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## CHAPTER 1

### ORTHODOXY IN MODERN FINANCE

*Authored by: Luca Piras*

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## CHAPTER 1. ORTHODOXY IN MODERN FINANCE

### 1.1 Modern Finance Backbone

In the past twenty years, and even faster in the latest ten, the world experienced a progressive reduction of boundaries and, although this led to a recrudescence of nationalisms, particularly in emerging Countries, financial resources have started to flow through markets and territories, looking for alternative and worthy allocations.

At the same time, the amazing development of digital technologies helped agents to operate in a much wider and more crowded market than ever before, in this similar to the Marshallian model of perfect competition market.<sup>8</sup> Such operational conditions suffered several bugs due to relevant discrepancies in regulatory systems throughout Countries. Nevertheless, financial markets evolved rapidly toward a global one, in which enormous amount of money met a variety of new financial products and started to follow high expected returns, often regarding less of risk profile. This way, numerous previously separated markets started appearing rather similar to a single globalized one. The size of it, the trading volumes, and the number of agents, made it similar to an efficient market, except, perhaps, for availability of relevant information, rationality of agents' behavior, lack of ethic and some differences, bugs and contradictions in regulatory systems. These environmental conditions had a role on putting behavioural finance as a direct opponent to traditional theory, frequently leading to generalizations and misinterpretations. In addition, the evidence against market efficiency from the long-term return studies appear, sometimes, fragile and anomalies as methodological illusions.

This is probably why the debate on the theory of behavioural finance too often turned into a debate on Efficient Market vs Inefficient Market Hypothesis:

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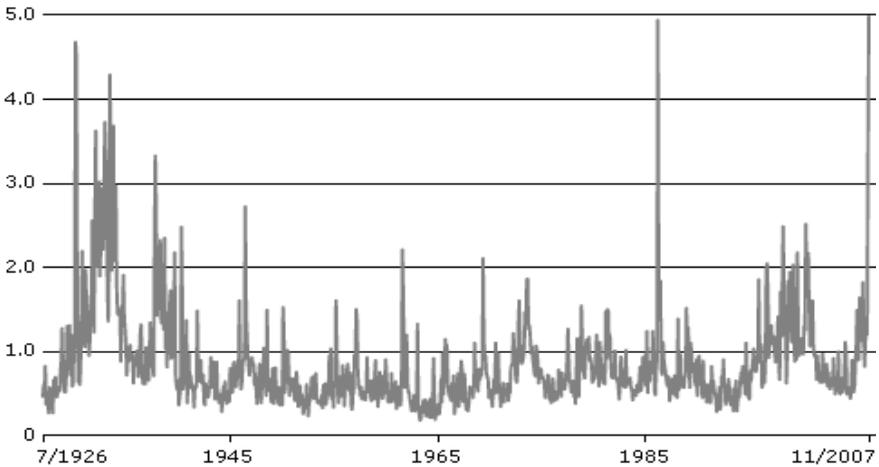
<sup>8</sup> Fabozzi, F. J., Modigliani F., Jones, F. J. & Ferri M. G. (2002). *Foundations of Financial Markets and Institutions*. Pearsons Educations, New Jersey.

i.e., a simple observation of common and systematic mistakes. However, no one can consistently apply rational logical principles to everything he or she does. Cognitive costs of such an effort, often exceed benefits, while theorems rarely contain similar errors. Nevertheless, bounded rationality imposes severe limitations on our capacity to develop economic theories much earlier than it does on our economic behaviour and this is why too often at various levels, requests for new rules are addressed.

The recent global financial crisis started to show its effects during late spring of 2007, developed in 2008 and is still exploiting its effects in many countries. Stock markets have fallen, large financial institutions have collapsed or been bought out, and Governments all over the world have been involved in very expensive rescue packages to bail out their financial systems and their real economies.

In one way, orthodoxy sees the market turmoil as a combination of sudden fluctuating changes in expected cash flows, and quick variation in investors' risk aversion, both leading to changes in expectation on returns (involving discount rates for expected cash flows). Nevertheless, in traditional theory both effects can be interpreted as rational.

A change in volatility, by itself, says nothing about market efficiency. It is, however, very interesting to inquire the reasons of the size volatility of expected cash flows and expected returns displayed in the past four years (see Figure 1.1), and this requires a much longer and articulated analysis than simply recalling Efficient Market Hypothesis precepts.



**Figure 1.1 Intra-Month Daily Volatility, S&P 500, July 1926 to October 2008**  
*Source: Fama and French (2008)*

Corporate finance has, over decades, developed a relevant number of theories and models. These have been accepted by scholars and became established part of the discipline when fitting contemporary four fundamental ideas:

1. Value enhancement;
2. Financial value of time;
3. Opportunity cost of capital;
4. Risk/return relation.

Whenever the idea of value is involved, too often is omitted to recall the fundamental meaning the term has in corporate finance.

At the same time, most theories consider value enhancement as a natural, spontaneous and assumptive economic behavior. This is not always true: creating new value can be quite a difficult activity and the search for value very easily turns into a search for shortcuts and these, as such, create fertile conditions for mistakes.

Although value enhancement is unanimously considered the most rational thing to do, not always it seems to be a top priority, particularly, in managers and investors' mind. As we read financial analysts reports or top managers' forecasts, quite often we perceive them as *people who seem to know very precisely the price of everything, but the true value of nothing*, to say it with Oscar Wilde.

At the same time if we go back over recent events in financial world, we see agents' behavior fitting the famous "bigger fool theory of investing": the value of an asset is irrelevant as long as there is a "bigger fool" willing to buy the asset from them. In recent time many strategies were laying on such a base, and by the end of 2008 everyone was clearly put aware of how dangerous this can be when time to sell suddenly comes and you may not find bigger fool investors when you most need them.

