

Efficient Market Hypothesis: Share Prices Reflect All Information and Consistent Alpha Generation is Impossible

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Abstract:

The Efficient Markets Hypothesis (EMH) is a fundamental principle in contemporary finance theory. It prompts an inquiry into price formation. The Efficient Market Hypothesis necessitates several essential conditions: investor rationality, unrestricted and open access to information, the lack of transaction costs and taxes, and the individuality of investors. Based on these assumptions, it is concluded that present prices entirely embody the information on the company's value, and thus it is impossible to achieve abnormal profits (outperform the market) utilizing this information, fundamentally, for free. Nonetheless, these principles do not align with the actual reality. Anomalous phenomena have emerged in the financial sector. Since then, other researchers have endeavored to validate the idea regarding the efficiency of financial markets, and debate to examine the efficacy of financial markets, highlighting the most common assertions regarding the issue.

Keywords: Financial market efficiency; informational efficiency; rationality; behavioral finance

Résumé:

L'hypothèse des marchés efficients (EMH) est un concept central de la théorie financière moderne. Car elle pose la question de la construction des prix. L'EMH nécessite plusieurs modalités fondamentales à savoir la rationalité des investisseurs, la libre circulation et la gratuité de l'information, l'absence des coûts des transactions et d'impôts, ainsi que l'atomicité des investisseurs. A partir de ces postulats, il s'ensuit que les cours actuels reflètent pleinement les informations disponibles sur la valeur de l'entreprise, et qu'il n'y a aucun moyen de réaliser des profits excessifs (battre le marché) en utilisant cette information, en principe, gratuitement. Or, ces fondamentaux ne correspondent pas au monde réel dont lequel nous vivons. Des phénomènes qualifiés d'anomalies ont surgi sur le marché financier. Dès lors, bon nombre de chercheurs se sont attelés pour vérifier l'hypothèse de l'efficacité des marchés financiers. Et fait ensuite, un débat de remise en cause de l'efficacité des marchés financiers, en jetant la lumière sur les affirmations les plus fréquentes abordés sur le sujet.

Mots clés: Efficience des marchés financiers ; efficience informationnelle ; rationalité, marchés financiers, finance comportementale

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I. Introduction

Financial theory was built by the deepening of two essential aspects, uncertainty and information, with a perspective increasingly applied to the evaluation of companies or derivative financial products. It identified basic notions such as risk and the arbitrage principle, expected utility, and the expectation-variance criterion. It was also interested in economic information and the relationship between it and the capital markets. Most economic agents express a need to clearly analyze the information that reaches them. There are also great uncertainties behind the notion of information regarding the very meaning of the term “information”.

Information is an ambiguous economic good due to our limited understanding of its producers, production process, and consumer use. The information is objective because it usually includes official indications from corporations, institutions, or governments. Since it depends on the user, agent, or investor, its importance may seem subjective. Information and market informational efficiency were Eugene FAMA's main study topics (1965, 1970, 1992). This underpins modern financial theory and addresses investor openness and disclosure. It claims the market price absorbs all available information instantaneously (FAMA, 1970). However, FAMA's (1965) definition raised questions about "information," which is imprecise and difficult to assess. Moreover, the efficient market hypothesis depends on rigorous requirements (perfect rationality, lack of transaction costs, and unrestricted, immediate distribution of information) that are hardly observed in practice. The growing identification of stock market anomalies in empirical studies (such as overreactions, momentum, calendar effects, and speculative bubbles) has stimulated a robust critique of classical finance and resulted in the establishment of a new research domain: behavioral finance (Shiller, 2003).

The proliferation of stock market anomalies found after testing the efficient market hypothesis has led to criticism of classical finance and attempts to explain market behavior. Research in behavioral finance has led to a dual theoretical framework based on limited arbitrage and investor irrationality. Some investors are irrational, according to behavioral finance. They can't determine an asset's intrinsic value due to behavioral biases, hence the market price and intrinsic value differ.

The 2024 IPO of Crédit Populaire d'Algérie (CPA) is a significant event for the Algerian financial market, providing a unique analytical opportunity to assess the market's capacity to swiftly and accurately assimilate new information into pricing.

Based on the above, the main research question is:

To what extent is the Algiers Stock Exchange informationally efficient, especially after the CPA's listing, and what anomalies or behavioral patterns elucidate the ongoing divergences between market prices and the intrinsic values of listed securities?

To address this problem, the research is organized around the subsequent overarching hypothesis:

General Hypothesis (H0):

The Algiers Stock Exchange exhibits a lack of informational efficiency in the semi-strong form, attributable to sluggish information distribution, restricted liquidity, and the prevalence of irrational investor behavior.

This overarching hypothesis is subdivided into multiple distinct hypotheses:

Hypothesis 1: The returns of securities on the Algiers Stock Exchange are somewhat contingent upon historical prices, hence challenging the weak-form efficiency hypothesis and the notion of a random price walk.

Hypothesis 2: The prices of assets on the Algiers Stock Exchange do not promptly respond to public information, especially financial disclosures and the IPO of the CPA, indicating a semi-strong informational inefficiency.

Hypothesis 3: The Algerian stock market has enduring performance abnormalities, including under- or over-reaction to announcements, which contradict the assertions of the efficient market hypothesis.

