changes. These changes in the market then become the basis for new thinking. A self-feedback loop established between the investors and market. Investors are both participants and observers. That is, the investors affect the market changes as well as are affected by the market, so the information that market participants obtained includes the information which is influenced by the participants' own behavior.

Therefore, it is impossible to understand the market completely and objectively. As Baker (2006) has suggested that the investors' behaviors need to be considered as one important factor in those theories like EMH's perfect preconditions.

From the view of information dissemination, false and short information commonly exists in market and it cannot be aware of. That is may be another reason for leading irrational behaviour. For instance, as Duncan reported (2009), on September 15th 2008, Lehman Brother collapsed with about $60 billion in toxic bad debts, and assets of $639 billion against debts of $613 billion. That made Lehman Brother, the largest investment bank, collapsed since 1990's. However, just five months ago, Lehman Brother held the annual shareholders meeting and the stock price was up to about 86 dollars per share. According to Fama (1970), investors operate stocks according to the information. When news spread on the stock market, the share prices begin to fluctuate. With the rapid dissemination of information, more and more people take part in the trade of stock. The share price will stay at a right level when all the people know the information. However from the Lehman Brother's example such evidence has been provided that because of the information quality, the price cannot reflect the right value. As Barry andHarvard(1979) have stated that the sufficient uncertainty information frequent transacting may be deleterious to market.

Another precondition of EMH is the market is a perfectly competitive market. The perfectly competitive market is a market without government intervention and everyone is a price-taker (Nicholson, 2005). In reality, the

perfectly competitive market is impossible to exist, although the governments advocate the market liberalization to attract people to take part in trading. Some liberal economics like Levine (2001) have pointed out " financial liberalization leads to more efficient investments and that financial liberalization boosts productivity growth", but the huge rescue is the biggest evidence of thefailureof market liberalization. The disappearance of business profit model of investment banks, government managed commercial banks and mortgage institutions provide the most effective large-scale evidence. The large investment institutions cannot effectively regulate themselves. So there is no perfectly competitive market and all the theory based on this assumption seems to go to failure.

## 3. 3 What do we learn from financial crisis?

Financial crisis reveals that the preconditions of EMH cannot realize in present world. Information uncertainty and feed-back loop lead people irrational and the huge rescue policy proves market is never perfectly competitive. So the prices cannot inflect reflect information in the right level. Lack of regulation of information and financial innovations may be the main reasons for this financial crisis.

The Lehman Brother's collapse indicates that financial markets potential failure really exists and that blindly believe in market lead to systemic collapse of financial markets. Therefore, only relying on the market self-regulation is insufficient, it needs government regulation and macroeconomic control to solve the problems. As the modern financial system in particular with the features of high leverage, high-relevance and

high asymmetric, the market systemic risk and complexity have increased. In this case, government must play its leading role in financial supervision and take effective measures to curb excessive market speculation and the vicious competition among financial institutions. Particularly, government should strengthen the investment banking and financial regulations of derivatives to prevent financial institutions rely on excessive leverage to blind investment.

## 4 Conclusions

The efficient market hypothesis provides an ideally situation that the stock prices reflect all relevant information in a perfectly competitive market in which the people are rational. Some valuable studies base on the concept of efficient market has been recognized.

However, the extremely ideally preconditions of EMH lead people to rethink the application scope and its practice value. In the current financial crisis, EMH has faced huge challenges to the perfectly preconditions that perfectly rational man and perfectly competitive market cannot realize. These challenges are mainly from two aspects which are information and role of self-regulation in market. Firstly, with the rapidly information dissemination, an information circulation mechanism was established between investors and market. Investors not only absorb information from market, but also give their own views to market. So the information they get already includes their own views which is a reason to make investors irrational. Another problem about information is the uncertainty and inaccuracy that investment banks

may use accounting method to blind investors and leads investors to operate stocks irrational. Secondly, EMH overemphasizes the role of self-regulation in the market. However, large investment institutions cannot regulate themselves effectively. The U. S. government’s rescue policy is the greatest evidence of the failure of market liberalization.

The departure from reality does not mean the complete failure of EMH. In future studies, EMH may be combined with other disciplines, in order to achieve a greater scope.

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