An obvious statement of value theory is that no one should be willing to pay for an asset more than it worth. Investors should not act under the pressure of emotional reasons; financial assets are acquired for the expected cash flows, consequently, perceptions of value have to be backed up by reality, which implies that prices should reflect the present value of those expected cash flows. It does not really matter how obvious this statement sounds, it is also the most forgotten and eventually rediscovered, usually when is too late.<sup>9</sup>

Value has three fundamental attributes that all together help to define its nature:

- Relativity
- Dynamicity
- Instability

"Relativity" lay on the fact that valuation cannot be considered more objective than it is the esteem of the elements needed to the calculus of it, by

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<sup>9</sup> Damodaran , A. (1997). *Corporate Finance, Theory and Practice*. John Wiley & Sons, Inc. New York.

definition subjective. Although quantitative models are used in valuation processes the inputs leave plenty of room for subjective judgments. The final value we obtain from these models is therefore affected by all the bias put into the process by valuers. Further argument is that too many times prices get set first and valuation follows. One very important source of biases is given by subjective goals of the valuator. Such goals can be very strong on conditioning the whole process and the result can sometimes be very far from reality.

“Dynamicity” recalls the fact that value is determined as a differential quantity from time to time, considering normal corporate variations in fundamentals. Such variations create or destroy expectations on cash flows and affect value. Clear enough, environmental and corporate instability give quite a bit of volatility to possible results.

Deriving from the two aspects mentioned above, “instability” largely depend on environmental complexity and variability, which strongly influence expectations on future cash flows and, as a direct consequence, value drivers.

All this being said, thinking to value simply in terms of positive cash flows or, and this would be even worse, in terms of positive earnings, would be quite an error, easily leading to severe mistakes in investing decisions.

Financial value of time directly descends from Irving Fisher’s Theory of Interest Rate.<sup>10</sup> Fisher’s theory states that the market pure rate of interest represents the trade-off for an individual between present goods consumption and future goods consumption. Put it differently, a surplus agent decide to spend money in present goods or save it and eventually invest it, if the sacrifice is compensated by the market rate. At the same time, deficit subjects will borrow money for their investments and consumption if the cost of loans is coherent with expected returns of investments.

Such a coherency no longer exist in consumer market, where people too often prefer to pay high rates on credit sales, while accepting very low returns on their deposits: a very high cost for their liquidity preference.

The size of interest rate, as J.M. Keynes positively argued in 1936,<sup>11</sup> strongly depends on the interaction between the supply of money and the public aggregate demand for holding money. Holding money make possible to carry immediate transactions and although it does not pay any interest, the demand for money is a negative function of market interest rate. This happens because at low rate people hold money simply because they lose little pay-offs, while keeping the possibility of immediate transactions, at the same time the risk for a rise of interest

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<sup>10</sup> Fisher, I. (1930). *The Theory of Interest Rate*. Macmillan, New York and Fisher, I. (1907). *The Rate of Interest*. Macmillan, New York.

<sup>11</sup> Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. Harcourt, Brace & World, New York.

and a consequent downturn in the value of bonds discourage individual investors to hold such securities.

On the other side, when high rates dominates the markets, households prefer to have their money put in bonds, since they would lose much money as interest pay-offs and, in case of decline of rates, bond's value would raise significantly.

These are the main arguments provided by theory that allow considering financial value of time as one of the main pillars in corporate finance.

It was in the Fifties that Franco Modigliani and Merton Miller introduced in the theory the idea of the relevance of opportunity cost of capital in what is well known as Proposition One of their theory and the important relation between risk and return in the Proposition Two.<sup>12</sup>

With their work, Modigliani and Miller overcame Keynes' idea that individual choose their investment having in mind a single parameter: public bond's yield.

The opportunity cost of capital is defined as the weighted average cost of all sources of capital for the investor, who will properly consider each source of capital in terms of its contribution to risk profile.

In the same years, Harry Markowitz,<sup>13</sup> having in mind the idea that rational agents are in general risk adverse, demonstrates that they will choose investments considering exclusively their expected returns and risk profile, in this asserting the absolute relevance of risk/return relation.

During the Sixties many economists worked on a correct definition of the financial market and achieved some important results on interpreting its functions,<sup>14</sup> and defining models able to price assets in competitive markets.<sup>15</sup>

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<sup>12</sup> Modigliani, F. & Miller, M.H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review*, Vol. 48.

<sup>13</sup> Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, vol. 7, No. 1, 77-91; Markowitz, H. (1952). The utility of wealth. *Journal of Political Economy*, vol. 60; Markowitz, H. (1959). *Portfolio selection: Efficient diversification of Investments*. Yale University Press, New Haven.

<sup>14</sup> Tobin, J. (1958). Liquidity Preference as Behaviour towards Risk. *Review of Economic Studies*, vol. 25; Tobin, J. (1984). On the efficiency of the Financial System. *Lloyds Bank Review*.

<sup>15</sup> Sharpe, W. F. (1963). A simplified Model for Portfolio Analysis, in *Management Science*; Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Condition of Risk. *Journal of Finance*; Sharpe, W. F. (1970). *Portfolio Theory and Capital Markets*. McGraw-Hill, New York; Sharpe, W.F., & Alexander, G. (1990). *Investments* (fourth edition). Prentice Hall, Englewood; Mossin, J. (1973). *Theory of Financial Markets*, Englewood Cliffs, N.J. Prentice-Hall; Lintner, J. (1965 February). The Valuation of Risk Assets and the Selection of Risk Investments in Stock Portfolios and Capital Budgets. *The Review of Economics and Statistics*; Lintner, J. (1971 December). The Effects of Short

Taking advantage of such a robust theoretical corpus, in 1970, Eugene Fama present his Efficient Market Hypothesis,<sup>16</sup> which will soon become an established theoretical framework and the base for interpreting real markets functioning. Fama, together with Kenneth French, also started the type of scientific investigation that will be known as event studies.

Event studies became very soon a very common and useful type of analysis and many important results were achieved over years.