Hypothesis 4: Investor behavior on the Algiers Stock Exchange is affected by behavioral biases, including mimetic behavior, overconfidence, and conservatism, leading to divergences between market prices and intrinsic values.

Hypothesis 5: The limited liquidity and confined framework of the Algiers Stock Exchange impede arbitrage mechanisms, hindering the swift rectification of informational inefficiencies.

Hypothesis 6: The listing of CPA on the stock exchange has partially enhanced the informational efficiency of the Algiers Stock Exchange, although it has not entirely eradicated the market abnormalities identified.

- **Theoretical study**

II. What is the efficient market hypothesis?

The efficiency hypothesis asserts that financial market prices reflect all information. The price of an asset is equal to its "fundamental value" given current information, and future (risk-adjusted) price fluctuations are equally likely up and down. Actually, prices vary randomly because they depend on new, unpredictable information. If relevant public information were not reflected in

present asset prices, future prices would be predictable. As the information integrates, prices will grow or fall as predicted from the start. If future prices are foreseeable, even imperfectly, a positive profit can be expected across numerous periods. If the information not reflected in prices is good, such as positive corporate account data, this profit is made by buying a security today and waiting for it to rise. Selling short (making money when an asset's price falls) will yield the same reward if the information is bad. If industrial group sales are lower than predicted, its share price must decline. If negative sales data is not yet reflected in current prices, short selling shares of this group allows profit from the predicted price drop.

Therefore, explicitly testing the efficiency hypothesis means that markets have untapped profit prospects. Economic agents' poor rationality may explain this skepticism. Many critiques of the efficiency hypothesis include behavioral assertions that refute the conventional assumption of perfect rationality among economic actors; these agents' cognitive biases can explain their failure to capitalize on predictable return profit opportunities.

The efficiency hypothesis states that markets have no arbitrage opportunities. Arbitrage is the ability to profit from price fluctuations without risk. An identical bond priced differently in two markets can be bought at the lower price and resold at the higher price to make a risk-free profit. If arbitrage opportunities last, one might theoretically accumulate limitless riches.

What links arbitrage with market efficiency? Arbitrage now means taking advantage of predictable price structure features to make a profit. Thus, if the market's price structure shows predictable future price elements that are not currently reflected, it is possible to anticipate profit without initial investment by exploiting arbitrage opportunities by buying and selling assets. Arbitrage opportunities are impossible with market efficiency.

This crucial point can be demonstrated with a simple example. If two identical companies, A and B, produce the same items and have the same future prospects, their stock values must be the same. Assuming the prospects of only one of these companies (say A) worsen, the current pricing structure—that is, the fact that the two shares are priced the same—allows arbitrage: two assets with the same price but different projected returns. Selling this security short may yield a profit if the share price does not decline. Arbitrage opportunities will end when the price of share A falls, or the information is incorporated. The absence of market arbitrage is linked to the efficiency theory, which integrates knowledge into prices. The efficiency hypothesis is applied to financial institution operations, and it is essential to market asset valuation. Suppose we have a current pricing structure and a new asset, like a stock, with known features like predicted dividend flow: The idea that a “fundamental” price must preclude arbitrage

implies that this new item has one price. Any price other than this “equilibrium” price allows asset arbitrage. If we reject the efficiency premise and allow market arbitrage, this new asset can have any price.

Since identifying its price is impossible, the efficient market hypothesis creates a productive asset pricing domain, which contributes to its success. Scholars and financial institutions need asset theoretical prices as benchmarks. Without market arbitrage assumptions, asset valuation, needed for many purposes, is difficult. Although many market players accept the efficiency hypothesis's shortcomings (such as bubbles), it remains a key foundation for initial approximation projections. Economists using alternative frameworks like behavioral finance struggle to ignore the efficiency hypothesis when assessing their forecasts.

II.1 Market Efficiency

Most financial researchers assert that security prices are set randomly. The observation of these erratic fluctuations prompted the formulation of the "random walk" hypothesis, which posits that price variations are inherently unpredictable, rendering the analysis of securities ineffective for forecasting future market behavior. In an efficient market, there exists a fair distribution of savings. This constitutes the "Random Walk" model.

$$\begin{array}{l} P_t = P_{t-1} + \mu_t \\ \text{Or} \end{array} \quad \left\{ \begin{array}{l} P_t - P_{t-1} = \mu_t \quad (\mu_t = \text{random}) \end{array} \right.$$

The establishment of prices is hence arbitrary, and the variance between the present price (P_t) and the previous price (P_{t-1}) is equivalent to (μ_t):

μ_t = price differential = disparity between actual value and expected value
= novel information

Price variation may result from this new information. For some, volatility therefore results from the interpretation of this information and therefore proves the efficiency of the market. The underlying hypothesis of modern finance is undoubtedly that of the efficiency of financial markets; according to this hypothesis, prices reflect all available information, so that the opportunity to achieve abnormal profitability can only be done when the investor has private information. Thus, the question of informational transparency has become essential in the debate on stock market efficiency. This definition given to the concept of market efficiency is called informational efficiency, where Information Processing is the essential factor. But in the most general sense of the term, we can admit that an efficient market is a market which satisfactorily

achieves the objectives of optimal allocation of resources, fair evaluation of the terms of exchange, and an intermediation service provided at the lowest cost. In addition to informational efficiency, there are three other forms of efficiency, which are:

a) Allocative efficiency: This concept is particularly relevant in corporate investment decision-making, as the resources allocated by a company generate value for its shareholders. According to Tobin (1985), a market is deemed efficient if it enables participants to maximize their utility (consumption level) given their available resources. Consequently, funds should be directed towards profitable projects that foster economic growth and benefit all stakeholders. It is important to note that allocative efficiency is interconnected with informational efficiency, as the effective allocation of resources relies on transparent information and accurate asset price assessments.

