

# The Concept Of The Circle Of Epistemic Matrices In Finance

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## Abstract:

**Background:** About 15 years ago, the essay proposed by Iquiapaza et al. (2009) and published in the *Organizations and Society Journal* presented an epistemological analysis and the proposition of a paradigmatic dispute within the field of financial economics, leaving open, in its conclusion, the unfolding of the evolution that would or would not mark the possibility of the rise of behavioral finance to the position of dominant paradigm. Since then, although there have been specific publications on epistemology in the field of finance, there has been no specific response to these discussions.

**Materials and Methods:** The purpose of this essay is to discuss the proposal that aims to fill this gap, by analyzing the classic studies of epistemology to show the inappropriateness of a paradigmatic dispute, given the important complementarity between modern finance and behavioral finance. It is therefore based on a methodological review of the literature through seminal studies and recent work on the subject.

**Results:** The paper raises the possibility of discussions about the circle of epistemic matrices in finance that consider an existing correlation between the different areas of finance and enable new theoretical-epistemological propositions that encompass the correlation between the different strands studied.

**Conclusion:** The main conclusion of this work lies in the perception of the need to view finance studies from a broader perspective that does not exclusively involve a single episteme.

**Key Word:** Modern finance; Behavioral finance; Epistemology; Dichotomy.

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## I. Introduction

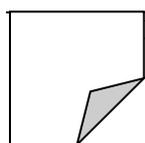
Modern financial theory has been built over many decades on the contribution of many scholars in financial economics who have meant that, even today, many economists and financiers apply at least part of the principles they brought. Since Adam Smith is considered the father of modern economics, his principle of the free market had an important influence on Jevons' marginalism and, consequently, on the concept of marginal utility. Modern finance, however, was structured in the last century, as Iquiapaza, Amaral and Bressan (2009) point out, on the basis of Keynes' macroeconomic ideas, Markowitz's theory of optimal investment allocation and Black and Scholes' option valuations. Above all, the 20th century would mark discussions about the assumptions of rationality of market players and the idea of the efficient market. The sum of these efforts became the framework for the prevailing model until at least the turn of the millennium.

The emergence of behavioral finance in the final quarter of the 20th century emerged as an alternative and has since had a significant projection, broadening the theoretical base and bringing, as Barberis (2013, p. 174) points out, a growing number of empirical works applied to economic environments with the potential to elevate this area to a "permanent and significant place in mainstream economic analysis".

The authors, Iquiapaza, Amaral and Bressan (2009), focus their work on the discussion of the evolution of financial theories, tracing the beginnings of the traditional approach to finance, passing through modern finance and pointing out the role, the attempt and the difficulties of behavioral finance in promoting itself as the new predominant paradigm in financial economics.

More than a decade on from the publication of "Evolution of research in finance: epistemology, paradigm and criticism", the concept of which is the predominant theoretical model still seems to be under discussion, which is often a necessary correlation for the construction of research in both the field of modern finance and behavioral finance.

Unlike the arguments presented in the aforementioned article that behavioral finance, given its inability to rise as a dominant theoretical framework, is self-marginalized by employing methods and doctrines implicit in



modern theory (considered the prevailing paradigm), this essay aims to present a counterpoint and discuss the possibility of correlation between different epistemologies.

By bringing up the epistemic discussion and its paradigms in this essay, the aim is both to understand how the decade of finance fits into a philosophy of science model and to corroborate the idea that it is possible for different methods to interact harmoniously. It is known that epistemology plays a crucial role in the definition of research questions, the methodologies adopted for their development and the interpretation of research data, since epistemological assumptions can determine what can be considered valid evidence and which methods are appropriate for collecting this evidence.

It is precisely for this reason that a clear understanding of epistemology for social science research, including finance studies, is necessary. Epistemological considerations are particularly important in the social sciences because of the subjectivity inherent in social phenomena. The complexity related to culture in society makes the research process in this large area a challenge that can be better managed through epistemic structuring, enabling greater reliability in theoretical-scientific constructions.