## 1.2 Rationality, Efficiency and Social Behaviour

Theory, as seen so far, is basically a theory of rational behavior. Rationality is essential for all traditional models to hold. We all know by now though, that bounded rationality is a characteristic of human brain, something that we simply can't do without. Since 1957, economists started to consider the idea of bounded rationality.<sup>17</sup> According to this new view, human choices don't necessarily follow a maximizing utility function, the decision problem imply choices among different utility functions and rationality limits appear on the selection of such multiple functions and in setting up their hierarchies, since the economic one don't seem anymore to be the only relevant criteria. Brain limits and time consuming processes impose to individuals to employ part of the available time to find shortcuts and define rules of thumbs to deal with complex problems, rather than analyze, under a strict rational framework, every single aspect of the problem, in order to eventually accomplish an optimizing result, too late to be useful. This way rationality starts to be perceived not in terms of optimum results, but in terms of processes' logic. In this sense, processes need to be designed in order to economize the scarce mind capacities of human brain. Put it differently, the idea that rationality pushes toward maximization of economic utility, limits in itself optimization possibilities of the utility functions system. In other further words, rationality limits itself, in order to be able to work reasonably, and such limitation generates a self-evident contradiction: rationality exclude optimization.

However rationality, as a pure theoretical concept, simplify the idea of economic behavior and, this way, make much easier economic models drawing.

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Selling and margin Requirements in Perfect Capital Markets. *Journal of Financial and Quantitative Analysis*.

<sup>16</sup> Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, vol. 25, 383 – 417.

<sup>17</sup> Simon, H. A. (1955 February). A Behavioural Model of Rational Choice. *Quarterly Journal of Economics*, vol. 69. For a literature review on this point also see Piras, L. (1995), Alcune considerazioni sui processi decisionali nelle organizzazioni, in *Annali della Facoltà di Economia dell'Università di Cagliari*, nuova serie, vol. 8, Franco Angeli.

In such a framework is supposed to operate the *homo economics*, an ideal agent who has as many competences as possible and a very strong logic capacity to evaluate what is relevant and better, at any moment, to make the proper decision, in order to solve a certain problem (i.e. the selection of a portfolio).<sup>18</sup>

This approach took scholars directly to consider rationality as a characteristic of intelligence, in this way considering it as mere capacity to carry out calculations. Intelligence flexibility derive instead from brain capacity to rule its functions and to set rules to enhance other rules at different levels. Such capacity allows the brain to produce original solutions to problems never faced before, and that had never been resolved before. Such processes require few simple rules to ignite itself.<sup>19</sup>

Rationality should therefore be interpreted in terms of appropriateness of consequences of decision making which depend upon four main aspects:

- Created alternatives;
- Expectations for each alternative and related probability;
- Preferences;
- Decisions' rules.

Appropriateness imposes to examine choices in a social framework (i.e. the financial market) that limits, evaluates and eventually rejects or approves solutions.

The social framework ensures an external level of control and gives more strength to decision making, legitimating it.<sup>20</sup> The agent has however to define his subjective level of risk acceptance, but in his/her approach to risk and inability to properly recognize and measure it, set the mainstream of cognitive biases.

Efficient Market hypothesis has been very successful because states a very simple idea: markets are efficient and security' prices incorporate all available information. Also have very simple arguments to prove it. By this definition is therefore impossible to systematically beat the market for any agent, since his/her information is at the same time possessed by all others. Since they have all relevant information, they all evaluate correctly securities.

However, even possessing information, investors in such a market have about fifty percent of probability to beat the market and this makes irrelevant professional capacities. He bases this idea on three arguments:

1. Agents are and act rationally;

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<sup>18</sup> Lange, O. (1945-1946). The scope and methods of economics, in *The Review of Economic Studies*, vol. 13 (I), n. 33, 19-32. Markowitz, H. (1959), Yale University Press, New Haven.

<sup>19</sup> Hofstadter, D. R.(1984). Gödel Escher, Bach: un'eterna ghirlanda brillante, Adelphi, Milano, p. 28.

<sup>20</sup> In this sense see March, J. G. (1994). *A Primer on Decision Making: How Decisions Happen*. The Free Press, New York.

2. Whenever they wouldn't act rationally, errors would display a random distribution and the overall effect would be sterilized;

3. If this would not happen sophisticated investors (arbitrageurs) would recognize anomalous market patterns and would take easy advantage out of it. In doing so they would quickly bring prices back to equilibrium.<sup>21</sup>

Therefore, traditional theory is meant to be "The theory of rational behaviour [...] a study of the principles upon which a rational man would act.

This rational man is unlike you and me in that he makes no errors in arithmetic or logic in attempting to achieve his clearly defined objectives. He is like you and me, on the other hand, in that he is neither omnipotent nor omniscient. He must make decisions, such as the selection of a portfolio, in the face of uncertainty. Since his information is limited, he may take less than perfect actions. Since his powers are limited, his achievement may fall short of the best conceivable. Every action however, is perfectly thought out; every risk is perfectly calculated."(Markowitz, 1959).

In other words, rational people do make mistakes; such mistakes display though a random distribution and can be studied statistically to measure their probability. In efficient markets, this mean that expected returns will be usually coherent with their long run risk profile, while some even significant deviation can be observed in short time horizon.

Still markets, as social institutions, are the result of conscious deductive processes of human reason. As such, they are intended to emerge from a deliberate creation of consciousness. This idea implies rationality as a basic tool of consciousness and economic behaviours, just as traditional theory posits, this one intended as a theory of efficient market behaviour, while the first as an empirical evidence of the failure of such a theory.

At the same time, brilliant researchers all over the world keep on declaring their loyalty to EMH considering the fact that behavioural finance hasn't yet proposed any market model likely to have the same elegance, strong theoretical framework and general applicability as the traditional models do. The bottom line seems to be represented by the fact that the evidence against market efficiency from the long-term return studies appears significantly fragile and anomalies as methodological illusions.<sup>22</sup>

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<sup>21</sup> Fama's work is part of well known "Random Walk Theory" already explored at the beginning of XXth century by Louis Bachelier in 1900, Holbrook Working in 1934, Alfred Cowles in 1937, Clive Granger e Oskar Morgenstern in 1963 and Paul Samuelson in 1965.