b) Operational efficiency: This denotes that financial intermediaries effectively link savers and investors at minimal expense, securing equitable compensation for their services. The three types of general efficiency (allocational, operational, and informational) are interdependent. In fact, the market can only achieve optimal allocation of funds if there is also adequate attention to information and transactions are executed at the lowest possible cost.

The effective allocation of funds can only be accurately achieved if the securities are appropriately valued. The assessment of securities must rely on "information" pertaining to publicly traded companies, and this information must be accessible at a certain moment.

c) Informational efficiency: The theory of financial markets originated in the early 1960s through the contributions of modern finance pioneers; however, Eugene FAMA (1965) is credited with its authorship due to his seminal paper, which asserts that "a financial market is deemed efficient if and only if all available information regarding each financial asset listed on this market is instantaneously reflected in the price of that asset."

A second definition from FAMA (1970) characterizes an efficient financial market as one in which security prices fully reflect available information. Consequently, in an efficient market, the price of an asset is immediately adjusted to integrate any newly available information regarding that asset. Consequently, efficiency is defined a priori as the market's capacity to reestablish equilibrium; the market is deemed efficient if the prices generated therein serve as dependable indicators enabling investors to make appropriate resource allocation decisions.

Actions must be accurately assessed based on the information available at the time.

The definition of efficiency has transformed since FAMA's original work; it is now less rigid and permits certain forms of predictability. Thus, the concept

has shifted from an initial understanding of efficiency as synonymous with a random market of security prices to a definition that implies the impossibility of achieving substantial gains (abnormal profitability). According to JENSEN (1978), "a market is efficient if prices reflect information to the extent that the marginal benefit of acting on that information does not surpass the marginal cost."

This implies that markets are structured such that the prices of listed assets incorporate all relevant information, preventing an investor from achieving a profit above the transaction costs incurred by buying or selling the item.

II.2 Evaluation of the informational efficiency hypothesis

The evaluation of the informational efficiency hypothesis is conducted using a model referred to as a "fair game"; this suggests that the price established at any particular moment is derived from the return expectations of the actors. Therefore, an individual investor cannot achieve returns that differ from those attainable by other market participants for the same security.

This evaluation can be conducted by juxtaposing the actual price or yield of a securities with its anticipated price or yield. FAMA formulated the fair game model in relation to market efficiency as follows:

$$Z_{i,t+1} = R_{i,t+1} - E(\bar{R}_{i,t+1} | \emptyset_t)$$

With:

$Z_{i,t+1}$: Abnormal return for security i at time $t+1$

$R_{i,t+1}$: The actual or observed return of security i in period $t+1$

$E(\bar{R}_{i,t+1} | \emptyset_t)$: Anticipated return at $t+1$ predicated on accessible information or expectations of the return

The approach posits that the abnormal return (abnormal profitability) is the disparity between the actual return for the time and the expected return for that same period, derived from all accessible information. In a fair game, the anomalous return must equal zero, indicating that the available knowledge accurately forecasted the market price achieved.

$$Z_{i,t+1} = 0$$

FAMA distinguished three aspects based on his 1965 notion of informational efficiency:

- The notion of information remains inadequately defined, rendering it challenging to quantify.
- The notion of information availability, specifically regarding its destination and potential cost.
- The notion of information reflection in pricing and the rapidity of price adjustment in response to new information is encapsulated in FAMA's definitions by the term "immediately."

III. Types of informational efficiency

The efficient market hypothesis relies on the type and source of information, as well as the quality and speed of its dissemination to investors. The definition posited by FAMA (1965), which asserts that a market is informationally efficient when the observed price fully and instantaneously incorporates all available information, considers the informational context comprehensively and is consequently too broad for empirical validation. FAMA (1970) provides three types of efficiency, highlighting the information flows utilized by investors to guide their judgments. The three categories of information flows are:

- a) Historical prices exclusively (weak efficiency).
- b) Historical prices in conjunction with all publicly available information (semi-strong efficiency).
- c) Historical prices, all publicly available information, and private information (strong efficiency).

a) Weak efficiency, which refers to the condition where all historical information is accessible and the present price is determined exclusively by previous prices. In this instance, technical analysis is ineffective in achieving returns that exceed market performance. The individual utilizing this study is focused on market dynamics rather than economic fundamentals. He thus contends that alone the examination of internal market characteristics (pricing and transaction volumes) is crucial for ascertaining the future trajectory of prices. It relies on many price charts to discern trends and generate short-term predictions. Hence, historical prices, transaction volumes, and open positions in future markets comprise the majority of the data utilized by the analysts. These are fundamentally empirical methodologies. This method posits that stock prices fluctuate in accordance with trends. These trends are sufficiently robust to be recognized, and history often recurs. Chartists will analyze historical price series to discern patterns that may predict future behavior. The market is inefficient if these strategies can be utilized for profit.