In this context, an overview is drawn up to guide the interpretation of epistemic models in finance and the paradigmatic constructions associated with it, taking as a reference classic studies by scholars such as Popper, Kuhn, Hempel and MacKenzie, as well as bringing analyses from a more recent study (Walter, 2021) that deal with the subject, making it possible to corroborate the ideas brought up on the issue, and which help to identify the construction of knowledge in the area.

In addition, we seek to understand what is actually understood as a circle of epistemic matrices and how there is the construction of an epistemic circle in finance, based on the work of Paula (2016), to demonstrate that the concept of epistemic matrices in finance is not new, and that it continues to be considered for the evolution of research in this area.

## **II. Epistemic And Paradigmatic Positioning**

The issue brought to the forefront of discussions is the epistemological clash that permeates modern finance and which places behavioral finance as an alternative to the positivist characteristics of the former, often creating a general sense of analytical lethargy in the philosophical-scientific construction of finance and the great difficulty of clearly defining the paradigm that exists in this branch of study.

Lagoarde-Segot (2015) points out that, from an academic perspective, there is a substantial predominance of the functionalist positivist paradigm and objectivist ontology, in which the dichotomy that contrasts values and facts is highlighted in such a way that the idea of an association between statistical data analysis and "facts" prevails among scholars of the dominant theories. For the author, the cohesion that exists in the mainstream of research in the area makes researchers ignore their own epistemological position, stimulating the restriction of academic debates in finance.

Despite the apparent doldrums in proposing the diversification of finance research, as suggested by Lagoarde-Segot (2015), this is a reasonable justification for the widespread resistance to the construction of alternative ideas to the positivist-functionalist model, based on the explanations observed in MacKenzie (2001).

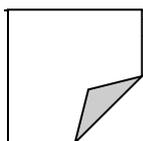
For now, it is worth noting that, for the purposes of the more general epistemological discussions for finance, at its inception, even though the ideas of a scientific philosophy in finance were not being propagated at the time, the so-called traditional (or classical) finance was mostly positive in nature, but as indicated by Sato, Savoia and Famá (2013), it was more normative in nature; Modern finance, on the other hand, which began with Markowitz in the 1950s and was reinforced in later developments, such as Sharpe (1964), Black and Scholes, Merton, among many others, is clearly a positivist functionalist model; while behavioral finance, from the perspective of Berger and Luckman (2000), is predominantly interpretivist and critical.

For comparative purposes, however, it is reasonable to contrast the functionalist positivist perspective with the interpretivist and critical perspective, based on considerations of modern and behavioral finance, respectively. The apparent "exclusion" of traditional finance (pre-Markowitz), based on Lagoarde-Segot (2015), is due to its limitations from a theoretical-academic point of view until the 1950s. From this point of view, a brief assessment of these models within the most prominent philosophical-scientific approaches to the study of the social sciences is relevant and substantial to understanding the paradigmatic issue.

## **III. Analysis And Results**

### **The epistemic question from Hempel's perspective**

Hempel, among many scholars on the philosophy of science, can be considered one of the key figures in the advent of the positivist-functionalist view in academic-scientific practice. With his education strongly influenced by the ideas of the Vienna circle, his efforts to investigate the nature of scientific knowledge related to observation and experimentation were expressed in a significant way with the publication of *Philosophy of natural Science* in 1966, focusing on the empiricist approach and the idea of the cumulative nature of scientific knowledge.



According to Salmon (1999), Hempel's work was the most important in the construction of logical empiricism and, together with other scholars in this field in the first half of the 20th century, they established the idea that there was no such thing as "scientific explanation", which was relegated to metaphysics and theology, reinforcing that observation and empiricism should prevail in the analysis of facts.

Considering Hempel's own proposition (1966), the search to justify a given theory consists of resorting, on an empirical level, to facts that can be observed (which have already taken place or will eventually take place). It is observation that will make it possible to verify or not that a given hypothesis can lead to some prediction or consequence. This structure outlines the testing of hypotheses in terms of the possibility of their logical validity on pre-defined premises, giving as an answer the idea that a premise may or may not pass the test, but it carries with it the 'fallacy of affirming the consequent'.