<sup>22</sup> An efficient market generates categories of events that individually suggest that prices over-react to information. But in an efficient market, apparent underreaction will be about as frequent as overreaction. If anomalies split randomly between underreaction and overreaction, they are consistent with market efficiency". See Fama, E.(1998). Market efficiency, long-term returns, and behavioural finance. *Journal of Financial Economics* 49, 284.

The on-going debate, although very useful on helping to improve theoretical understanding of market behaviour, does not necessarily involve behavioural finance and, sometimes, leads to extreme positions and assumptions, which seem very much arguable on both sides.

Markets' inefficiency is envisaged by EMH, although traditional models do not help much on predicting neither the moment in which biases will appear, nor their intensity, nor for how long their effects on prices will last. In this sense, behavioural finance would appear as a simple observation of common and systematic mistakes.

Vernon Smith, in his Nobel Prize Lecture in 2002, doesn't oppose rationality to irrationality but uses Constructivist and Ecological rationality. That is to say that quite often and virtually in every aspect of their life, individuals must make decisions under uncertainty constraint, basically for lack of time or for incomplete information and, of course, for lack of ability. These are – he says - “fast and frugal decision making”. Such decisions are “ecologically rational to the degree that they are adapted to the structure of an environment.” Moreover, even in the past, economists argued that the values to which people respond are not necessarily confined to those one would expect, based on the narrowly defined canons of rationality. Individuals define and pursue their own interest in their own way, it is, this one, an “ecological expected utility”, to use Vernon Smith figures, that leads to a new smoother concept of “economic man”.<sup>23</sup>

### **1.3 Efficient Markets, Information and Biases**

The EMH [Fama, 1970] is based on the idea that prices in the market tend to incorporate all the available information about securities' cash flows prospects.

This idea has represented an accepted cornerstone for most established asset allocation models in the past forty years, involving that individuals in the market act rationally Markowitz [1952, 1959].

Fama proposed three types of efficiency: (i) the strong form; (ii) the semi-strong form; and (iii) the weak form. In the weak form, prices can be predicted from a historical price trend thus profiting from it is impossible. The semi-strong form tests whether all public information, such as companies' announcements or annual earnings figures, is reflected in prices. Finally, the strong form concerns all information, including private information, and implies that no monopolistic information can entail profits. In other words, insider trading cannot earn a profit in the strong-form market efficiency world.

Thus, efficiency posits that the capital market is efficient when security prices fully reflect all known information and none of the investors can have monopoly control of it. In this sense, agreeing on a clear meaning of the expression

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<sup>23</sup> Smith, V. L. (2002 December, 8). *Nobel Prize Lecture*.

“fully reflect”, which is rather helpful in setting empirical tests on any efficient market proposition, becomes essential.

As Fama claims, on the basis of his own empirical tests, full market efficiency (i.e. the strong form) is not clearly and easily met [Ball and Brown, 1968; Fama, Fisher, Jensen and Roll, 1969; Iederhoffer and Osborne, 1966; Scholes, 1969]. Nevertheless, the effect of information on price dynamics is an accepted point, at least in the semi-strong form. At the same time, rejecting the EMH implies the rejection of the market equilibrium model (e.g. the price setting mechanism).

Market efficiency denotes how information is factored in prices. The hypothesis of market efficiency must be tested in the context of expected returns: when a model yields a return which significantly differs from the actual return, one can never be certain as whether this is due to an imperfection in the model or to the market inefficiency.

This concept, known as the “joint hypothesis problem” [Fama, 1970], has ever since vexed researchers. Thus, market efficiency *per se* is not testable but has to be tested jointly with an equilibrium asset-pricing model [Fama, 1991]. The only possibility left is then to modify the model by adding different factors in order to mitigate anomalies and to fully explain the return exploited by the model itself [Fama, 1992].

Therefore, the same anomalies work as signals. However, as long as they exist, neither the conclusion of a flawed model nor of market inefficiency can be drawn according to the joint hypothesis.

The EMH is widely recognized as an elegant theory that has held great attention among scholars and practitioners, leading to the idea that free markets are the most efficient means of allocating economic resources. If investors rapidly and rationally incorporate all available information into stock prices, then stock selection is a quite futile activity: no risk-adjusted returns exceeding the market ones can be earned from stock selection. Given this idea, several questions could arise on why institutions and investors put consistent amounts of money in market analyses and market information production.

If an active portfolio management strategy based on identifying “undervalued” stocks is basically unworthy, and if outperformance relative to a valid benchmark is a random outcome rather than the result of insightful investment decision making, then the distinction between luck and skill appears extremely vague and undetermined. Still, financial information and available trading strategies cannot avoid biases and irrational behaviors among investors, as evidenced by the increase in the frequency and severity of bubbles and crashes in the markets. Irrational behaviors by individual and institutional investors drove researchers to develop new theories on how people act in the market: an example is behavioral finance, which is often and wrongly seen as an anti-EMH theory.

- omniscient and, therefore, right;

- Seeing patterns that don't exist, either embracing certainty (however irrelevant) or, on the other hand Overestimating the likelihood of certain events based on memorable data or experiences;
- Fears connected to changes in important aspects of life (status quo bias), of uncertainty, deriving from information overload or from the existence of too many attractive options (Candy Store Bias) that paralyzes the decision maker;
- Reluctance to admit mistakes and excessive aversion to loss;
- Regression to the mean and ex post overestimating predicting capacity or a tendency to seek only information that confirms one's opinions or decisions;
- Mental accounting.

Human beings are definitely subject to errors and biases in their decision making. Moreover, the ability of more sophisticated, though not always more rational investors, to correct mispricing shows to be quite limited [Shleifer and Vishny, 1997].

Behavioral finance focuses on errors of intuition. This means that cognitive biases are relevant for their intrinsic value as diagnostic indicators of mental mechanisms, in order to derive useful rules for interpreting and – eventually – predicting market trends.

We argue that traditional theory is a correct but largely incomplete theory and behavioral finance represents the best attempt to complete it, by observing and explaining rules people follow unconsciously. Rationality is then a qualitative parameter we can use to evaluate the adequacy of an individual decision, not very useful, though, to evaluate social behavior such as those driving capital market dynamics.