b) Semi-strong efficiency refers to this level of efficiency when all publicly available information is included, encompassing all data related to the company, such as accounting statistics and announcements of financial operations like dividends and share buybacks, actions, capital augmentations, disclosure of results, etc. In this scenario, the asset's price completely incorporates publicly available information, rendering fundamental analysis (for identifying undervalued assets) ineffective. Fundamental analysis involves predicting the sequence of cash flows related to a security, assessing the risk and return expectations of investors, and synthesizing this information to identify

overpriced assets (for sale) and undervalued assets (for purchase). This analysis aims to forecast stock price trends by examining economic and monetary data. According to FAMA's concept, if the market is efficient in the semi-strong sense, then fundamental analysis is rendered ineffective, since all economic information is already incorporated into the price.

c) Strong efficiency, this sort of efficiency is the most stringent, as the information set encompasses not just pricing history and public information but also all private information.

It specifically pertains to insider trading and the analysis of professional investors' performance. This efficiency paradigm posits that no information, whether public or private, enables investors to consistently get anomalous profits. A market is deemed efficient in the strong sense when all information, both public and private, is entirely incorporated into securities prices. Clearly, strong efficiency includes the other two levels of efficiency.

FAMA (1970) posits three hypothesis regarding the efficiency of financial markets:

- Swift distribution of information at little expense.
- Investors respond promptly to the information acquired.
- The price of a security adheres to an unpredictable trajectory, termed a "random walk."

These hypotheses entail the validation of five empirical conditions:

- The rationality of investors: financial markets can achieve efficiency just if the economic agents participating in these markets are rational. The information is accessible at no cost, and all agents will be able to utilize it. The market will subsequently embody all the viewpoints articulated by the stakeholders. This idea is hence founded on the concept of "information asymmetry."

- The lack of transaction costs and stock market levies may deter economic agents from investing or divesting due to exit barriers that hinder or negate prospective gains.

- The atomicity of investors and liquidity: economic agents will refrain from executing transactions on securities if such activities are likely to induce price fluctuations due to liquidity concerns.

The following table delineates the types of informational efficiency within the financial market, accompanied by examples:

Table (01): Types of informational efficiency in financial markets

	Weak type	Semi-strong type	Strong type
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Information reflected by stock prices	Information already known and published in the past	All public information in the past	Anticipated information (not yet published)
Examples of information	Accounts published in past years, series of interest rates...	Variation in interest rates, publication of accounts or announcement of results.	Insiders and performances, professional analyzes
Information enabling gain	Information about the present and the future	Private information	-----

Source: R. RAHAOUI (2007)

IV. Approaches to efficiency theory:

Three distinct currents of empirical study may be identified, each offering various tests that have been implemented since the introduction of the efficiency hypothesis by FAMA in 1965:

- An empirical or pragmatic school.
- A theoretical school grounded in probability theory.
- A school that incorporates the principles of game theory and information theory in addition to the prior curriculum.

A) The empirical school: This entails validating that the risk-return connection articulated by MARKOWITZ's portfolio theory is empirically substantiated and that the discrepancies can be elucidated by market imperfections. This school, however, does not propose any intricate mathematical model of efficiency. The primary study focuses on event studies, performance metrics, and the evaluation of optimal investing strategies on funds that are optimally structured.

B) The theoretical school: In this school, researchers propose that pricing behavior adheres to a specific mathematical process and formally associates these processes with the expectations of the agents. This research on market efficiency originates from SAMUELSON (1965) and fundamentally focuses on the examination of reasonable bubbles and assessments of excessive volatility.

C) The school of game and information theory: This school considers the conditions of equilibrium by incorporating the participants (market makers, informed agents, and uninformed agents). The analysis closely resembles that of the initial school, where the value of information is delineated between "useful information" and "noise." Grossman (1976) is the originator of this analysis. This results in the examination of market microstructures.

V. Challenging the concept of financial market efficiency:

Numerous studies conducted over the past two decades have shown findings that contradict the hypothesis of financial market efficiency. The proliferation of these inefficiencies, termed “anomalies,” has facilitated the emergence of a new research domain known as “behavioral finance.” The significance of this research domain was acknowledged by the conferment of the 2002 Nobel Prize to Daniel KAHNEMAN, an expert in behavioral finance whose contributions integrate psychology and economics. Since that time, behavioral finance has been acknowledged as a significant sector of modern economics.

The conventional premise in economics regarding the economic agent, a perfectly rational individual termed “Homo Oeconomicus,” who serves as a theoretical representation of human behavior and possesses all requisite knowledge for decision-making, appeared, in many instances, entirely inadequate for real-world application. Similarly, the idea of market efficiency, foundational to significant financial research at the time, appeared to be compromised by the presence of bubbles that evidently indicated irrational behavior among numerous participants. The market efficiency hypothesis posits that all market participants possess identical knowledge simultaneously and make rational inferences, resulting in market price equilibrium. Moreover, it is essential to highlight that informational efficiency entails robust assumptions. Individuals are presumed to utilize knowledge effectively by establishing what are termed rational expectations (MUTH, 1961). Indeed, a market may only be deemed efficient if the participants exhibit logical expectations and behavior.