To better understand this explanation, we can turn to Hempel's scheme. In this scheme, known in logic terms as Modus Tollens, any tested statement is treated as a hypothesis H which is verified by implicating it in a test I, as shown below, adapted from Bossio (2007):

An important point is the understanding of I which, as Hempel (1966, p.7) explains, is a statement that describes the "expected observable occurrences". The first scheme denotes that when the descriptive information is not true, then the hypothesis for the phenomenon studied will not be true either. In the second scheme, the idea is the opposite, in the sense that by confirming the veracity of the expected observable occurrences, the hypothesis is assumed to be equally true.

The fallacy of affirming the consequent arises precisely from the identification of a logical problem when considering conclusions based on patterns of observation. This fallacy occurs when a researcher assumes that if a given theory is true, then we can expect to observe certain results or effects. However, simply observing these effects is not enough to prove that the theory is true. Because of this condition, it is considered necessary to carry out additional tests and experiments to confirm or refute scientific hypotheses, rather than relying solely on observed correlations (Hempel, 1966; Bossio, 2007).

In general, what can be understood from this view is that the scientific explanation of a fact is structured on the basis of a logical inference or conclusion that must be in line with a general law. This rigorous model of analysis has encouraged many philosophers of science to reduce the different types of explanation present in the various scientific disciplines to the same basic scheme (Bossio, 2007).

The explanation of Modus Tollens and the brief analysis of the fallacy of the affirmation of the consequent lends itself to presenting the character of positivist scientificity discussed by Hempel, which influenced academic practice for a long time. This structures the traditional view of the philosophy of science, in which scientific knowledge is that which "can be proven to be accurate", in other words, "the traditional conception of the proof of truth is a verificationist epistemology" (Walter, 2021, p.13).

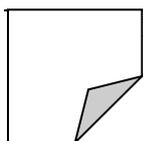
The idealization of scientificity by the positivist view naturally went beyond the predominantly empirical fields and began to penetrate other academic fields, such as the social sciences, for example. Rawarth (2019) explains that fields other than the natural sciences, such as economics in the social sciences, sought to present themselves in a scientific manner in the same way as physics or biology, for example, leading to the establishment in this area of study of the predominance of mathematical models and graphical representations for the scientific explanation of the economic universe, with economists such as Marshall, Samuelson and even the engineer Philips standing out in the definitions of the structural models of the economy.

Another relevant aspect in this model of experimental economics, presented by Migheli (2022), is the replication of experiments, which he describes not only as having grown in the field of study, but also as an important factor in ontological construction.

Nonetheless, as an integrated or complementary part of economics, finance studies have embraced the same techniques. The work of Franco Modigliani (1944), with the theory of corporate finance, Harry Markowitz (1952), with modern portfolio theory, William Sharpe (1964, 1966), with asset pricing and the Sharpe index, and Eugene Fama (1965, 1970), with the theory of market efficiency, to name just a few of the most prominent, who with the same obstinacy for metrics, contributed to moving the field of finance towards the positivist-functional side.

It is worth noting, however, that the very construction of the theory of behavioral finance, although framed in a different epistemic model (or mainly for this reason), also starts from empiricism, but a laboratory empiricism, that is, practices in deliberately and conveniently controlled environments, which is why it receives some of the main criticisms, as Rossiter (2019) explains.

An epistemic-paradigmatic distinction between them, therefore, may not be properly drawn from a model of thinking about science established in verificationism, or, at least, it may find greater strength in an alternative and opposite model: falsificationism.



### **Popper versus Mackenzie: a counterpoint to the paradigm in finance**

The alternative to verificationism emerged with Karl Popper after the publication of his work "The Logic of Scientific Research" in 1934. Popper (1959) argues that scientific observation is always guided by a theory to be proven, which means that the criterion of verifiability will not always be valid. Instead of seeking the verification of experiments that would confirm a theory, the new principle proposed sought particular facts that, once verified, would disprove the hypothesis. Thus, by establishing the moment of criticism of a theory as the point at which it can be considered scientific, the principle of falsifiability was established as a criterion for science.