Also, the adequacy of a decision largely relies upon: the number of alternatives likely to be generated by individuals; expectations related to each alternative and associated probability; subjective preferences assigned to the values of possible results; rules used to make decisions. Traditional models remain extremely robust on their normative power, though they usually suffer some kind of blindness to irrationality and actual risk propensity. Still, irrationality occurs and, quite often, not in terms of a random walk. Furthermore, most of the time arbitrage is not effective enough to bring order back. Mistakes are the essential source of potential value or, in other words, in the period of time between the emerging of a mistake in the market and the correction by arbitrageurs' activity, value can be created by *some* investors, at least. The possibility for economic models to embed all discussed elements faces relevant obstacles on subjective behavioral complexity, primarily because rational behavior and optimizing behavior are no longer perfect conceptual substitutes.

External constraints can limit optimization, but not necessarily rationality. In making decisions, individuals need to consider context variables adequately,

also because they determine the social endorsement of a choice, which is more important to people than the evaluations carried out in terms of economic orthodoxy [March, 1994]. This idea would perhaps add a sort of collective rationality to decision making, since external constraints provide a strong contribution in terms of experience.

Behavioral Finance can be considered as part of a larger field of studies, known as Behavioral Economics. Using interdisciplinary approach and experimental techniques normally employed in sociology, psychology and, as we will see, neurobiology, it tries to integrate traditional models in order to better explain agent's systematic errors and behavioral anomalies. Said it differently, it studies financial markets' dynamics considering the idea that agents may not act that rationally after all.

Thus, the main object of interest is the study of decision making when agents show limits and troubles typical of human nature. In doing so a strong critic to Efficient Market Hypothesis rises.

It was around mid '80s when first critics to the most solid theories up to that time appeared in literature.<sup>24</sup> At that time scholars were concentrating on empirical analysis of discordances between expectations based on EMH and facts. In 1986 Fisher Black found that investors act more frequently than they are supposed to on rumors, rather than on concrete information. It was then that the expression noise traders started to be used.<sup>25</sup> Acting this way, investor tend to sell too early good securities and too late bad ones, at the same time they tend to buy on voices or on too recent prices rather than on fundamental values.

It is then possible to set taxonomy of these behaviors in three main categories:<sup>26</sup>

- a) Attitude toward risk;
- b) Non-Bayesian structure of expectations;
- c) Strong influence of how problems are presented on decision making.

Daniel Kahneman and Amos Tversky first noticed these problems<sup>27</sup> in 1979 when they proposed, in their seminal studies, the Prospect Theory. Prospect Theory investigates how individuals do carry their mind processes to forecast future events when money is involved. Studying intuitions thoughts and preferences that come to mind quickly and without much reflection, they found

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<sup>24</sup> Jensen, M. (1978). Some Anomalous Evidence Regarding Market Efficiency. *Journal of Financial Economics*, vol. 6.

<sup>25</sup> Black, F. (1986). Noise. *Journal of Finance*, vol.41.

<sup>26</sup> Kahneman, D., & Ripe, M. (1998). Aspects of investor psychology. *Journal of Portfolio Management*, vol. 24.

<sup>27</sup> Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review*, vol. 80; Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica*, vol. 47.

three major topics: a) heuristics of judgment; b) risky choice; c) framing effects. Thoughts differ in a dimension of accessibility; some come to mind more easily than others, and drew a distinction between intuitive and deliberate thought processes. They also found that even experts and professional are subjected to such errors. According to Kahneman and Tversky it is therefore necessary to distinguish between intuition and reasoning. The perceptual system and the intuitive operations tend to generate impressions about objects' attributes. These impressions are not voluntary and don't need to be verbally explicit. On the other hand, judgments are always explicit and intentional, whether or not they are clearly expressed. Of course reasoning is involved in all judgments, whether they turn in impressions or in deliberate reasoning. Judgments directly reflecting impressions are those we usually refer to as "intuitive". One of the functions of reasoning is to monitor the quality of both mental operations and explicit behavior.

	PERCEPTION	INTUITION System 1	REASONING System 2
Process		Fast Parallel Automatic Effortless Associative Slow learning	Slow Serial Controlled Effortfull Rule-governed Flexxible
Content	Percepts Current Stimulation Stimulus Bound		Conceptual Representation Past, Present and Future Can be evoked by language

**Figure 1.2 Perception, Intuition and Reasoning**

*Source: Daniel Kahneman, Nobel Lecture, 2002*

Just as Herbert Simon said, problems don't exist in Nature. They are direct consequences of mental models our brain uses to collect and organize information. Mental models frame rules and criteria used in decision-making, therefore choices are extensively bent by how information are collected, organized and presented.<sup>28</sup>

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<sup>28</sup> "For example, investors may extrapolate short past histories of past earnings growth of some companies too far into the future and therefore overprice these glamorous companies without a recognition that, statistically speaking, trees do not grow to the sky. Such overreaction lowers futures returns as past growth rates fail to repeat themselves and prices

Having in mind the basic ideas above exposed, it is easier to go through the most frequent cognitive mistakes individuals face in their everyday decision making. Field evidence demonstrates that cognitive biases are systematic and mostly uncontrolled deviations from rationality. They are not always or necessarily mistakes.

Often they simplify processes, by reducing complexity of mental work, thus freeing extra calculation capacity.

Such distortions in rational thought involve, obviously, most human activities, but they are particularly significant in all decision making concerning the use of money.

For taxonomic reasons it is useful to set two main categories, each containing several types, as a mere example some can be listed:

- Biases
  - Overconfidence
  - Excessive Optimism
  - Confirmation Bias
  - Illusion of control
- Heuristics
  - Representativeness
  - Availability
  - Anchoring
  - Affect heuristic

Among mentioned, most frequent and relevant in its consequences is overconfidence.

An individual display overconfidence, and often a subsequent excessive optimism, when exaggerate trust in his own judgment, predictions capacities and more general abilities.

Overconfident people tend to overestimate positive chances and their ability to control events, underestimating risk associated to preferred options and neglecting to properly consider possible drawbacks and their probability distribution.