Challenging the concept of informational efficiency consequently undermines the theory of rational agents who can make decisions to optimize their utility. Among the fundamental hypotheses of market efficiency theory is the rationality of actors.

The occurrence of several crises consistently rekindles the discourse on information efficiency and the concept that prices perpetually represent the intrinsic value of securities. Research in behavioral finance has produced a dual theoretical framework centered on the concepts of limited arbitrage and investor irrationality. The inception of Behavioral Finance was examining the rationality of agents and the corresponding axioms. The results drawn by psychologists and other professionals in this field were as follows:

- Individual decisions frequently circumvent the axioms of independence and transitivity.
- Investors exhibit herd behavior.
- Investors do not adhere to the BAYES theorem.
- Investors exhibit overconfidence.

- Investors streamline intricate decisions through rules and shortcuts known as heuristics.

These observations have prompted scholars to dismiss the theory of agent rationality and, subsequently, the corollary of financial market informational efficiency.

The primary biases identified by Behavioral Finance to elucidate the irregularities observed in financial markets are:

- Familiarity bias
- Representativeness bias and momentum effect
- Conservatism bias
- Confirmation bias
- The disposition effect
- Optimism bias
- Excessive confidence and self-assessment
- Subsequent conduct: an elucidation of the momentum phenomenon and the overreaction of financial instruments
- Framing bias, often known as the "framing effect."

V.1 Speculative Bubbles

Among the consequences countering the principle of efficiency, we find the phenomenon of speculative bubbles. The latter are defined as the gap that exists between the market price of a stock and the price that would be justified in view of its determining variables (the fundamental value). For example, in the case of a company whose market capitalization is estimated, apparently correctly, by the market at one hundred million euros, a speculative bubble appears if, for no specific reason, the market capitalization of the company suddenly rises to one hundred and fifty million. Then, later, and always for no apparent reason, returns to its original level. This is why speculative bubbles are completely contrary to the hypothesis of market efficiency which says that the share price must be equal to the future income generated by a company, and therefore to the fundamental value.

The existence of a lasting divergence between the price of a security and its value is therefore a sign of a certain inefficiency of the markets. The formation of these bubbles is generated by two mechanisms described previously: mimicry and self-validation. When a few agents sense an increase in the price of a financial product, they acquire it and, with demand putting pressure on supply, their forecast comes true (self-fulfilling expectations). Wishing to participate in the movement, other operators do the same (mimicry) by causing the price of the security concerned to explode.

The process may continue beyond market fundamentals like dividends, interest rates, and equity business circumstances. The fast-rising share price and the company's true value differ, which will follow economic indications. A speculative bubble forms when economic agents focus their judgments on others' actions rather than their own. Due to their lack of economic base, speculative bubbles can collapse unexpectedly, destroying investors' money. Since early investors caused the price escalation, they will not be most affected. Their relevant equity holdings will have been carefully decreased. Private investors will suffer most from the bubble. They get the information late and buy their securities when speculators sell. Profit drives them to seize every decline. The speculative bubble damages more than finances. The stock market generates 25% of US household income. Therefore, financial markets will influence consumption more. This channels crises into output and employment. A major stock market crash would reduce production and increase unemployment. These bubbles are hard to spot as identifying the price determinants is not always easy.

Several economists worry about a speculative bubble in American markets, especially Internet companies. The American journal *Fortune* offers these estimates: AOL is a digital media giant. To justify the stock premium, profits must rise 67% year till 2010. Yahoo prices have risen 95% annually. Profits must nearly triple annually for a decade. Microsoft has only grown profits by 40% annually for the past decade. This analysis found that Yahoo and AOL (previously America Online) are valued higher than their profitability.

Is there a bubble or are these the new economy's values? In April 2000, the NASDAQ fell, supporting the initial answer. This evidence makes it puzzling that regulatory authorities are not taking steps to restore levels closer to economic reality. American market leader and Federal Reserve director Alan GREENSPAN has engaged with financial market participants for five years. His term "the irrational exuberance of the markets" will endure as proof of his failure.

Several factors appear to support such a bubble. In "Pension Funds, Idiot Traps?" Frédéric LORDON was intrigued by the causes of the American bubble's size and endurance. He proposes that "one of the most significant traits of the bubble is its transformation from a local anomaly, a fleeting deviation, a parenthetical occurrence within an otherwise rational financial trajectory, into a permanent feature of the financialized accumulation regime." This means that speculative bubbles are now "normal" in financial markets, making mitigation ineffective. He adds: "the bubble derives the rationale for its perpetual expansion from fulfilling a functional necessity of this accumulation regime."

Now, the bubble is essential. Who needs it and why? The bubble's fast price escalation will be the reservoir that allows excessive profitability. The 15% return on equities pension fund managers require comes to mind. LORDON says

“pension funds contribute to the maintenance of a chronic bubble, both by pouring their liquidity into it and by drawing from the rise in prices enough to satisfy their financial profitability.” He concludes that pension funds “feed” the speculative bubble, never longer finding profitability in the “real economy”. We now understand why regulatory norms are not implemented. It is impossible to cut profitability requirements and deflate the bubble without a catastrophic disaster. Any sustained price reduction causes market collapse. Headlong flying appears the only option, but when and how?