Popper's ideas created a lasting epistemological reference. Duerr (2023) explains an epistemological and dialogical model that encompasses the analysis of phasification in order to update methodological flexibility and ensure that Popper's ideas remain the heralds of a science privileged by true knowledge without the need for the mask of authority.

The strength of Popper's ideas is justified by the clear explanation and intrinsic logic that encompasses all branches of science. As Migheli (2022) describes, the view of falsifiability does not deny the existence of an absolute truth, but only describes that it is inaccessible to human beings. This is because scientific theories are not always falsifiable, and the logical framework in which they are embedded often does not allow such tests to be applied. In addition, the method, the initial assumptions and even the analysis of the empirical data collected are affected by subjectivity and the theories from which the investigation started.

The crux of Popper's ideas is, so to speak, a basic statement is essentially a temporary assertion about what has been observed during a particular observation taking place at a particular time (Shearmur, 2022).

As can be assumed, the Popperian model seeks the continuous progression of scientific knowledge and if a hypothesis is not corroborated through scientifically valid experimentation, it will soon be rejected, i.e. even if conclusive proof cannot be obtained for a given hypothesis, conducting empirical research will allow false theories to be identified and eliminated (Walter, 2021; Migheli 2022).

It is precisely at this point that the discussion about the paradigmatic condition between behavioral finance models and modern finance lies. Rabin and Thaler (2001), in a series of papers focused on the anomalies existing in the standard economic model, bring up, in the last of the articles (focused precisely on risk aversion), a small anecdote regarding the violation that empirical results show to the disadvantage of modern finance, exclaiming that expected utility, one of the foundations of modern finance, is not a currently valid theory. In their text, the aforementioned authors tell the story of an individual who buys a dead parrot and, after incessant attempts to recover the investment made in the animal, the seller tries to convince him that the parrot is not dead and that, despite not responding, the animal is still a parrot. The buyer, annoyed and after successive arguments, claims that it's just an ex-parrot. The metaphor is an effort to point out that expected utility is an ex-theory, regardless of whether there are still academic or practical discussions about it. The refutation of expected utility is old and had already been discussed, for example, by Roy (1952) and Allais (1953).

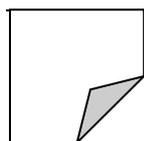
Expected utility, however, is not the only foundation of modern finance that has been criticized and refuted. Other criticisms have included its simplifying assumptions, which underestimate risks by considering only the normal distribution of asset returns and disregarding many social and political factors; the existence of asymmetry of information between market participants; or even conjecturing the existence of an efficient market. The main pillar of modern finance, the Efficient Market hypothesis (Fama, 1970) has received harsh criticism over the years, and has been refuted in articles by Thaler (1985), Shiller (2003) and Malkiel (2003), among other authors, who, in general, present arguments about the impossibility of market efficiency due to the irrational behavior of the agents that make it up.

With its foundations refuted by various studies, modern finance, from a Popperian perspective, does not have the solidity to remain dominant and continue to be presented as a paradigm in financial economics. But, despite this, it remains so.

As Walter (2021) points out, if the Hempel-Popper scheme were significant for the study of finance, the simple emphasis on the flaws observed in movements that do not follow the normal distribution would be enough to falsify modern finance and thus refute it, which, in other words, means that there is a need to find the answer in other fields to explain why it is still used.

This answer, at least in part, can be found in MacKenzie (2001). As Ardan (2008) points out, in the social sciences, especially for administration and finance, research has the potential to generate changes in the phenomena investigated and, because of this, certain financial theories operate as administrative control mechanisms. This can be seen in the way modern finance structures every practical view currently adopted in the financial field, including the necessary rules, proposed by MacKenzie (2001), to be treated as a paradigm in the economic-financial field.