Sometimes overconfidence tends to characterize rather homogeneously professional groups, such as top managers, top professionals, and financial analysts.

People in such groups acquire such an attitude, displaying arrogance and complacency, often not accepting ideas and opinions coming from outside their group. Typical mistakes related to overconfidence are the above mentioned illusion of control; tendency to projecting the immediate past into distant future; drawing conclusions from a limited sample size; confusing familiarity with knowledge.

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adjust to more plausible valuations”. A. Shleifer (2000). *Inefficient Markets: An introduction to Behavioural Finance*. Oxford University Press, Oxford, 11.

Heuristics also leads to frequent mistakes in decision making. Typical and frequent are:

- Herd-like behavior (social proof), consisting in believing that the crowd is omniscient and, therefore, right;
- Seeing patterns that don't exist, either embracing certainty (however irrelevant) or, on the other hand Overestimating the likelihood of certain events based on memorable data or experiences;
- Fears connected to changes in important aspects of life (status quo bias), of uncertainty, deriving from information overload or from the existence of too many attractive options (Candy Store Bias) that paralyzes the decision maker;
- Reluctance to admit mistakes and excessive aversion to loss;
- Regression to the mean and ex post overestimating predicting capacity or a tendency to seek only information that confirms one's opinions or decisions;
- Mental accounting.

All the above mentioned expressions of irrational behavior and, perhaps more explicitly, their frequency, are positive arguments in favor of EMH critics:

- Investors do make mistakes
- Their mistakes are quite often positively related to each other.

In other words, not only agents are not rational as much as traditional theories assume, they also frequently are irrational in the same way<sup>29</sup> and sophisticated trader don't seem to have the power, capacity and risk attitude required to bring prices back to equilibrium.

Such behavior is clearly held by professional investors as well.<sup>30</sup> Mutual funds and other professionals tend to lean too much toward their benchmarks, like S&P 500, in order to reduce the risk of being beaten by the market. In doing so they often sell securities or by them for the only reason that they enter or exit the index.<sup>31</sup> Arbitrageurs don't seem to find as easily and frequently adequate substitutes securities to carry safe short sales.<sup>32</sup> Many studies over years

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<sup>29</sup> Shiller, R. (1984). Stock prices and social dynamics, *Brooking Papers on Economic Activity*, vol. 2.

<sup>30</sup> Lakonishok, J., Shleifer, A., & Vishny, R.(1992). The structure and performance of the money management industry. *Brooking Papers on Economic Activity Microeconomics*, 339-91.

<sup>31</sup> Scharfstein, D., & Stein, J.(1990). Herd behavior in investment. *American Economic Review*, vol. 80.

<sup>32</sup> Campbell, J.Y., & Kyle, A. (1993). Smart money, noise trading and stock price behaviour. *Review of Economic Studies*, vol. 60; "These broad classes of securities do not have substitute portfolios, and therefore if for some reason they are mispriced, there is no risk less hedge for the arbitrageur. An arbitrageur who thinks that stocks as a whole are overpriced cannot sell short stocks and buy a substitute portfolio, since such portfolio does not exist. The arbitrageur can instead simply sell or reduce exposure to stocks in the hope of

highlighted several anomalies in investors' behavior, regarding less their professional skills,<sup>33</sup> weakening, in doing so, the idea of market efficiency and agents' rationality.

Grouping incoherent behaviors we can have three main categories:

- a) Bounded rationality, as proposed by Herbert Simon, explaining limits in human brain ability in problem solving;
- b) Limited, if existing at all, capacity to predict future events leading to choices with negative long run output;
- c) Limited capacity to pursue self-interests, often in favor of other individuals.

The strength of evolutionary theory, stating the interaction between market's dynamics and learning processes drive events in the same direction predicted by models, is therefore reduced by field evidence that most irrational behavior do not provoke adequate reactions in the market. Even the idea that fools rapidly lose their money, doesn't appear to meet reality, since the increasing size of internationalized markets keep on providing new fools to irrational trading.<sup>34</sup>

Learning from experience seems not to be an easy accomplishment either. Learning can be costly in terms of effort and time consuming, nevertheless in complex environments like financial markets seeking experience can be a vain effort for agents never getting to learn the right thing by the right time.<sup>35</sup>

Summing up what stated so far and viewing the financial market as a non-personal device likely to work as supposed by traditional models, any deviation from the model is a mistake. Deviations are though represented by transaction

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an above market return, but this arbitrage is no longer even approximately risk less, especially since the average expected return on stocks is high and positive". Shleifer, A. (2000). *Inefficient Markets: An introduction to Behavioural Finance*, 14.

<sup>33</sup> De Bondt W. F. M., & Thaler, R. (1985). Does the market overreact ? *Journal of Finance*, vol. 40; Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: implication for stock market efficiency. *Journal of Finance*, vol. 48; Siegel, J. (1993). *Stocks for the long run*. Mc Graw Hill, New York; Shleifer, A. (2000). *Inefficient Markets: An introduction to Behavioural Finance*, 19; De Bondt W. F. M., & Thaler, R. (1987). Further evidence on investor overreaction and stock market seasonality. *Journal of Finance*, vol. 42; Fama, E., & French, K. (1992). The cross section of expected stock returns. *Journal of Finance*, vol. 42; Lakonishok, J., Shleifer, A., & Vishny, R. (1994). Contrarian investment, extrapolation and risk. *Journal of Finance*, vol. 49.

<sup>34</sup> De Long, B., Shleifer, A., Summers, L., & Waldman, R. (1990 August). Noise Trader Risk in Financial Markets. *Journal of Political Economy*, vol. 98; Shleifer, A., & Vishny, R. (1997 March). The Limits of Arbitrage. *Journal of Finance*. vol. 52.

<sup>35</sup> Shefrin, H. (2000). *Beyond greed and fear: Understanding behavioral finance and the psychology of investing*. Harvard Business School Press, Boston, USA.

costs, fiscal policies and irrational behaviors.<sup>36</sup> Thus market is influenced by human (fallacy) actions having different origin and experience level, here meant as the result of past mistakes; no models can so far capture and explain such complexity in every possible scenario. This is though what creates possibilities for carving out value.