Finance may experience additional “small” crashes like 1997-1998. Small tweaks will momentarily deflate the bubble, but they won't end this financialized regime. If we follow LORDON's logic, these "small crises" will build tension and generate a "big crisis" in the long run. This mimics a 1930s economic and historical phenomenon that hit the world economy after the 1929 catastrophe. A time of economic optimism, strong stock market gains, and easy credit fueled speculation in the US. A stock market crash showed this significant crisis: values plunged 90% in 3 years and took 25 years to recover. If the market is left alone, LORDON says, “the regime of financialized accumulation is doomed to disappear in convulsions and ruins.”

V.2 Illustrations:

On September 17, 1998, the price of Alcatel, a major company in the French technology industry, fell by 38.4%. There have been multiple explanations, but no real justification has been put forward for this memorable fall. Initially, Serge TCHURUK announced that his company would not be able to meet its forecasts; the sanction was not long in coming and massive sales orders for the security were recorded, and the SBF decided to suspend the price as there were so many sales. At the opening of the New York Stock Exchange, same scenario happened... Following bad news, the reaction was immediate but certainly exaggerated; it may be an over-reaction amplified by a certain mimicry, with sales orders following one after the other. Furthermore, the day before the bad news was announced, Alcatel's price already fell by 5.9% in Paris and 10% in New York; could there have been insider trading, with certain investors having benefited from inside information? The hypothesis of a massive sale by some Anglo-Saxon pension funds holding a large part of Alcatel's capitalization has also been put forward, calling into question the atomicity of investors. Another well-known example is the fall in prices representing new technologies. During the month of April 2000, prices constantly declined with a record drop of 10% on April 14, 2000. This fall corresponds to a bursting of the bubble created in listed start-ups;

Indeed, with the advent of the Internet, investors have perpetually renewed their confidence in companies engaged in emerging technologies, anticipating an excessively optimistic economic outlook. The bubble continued to inflate until these companies were compelled to issue downward revisions of their forecasts, prompting investors to recognize the significant disparity between intrinsic value and market quotations. Subsequent sell-offs ensued, resulting in a recalibration of share values in accordance with the actual worth of the companies.

These instances distinctly illustrate the skepticism surrounding the efficiency of financial markets, which do not consistently align with the genuine economic landscape. The pronounced volatility of the stock market and the evident challenges within the financial system underscore a palpable lack of stability in the current context, particularly as financial issues impact the real economy.

VI. Financial crisis and market efficacy

Should the recent financial crisis lead us to reconsider the place or validity of the efficiency hypothesis in contemporary financial theory? At this point, we need to clear up some common misunderstandings that cloud many discussions about market efficiency. The most widespread specious idea that needs to be corrected is that according to which the efficiency of markets, as defined by FAMA, implies that there are no financial crises. If this were the case, then a succession of stock market crashes would clearly and definitively condemn the efficiency hypothesis. As defined above, the efficiency hypothesis does not imply that there is no crisis.

At any given date, once all relevant information is incorporated into asset pricing, future information remains uncertain. A series of bad news is possible because information arrives stochastically. This new information may cause prices to collapse, causing a crisis and crisis potential does not contradict market efficiency. The efficiency theory requires a certain understanding of financial crises, which is crucial. According to the efficiency theory, crises can only occur with extreme, external, and unanticipated shocks, which are rare. Many other financial crisis interpretations are impossible from this perspective. It's unsustainable to blame crises on an economic system's slow decline when even a small jolt might cause disruption.

KEYNES, HAYEK, and MINSKY argue that crises are caused by structural factors like excessive debt financing during a bubble, which undermines productive structures, contrary to the efficient market hypothesis. Other examples help explain these contrasting crisis views. If market efficiency

is accepted, asset prices match their "fundamental value." Given market efficiency, no asset can be essentially overvalued or undervalued.

Actually, the idea that an asset is "overvalued" relative to its underlying profitability violates market efficiency. Financial market illogical bubbles are ignored, and this does not negate crises, but rather proposes a different view of them. The efficiency hypothesis precludes a structural perspective on crises, which assumes a clear sequence of causes leading to a collapse. Instead, it requires a statistical and stochastic interpretation of crises.

After explaining the market efficiency hypothesis, can its empirical validity be assessed? Despite significant research on the efficiency hypothesis' empirical implications, it remains indirectly testable and requires an interpretation. This claim may seem paradoxical. Would detecting irrational bubbles or mispriced assets not disprove the efficiency hypothesis? The recent financial crisis may induce a fundamental reevaluation of market efficiency. However, the issue is more complicated, posing a methodological dilemma that penetrates economic theory.

Due to the objectifiable nature of phenomena, except in the infinitely large or small, physics can falsify theories despite epistemological challenges like the Duhem-Quine problem, which states that a hypothesis cannot be tested in isolation through a decisive experiment. However, economics' fundamental objects are always specified within a larger model or system, making it less clear.

In the perceptible world, there is no objectively discernible "fundamental value" for any economist. Asset fundamental value is always defined by a model. This renders empirical falsification of the proposition impossible. If an asset's price and model-calculated fundamental value differ, it cannot be undervalued or overpriced, violating the efficiency hypothesis. The asset's basic value model may be incorrect. Any efficiency hypothesis test is also a model test. As there is no "true model" offered to any economist, any empirical fact and asset price can be compatible with the efficiency hypothesis if we apply the valuation model to rationalize actual prices.