Despite not fulfilling Popper's assumptions to be considered paradigmatic, modern finance fulfills the criteria established by MacKenzie (2001) to become the dominant economic-financial model: the change in the disciplinary frontier of economics, the legal and cultural demarcation between legitimate commerce, and the



distinction between private and public knowledge. In this case, we can distinguish the circumstances in which modern finance already has the normalizing criteria and can therefore presuppose the rules of what is appropriate or not in the practice of the markets, in the legal demarcations and in the disciplinary frontier of the economy, limiting the ascendancy of behavioral finance.

Furthermore, Barberis (2013), one of the most prolific authors of real empirical applications of behavioral finance today, argues that financial learning needs to begin with a deeper understanding of modern finance, precisely because it is more comprehensible. But it's interesting to note that even if there weren't the technical-legal barrier presented by Mackenzie and if it weren't considered essential to first learn about modern finance before behavioral finance, as Barberis points out, behavioral finance would also come up against Popper's falsificationism.

In his work, Nwogugu (2006) scans the value function of the prospect theory and cumulative prospect theory models, presenting an analysis of their properties and the situations in which they find limitations in relation to real decision-making situations and, therefore, are not valid in many circumstances, concluding that, although different in theoretical terms, in conceptual terms they are equivalent to the expected utility theory.

Objectivity in defining the paradigm, or the model that should prevail, may, as seen in Popper's analysis, not be sufficient or, considering MacKenzie's analysis, come up against the limitation of being an administrative control. In the face of these discussions, the most significant question remains: if both modern finance and behavioral finance do not meet the necessary completeness to be exposed as the dominant paradigm, how can we actually determine which is the paradigm in the area? Although paradoxical, the answer may lie precisely in not sticking to one model as a paradigm, understanding that one should not (or should not) limit the epistemes of finance from a merely comparative angle.

### **Khun's incommensurability for finance**

In 1962 Thomas Khun created a "revolution" for understanding the development of science over time. Unlike the general ideas about scientific knowledge and its construction, which understood science to be built up in a linear way in which the accumulation of knowledge would allow scientific truths to increase, his ideas shed light on the understanding that evolution occurs through scientific revolutions, which are nothing more than ruptures with current parameters and the rise of new paradigms (Khun, 1997).

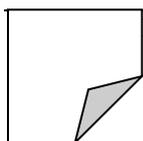
Kuhn does not consider science to be inductive or cumulative. His a priori argument is that every statement derived from a theory must be supported by experience, otherwise there is no doubt about the theory. When theories change, it is not because experience invalidates them, but because paradigms leave the scene to be replaced by new paradigms. This is a sociological position. A correct theory is a theory based on social consensus (Walter, 2021).

The succession of paradigmatic epistemology demanded by Rabin and Thaller (2001) is therefore not feasible. Following the reasoning of the Kuhnian scheme, what makes financial science a normal science is, among other things, the fact that research is conducted between two paradigms (Walter, 2021).

But the idea of scientific revolutions also gives rise to the image of incommensurability between the paradigm that has been overthrown and the model that is on the rise. For Khun (1997), during these revolutions, the emergence of a new paradigm is surrounded by such a significant change in scientists' views that it becomes difficult, if not impossible, to establish a direct and objective comparison between them, because each paradigm has its own language, theories and underlying assumptions, which makes communication and mutual understanding difficult. Instead, the acceptance of one paradigm over another is mainly determined by social, psychological and political factors, such as persuasion, the consensus of the scientific community and the change of generations of scientists.