If we consider the market more similar to a social system rather than to a hardware piece, we must expect that it will work as such. In social systems, information has an economic value, since is not as available as the theory require.<sup>37</sup> We will therefore have that:

- a) Most valuable information will cost more;
- b) Useful information will be total information minus misunderstood information;
- c) Information value is a negative function of information diffusion.<sup>38</sup>

It is then crucial understand how information is produced and conveyed to the market, but also who does the job and what kind of bias they are exposed to, which help to understand how their action influence, if it does, market's trends.

## 1.4 Financial Analyst's portrait

When arguing about financial markets in terms of social systems, one consequence is that rationality should be evaluated not only in terms of efficacy (achievement of expected results) but also in terms of coherency with the environment (other individuals' sentiment and expectations, which could be biased). Therefore, individual cognitive biases and deviations from rationality are not necessarily endogenous errors. In helping the mind to work conveniently in a complex environment (i.e., the capital market), rationality does not necessarily manage uncertainty in order to discover the truth, but to produce sense [Luckmann and Berger, 1966; Popper, 1959; Simon, 1955].

In complex environment biases will appear more frequently, although not necessarily more relevantly for the social system as a whole. At the same time, the investors' mind dealing with market complexity assumes information as a guide to environmental coherency, which is useful in order to feel comfortable even in the stake of errors. In this framework, understanding the dynamics followed by

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<sup>36</sup> Graham, B., Dodd, D. (1934). *Security Analysis*. McGraw-Hill, New York, 23. "Hopefully, future research will throw more light on the inner workings of the "voting machine" and make clear how market and individual decision making anomalies are linked."

<sup>37</sup> Grossman, S., & Stiglitz, J. On the impossibility of informationally efficient markets. *American Economic Review*, vol. 70, 393-408.

<sup>38</sup> Maxwell, J. (1871). *Theory of heat*. Green & Co., Longmans, London.

professional information providers becomes crucial, as they can give to the market the shape they like, rather than to describe the shape it really has.

The trading behavior of retail investors often demonstrates that they fail in understanding the true message: analysts do not always mean what they write in their reports [Peixinho and Taffler, 2010].<sup>39</sup> Nevertheless both retail and institutional investors still trust analysts and follow their recommendations. Reliance on analysts' expertise reduces the perception that investors have of uncertainty [e.g., Jiang, Lee, and Zhang, 2005; Zhang, 2006]. Moreover, the literature gives evidence to the fact that analysts may play a much greater role in the bad news domain, since corporations' managers tend to withhold bad news [e.g., Hong, Lim and Stein, 2000; Kothari, Shu and Wuysocki, 2010]. Rationales for trusting analyst reports are evident, since they are:

- Mostly highly educated professionals with an economic, business or financial background;
- Supposed to possess high standards in professional requirements as those requested by the Chartered Financial Analyst Institute or similar organizations;
- Bound to comply with the Code of Ethics and Standards of Professional Conduct, which implies to act with integrity, competence, diligence, respect, and in an ethical manner with the public, clients, prospective clients, etc.; but also to place the integrity of the investment profession and the interests of clients above their own personal interests, to promote the integrity of, and uphold the rules governing, capital markets;
- Mostly analytical minded people with strong mathematical competences.

In short, analysts forge themselves to be the kind of person one would trust. Investors dealing with complex environment, such as financial markets, need to rely on someone in order to make a complex decisions. Deciding within uncertainty can be a serious problem; trust can be a partial solution. Due to their characteristics, analysts embody all the elements that make investors feel rational though they are perfectly aware of the fact that they miss most of the information and competences needed.

At the same time trust has many implications, mainly driven by its characteristics (Olsen, 2012):<sup>40</sup>

1. Trust builds slowly but can be destroyed quickly;

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<sup>39</sup> Retail investors seem strongly misled in their decisions when analyst recommendations exert positive or no "pressure" on these non-sophisticated clientele (i.e., "strong buy", "buy" or "hold"). Such recommendations are likely to keep stock prices artificially high and lead investors to delay the incorporation of going-concern uncertainties into stock prices.

<sup>40</sup> Olsen R. A. (2012), Trust: The Under Appreciated Investment Risk Attribute, paper presented at 19<sup>th</sup> Annual Meeting of the Multinational Finance Society, Krakow, June 2012.

2. Trust is strongest when based on personal association and contact;
3. Trust destroying events are more salient and seen as informative;
4. Trust is more difficult to establish with women;
5. Trust is weakened by diversity in values and beliefs;
6. Trust is weakened by perceptions of inequality (wealth, status).

If we look at the list above, we can easily realize that financial analysts are in a halfway position between retail investors, covered corporations' management and institutions they work for. They tend to act, think and write reports in a manner that should be perceived as reliable by all sides, which often have opposite interests, though traditional value enhancement theory postulate they all share the same goal: create value. Still analysts face a trust-building problem on three opposite sides and they have to develop accurate strategies to solve it. This seems to have quite an influence in their use of language and in the way they write. Hardly do analysts write something they don't think in a natural, straightforward and convincing way. If they have to, because of possible conflicts of interests, chances are that the way they express it will contain linguistic evidence of such biases.

Neuroscience defines a social behavioural output as a function of online processing of social stimuli.<sup>41</sup> This leads to the consequence that a social behaviour, such as investing in the capital market, requires people to direct their attention to specific stimuli (information on investment fundamentals; experts' opinions etc.) coming from the specific environment considered (the capital market) and give meaning to them. Only after mentally ordering those stimuli investors can consider their personal utility function in terms of goals and expected returns and after calculating the outcomes associated with possible behavioural responses (coherent with the social environment) can decide on their personal response.<sup>42</sup> This is why, for example, emotion has very strong and predictable effects on cognitions and decision processes. Emotional experiences engage sensible cognitive strategies that influence response selection.<sup>43</sup>

People feeling good are more likely to engage in automatic cognitive process, react quickly, underestimate risk and focuses on positive explanations when making decisions or judgments. On the other hand, when people are feeling

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<sup>41</sup> Crick, N.R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 115, 74-101.