Numerous studies show that major announcements cause price changes. However, such evaluations are pointless. The main problem is that "relevant information" cannot be objectively distinguished from irrelevant "news." Only a larger economic model or theory defines relevant information.

Thus, if seemingly significant information does not cause expected price fluctuations, the efficiency hypothesis can be supported by the claim that "this news substantiates that the asset's price should be x ," or that "such news is ultimately inconsequential given our prior knowledge." This has no clear answer.

The distinction between two crisis categories is another example. Can earlier financial crises be evaluated to determine if they were caused by a major

negative shock or by a steady financial system deterioration that made it vulnerable to lesser shocks? No objectively observable crisis exists under either of these conditions. Since "financial fragilities" and "asset overvaluation" are model-dependent, each crisis can be interpreted in one of these ways. Does this mean challenging the efficiency hypothesis is pointless? If we choose an asset valuation model that enables observed prices, any financial market data can potentially support the efficiency theory.

The valuation model selection is the second issue to consider. Although it is possible to alter current asset valuation models to sustain the efficiency hypothesis, reinterpreting underlying value or relevant information for an asset, repetitive applications of standard models will cause distortions that vary in credibility and adequacy. We may begin to doubt the efficiency hypothesis when forced to establish ad hoc assumptions, generate subsidiary hypotheses, or use increasingly complex mathematical constructions. These valuation models may be accurate and not easily falsifiable; thus, this is not falsification.

We can conclude by referencing the 2008 financial crisis to emphasize the "credibility" of competing economic theories. Due to overvaluation of real estate and securitized assets, the crisis does not disprove the efficiency argument. In a system where asset prices were precisely assessed and matched to their inherent value, the crisis was a substantial unfavorable shock.

We can verify such an argument by examining the shock needed to explain our observations. Goldman SACHS' financial director estimated that the peak of the crisis had a possibility of "standard deviations $\sigma = 25$ " compared to average price swings. Catastrophes occur on average every 10^{140} years, greatly beyond the age of the universe. Such an incident may not be enough to explain the 2008 financial crisis, showing that valuation models were flawed before the disaster. One can thus doubt the efficiency theory in this case.

VII. An alternative: Behavioral finance

The occurrences in the financial markets during the 2010s, triggered by the downfall of Lehman Brothers on September 15, 2008, demonstrated the deficiencies of conventional economic theory. The abrupt fluctuations cannot be reconciled with expectations aligned with the Efficient Market Hypothesis and the rational behavior of agents. Consequently, the significance of the theoretical framework of Behavioral Finance cannot be dismissed. The incorporation of psychological factors into the analysis of behavior and the decision-making process is a crucial component in any financial explanation concerning economic agents. If this seeks to challenge the three foundational tenets of the Efficient Market Theory—namely, the maximizing of expected utility, the efficient market hypothesis, and the absence of arbitrage opportunities—then Behavioral Finance

is not a cohesive trend. The many currents approach these pillars differently, each rejecting distinct aspects of conventional economic theory.

In an unpredictable economic landscape, Behavioral Finance elucidates the factors influencing individuals' decision-making processes, which may lead to outcomes that deviate from the rationality posited by Standard Economic Theory. The most unique aspect is the incorporation of behavioral biases among economic agents. The former may exhibit varying degrees of influence on the process and differing levels of utility for the objective of "outperforming the market." They assume an anecdotal nature for specific calendar events or serve as a genuine background influence on persons, which may subsequently be exploited by agents who would manipulate them counter to their intended purpose. This finding of a market efficiency breach led to the concept of an attempted integration with Pension Funds. Indeed, the latter are significant institutional investors in the financial markets, employing the principles of the Standard Theory as a management framework. Notwithstanding a significant and stringent legal framework, they face extensive critiques concerning their operations. The attention is to the insights that this theoretical advancement may provide regarding the operation and evaluation methods of Pension Funds. Indeed, on the theory of financial market efficiency, managers to whom the management of pension fund assets has been assigned encounter challenges due to the empirical limitations of the Standard Theory, as they lack the cognitive framework necessary to rationalize an alternative approach to their investment decisions.

Adhering to the principle that it is preferable to lose collectively rather than to triumph in isolation, managers consequently persist with the same decision-making methods that they can defend when questioned. Consequently, Behavioral Finance may serve as this cognitive framework.

- ***Empirical study: Informational efficiency of the Algiers Stock Exchange***
VIII. Presentation of the Empirical Study

This empirical study seeks to evaluate the informational efficiency of the Algiers Stock Exchange by employing statistical tests on the returns of the CPA stock during its first public offering.

IX. Empirical Findings

Table (02): Autocorrelation test of returns

Lag	Autocorrelation	P-value
1.0	0.214	0.032
2.0	0.167	0.041
3.0	0.098	0.112

Source: Prepared by the author

The results indicate a significant autocorrelation at the first delays, which raises doubts about the hypothesis of weak informational efficiency.