<sup>42</sup> Beer, J. S. (2007). The Importance of Emotion-Social Cognition Interactions for Social Functioning, in Jones, E. H. and Winkelman, P., *Social Neuroscience, integrating Biological and Psychological Explanations of Social Behavior*. The Guilford Press, New York, 15.

<sup>43</sup> Levenson, R.W. (1999). The interpersonal functions of emotion, *Cognition and Emotion*, 13, 481-504.

bad, they are more likely to engage in effortful cognitive processes, react more slowly, overestimate risk and focuses on negative explanations when making decisions or judgments.

Interpreting the statement above in terms of EMH requires agents to have an information set and the capacity to use it by far more complete than could ever be given to one mind. Also, as Damasio demonstrates, because of the brain physiology, such a talented mind would be totally incapable to stop at an appropriate level the number of iterations needed to make a proper decision. This may cause the temptation in scholars to ignore this reality because it is poorly understood and does not yield to our familiar although inadequate modeling tools, and to proceed in the implicit belief that functions and curves capture what is most essential of what we observe.

Creating deliberately rules of action and being conscious of their effectiveness require to remain sensitive to the fact that most human decision making is not primarily guided, if at all, by conscious rationality. The brain has over millennia developed arrangement capacities and survival properties that take account of opportunity costs and environmental challenges that are invisible – so far - to any possible modeling effort.

In this sense trust appear to be the most revealing example of what stated above, for the role it plays in social behaviour everywhere in the world, in different times and among all species socially organized. To trust someone imply the existence of an interpersonal link aimed to achieve an improved state compared to the status quo. Possible outcomes of a choice strongly depend on combined effects of others' choices and behaviour. Being impossible to adequately calculate all implications for each external stimulus, trust operates as a consistent simplifying factor for those calculi.<sup>44</sup>

In more simple words, trust seems to be a convenient shortcut for economic choices, but works somehow in the wrong direction when interpreted in a classical theory framework. If the idea of maximising subjective utility function is essential on coding economic rational behaviour and this because rationality imply correct logic and calculus, trust, which is nothing more than a quite often not very accurate esteem, has very little to do with precise calculus, and, as a direct consequence, with rationality. Still trust is an essential component of economic behaviour adding efficacy and efficiency in all cases in which contracts fail on considering every possible effect of misbehaviour.<sup>45</sup> Putting it again as Vernon Smith does, “We have become accustomed to the idea that a natural system like the human body or an ecosystem regulates itself. To explain the regulation, we look

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<sup>44</sup> Pelligra, V. (2007). I paradossi della fiducia: scelte razionali e dinamiche sociali, Il Mulino, Bologna.

<sup>45</sup> Mill, J. S.(1848). *Principle of political economy*.John W. Parker, London; Arrow, K. J. (1974). *The limits of Organizations*. Norton. New York.

for feedback loops rather than a central planning and directing body. But somehow our intuitions about self-regulation do not carry over to the artificial systems of human society. The actual shape we observe is the consequence of myriads of individual decisions.”<sup>46</sup> What appears really important is not to confuse rationality with selfishness, since standard models usually promote or require selfish behaviour. Still, as demonstrated by experimental economists, selfish behaviour is not necessarily prevalent in common economic decisions and this seems to somehow contradict standard models. But when one actor’ selfish behaviour is perceived as unfair (quite often I would say) by other actors, the latter may react, punishing such behaviour and such costly consequences should drive rational behaviour toward a non-selfish attitude.

## 1.5 Conclusions

In traditional corporate finance theory - and portfolio theory within it - price mistakes are an essential source for potential value or, in other words, in the period of time between the emerging of mispricing in the market and the correction by arbitrageurs’ activity, value can be created by some investors.

Following EMH such dynamics must be interpreted in a statistical sense: market equilibrium must be intended in a long run framework and in a dynamic flexible way.

Cognitive biases are relevant for their intrinsic interest and for their value as diagnostic indicators of mental mechanisms, in order to derive useful rules for interpreting and - eventually - predicting market trends. Choices are often affected by contingent judgments about the scenarios, and the potential impact of each choice on the decision maker general frame of reference, in this considering previsions on the social adequacy of a choice and the forthcoming behavior.

Rationality is attractive to scholars since simplify models, but being a qualitative parameter, it can be used only to evaluate the adequacy of an individual decision, it is not very useful, though, to evaluate social behaviour such as those driving capital market dynamics. Also the adequacy of a decision largely relay on:

- The number of alternative likely to be generated by individuals;
- Expectations related to each alternative and associated probabilities;
- Subjective preferences assigned to the values of possible results;
- Rules used to make decisions.

The hypothesis that prices fully reflect available information is a partial and faulty description of price formation. Following the standard scientific rule, however, market efficiency can only be replaced by a better specific model of price formation, itself potentially dumped by empirical tests.

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<sup>46</sup> Smith, V. L. (2002). *Nobel Prize Lecture*, here referring to Herbert Simon.

Alternatives must though specify biases in information processing that cause the same investors to under-react to some types of events and over-react to others. At the same time they must explain the range of observed results better than the simple market efficiency.

Financial analysts have an essential role in such processes; their work, their rationality and their biases strongly influence other market agents' behaviors. This is why the study of their role is of a great interest. Rational behaviour and optimizing behaviour are no longer perfect conceptual substitutes and external constraints can for sure limit optimization strategies, but not necessarily rationality. Making a decision need to adequately consider context variables, also because those variables determine the social endorsement of the choice, more important to individuals than evaluations expressed in terms of economic orthodoxy.<sup>47</sup> This idea would perhaps add a sort of a collective rationality to decision making, since external constraints provide a strong contribution in terms of experience.

The following chapters are aimed at explore a multiplicity of Analysts' work and behavior aspects, through the recognition of ten years of research work on the topic carried by the authors.

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<sup>47</sup> Cfr. March, J. G. (1994). *A Primer on Decision Making: How Decisions Happen*. Free Press, New Haven.

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