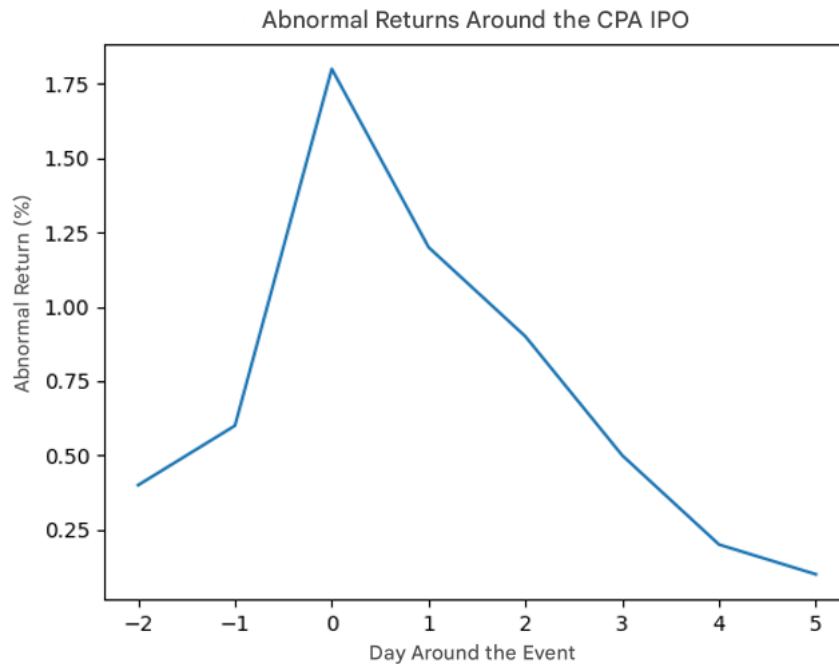
Table (03) : Abnormal returns around the IPO of CPA

Day	Abnormal yield (%)
-2.0	0.4
-1.0	0.6
0.0	1.8
1.0	1.2
2.0	0.9
3.0	0.5
4.0	0.2
5.0	0.1

Source: Prepared by the author

The persistence of abnormally positive returns after the event reflects a gradual adjustment of prices to public information.

Figure 1 : Rendements anormaux autour de l'IPO du CPA



Source: Prepared by the author

Figure 1 highlights a delayed market reaction, characteristic of emerging financial markets.

X. Conclusion

The Efficient Market Hypothesis (EMH) is a fundamental principle of contemporary finance. By asserting that the prices of financial assets instantaneously and thoroughly incorporate all available information, it claims that investors cannot consistently surpass the market by attaining abnormal returns, unless they possess private information or are prepared to incur costs that exceed their anticipated gains. This concept has resulted in significant progress in asset assessment, efficient resource allocation, and comprehension of the function of information in financial markets.

Behavioral finance has developed as a legitimate alternative, including findings from cognitive psychology and emphasizing the behavioral biases that influence investor decisions. Individual irrationality, constrained arbitrage, imitative conduct, and cognitive heuristics predominantly account for the enduring divergences between market prices and intrinsic values. This approach provides a more pragmatic perspective on financial markets, suggesting that efficiency is an approximation rather than an absolute principle, without completely dismissing the Efficient Market Hypothesis (EMH).

This work's theoretical and empirical examination underscores the substantial limits of this notion. The stringent requirements necessary for efficiency—complete rationality of actors, the lack of transaction costs, and the immediate and unrestricted distribution of information—are seldom fulfilled in practice. The emergence of stock market anomalies, the presence of speculative bubbles, the excessive or insufficient market reactions to announcements, and significant financial crises have significantly undermined the explanatory capacity of classical finance.

Utilizing the theoretical constructs of the efficient market hypothesis and behavioral finance, alongside an empirical analysis of the initial public offering (IPO) of Crédit Populaire d'Algérie (CPA), the primary objective was to evaluate the Algerian market's ability to swiftly and accurately assimilate available information into financial asset valuations.

The empirical findings indicate informational inefficiency in the weak sense. Autocorrelation and run tests indicate a substantial dependency of returns on historical prices, hence contesting the random walk hypothesis. The limited predictability of returns indicates that the market does not fully and immediately assimilate information from historical prices, a trait of low-liquidity financial markets.

The examination of events related to the CPA IPO indicates informational inefficiency in the semi-strong type. The continued presence of positive cumulative anomalous returns following the IPO date suggests that prices do not promptly respond to publicly available information. This incremental market response indicates an initial underreaction succeeded by a postponed adjustment, contradicting the assertions of the efficient market theory.

The analysis of trade volumes substantiates these assumptions by indicating a notable rise in trading activity in the days subsequent to the CPA IPO. This conduct indicates the existence of behavioral biases, including herding behavior and investor overconfidence, as emphasized by behavioral finance. The psychological variables, along with the concentrated structure and shallow market depth, restrict arbitrage possibilities and perpetuate the observed inefficiencies.

Nonetheless, the findings suggest that the CPA IPO exerted a partially beneficial impact on the operations of the Algiers Stock Exchange. This event enhanced market capitalization, visibility, and trade volumes, hence improving information diffusion and market dynamics, while it did not attain full informational efficiency.

This research ultimately establishes that the informational efficiency of the Algiers Stock Exchange should be perceived as a progressive and contextual

process, influenced by the market's institutional characteristics and investor behavior. The findings highlight the necessity to enhance the transparency, liquidity, and quality of financial information to optimize the operation of the Algerian stock market.

Future research avenues may encompass broadening the sample to encompass all listed securities, prolonging the investigation duration, or incorporating more sophisticated econometric models to enhance the examination of financial market efficiency in Algeria.

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