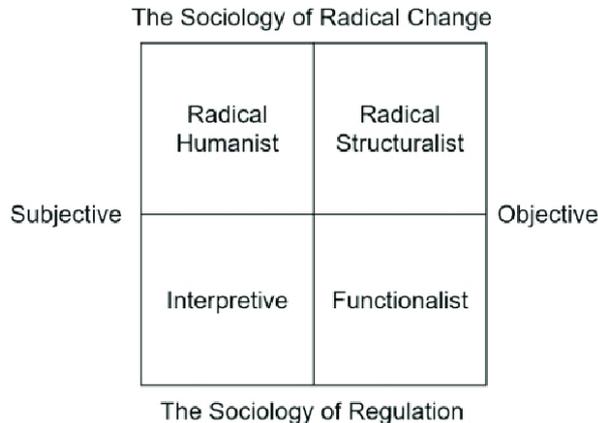
At this point, the question for this analysis is: is Khun's incommensurability valid for finance? The answer, at least in theory, should be no. This is because the emergence of prospect theory was due to the need to answer unanswered questions in modern finance and, at the same time, it points out deficiencies that de-characterize the scientificity of the prevailing model at the time, as Khun (1997) himself suggests. However, the dissatisfaction of behavioral finance theorists with the propositions of the Market Efficiency Hypothesis and the Marginal Utility Law are to it as Mathematical Expectancy and Expected Utility Theory are, respectively, to modern finance in relation to traditional finance, one of them understood to be outside of reality and the other a necessary basis for its own construction. In other words, there is an innate connection and communication between the three major phases/theories of finance.

Thus, if there is no substitution between paradigms and there is, at the very least, a limitation to the incommensurability between two coexisting paradigms, the relationship between behavioral finance and modern finance can - and should - be studied to understand their possible approximation or integration.



**The circle of epistemic matrices in finance**

The great turning point in the evolution of theoretical, academic and practical studies was the 1950s. At this point, the construction and affirmation of modern finance as the dominant paradigm allowed for a cohesion in the field of finance studies that had not existed until then, but with the paradoxical consequence of the lack of capacity on the part of many of its researchers to situate themselves in terms of the paradigm, limiting the possibilities for expanding studies. The self-imposed limitation is formed by the epistemological naivety that prevails in finance research programming even today (Lagoarde-Segot, 2015). Burrell and Morgan's (1979) diagram below helps us to understand the epistemic possibilities that permeate the social sciences.



The functionalist paradigm assumes that society has a concrete and objective order, and that social science can produce true and predictive knowledge based on empirical evidence. Functionalists emphasize the importance of understanding order, balance and stability in society, seeking rational explanations and promoting the regulation and control of social affairs. They adopt a pragmatic approach, concerned with providing practical solutions to society's problems. This approach is rooted in positivism and uses methods from the natural sciences to understand the social world (Ardalan, 2017).

Rooted in positivism, the functionalist paradigm understands that science should be limited to what can be observed and measured, in other words, it is limited to data. The researcher is seen as separate from the subject of study and has no influence on the results of the research. In this sense, financial theory would have no impact on the financial markets, since the search for an accurate representation of price dynamics could be achieved exclusively through financial data, which shows the unfeasibility of this paradigm for explaining the financial market and its movements (Walter, 2021).

A second paradigm, the interpretivist, understands social reality as being constructed through the subjective interpretations of individuals, resulting in multiple shared realities. Interpretivist researchers adopt a participant perspective and reject the use of mathematics and biology as analogies for the study of society, emphasizing the understanding of the social world from the perspective of the individuals involved in social activities, questioning the functionalist approach with the argument that human values influence scientific research. Interpretive researchers also criticize the view of economic theorists who treat the economy as a concrete and tangible phenomenon and argue that the social world is a subjective and constantly changing construction. Interpretive economic research allows for the analysis of market behavior alongside ethical, cultural, political and social issues (Ardalan, 2017; Berryman, 2019).

The radical humanist paradigm also questions the influence of financial theory on the financial markets. This paradigm argues that the search for an accurate representation of price dynamics must go beyond purely financial data. Radical humanists believe that society is shaped by ideological superstructures, including the influence of science, ideology, technology and language, which underpin the system of power and domination. They emphasize the political and repressive nature of these structures and seek to unmask their role in society, with the aim of influencing human consciousness towards emancipation and the creation of alternative social forms (Ardalan, 2017).

Finally, the radical structuralist paradigm seeks to understand society as an objective and concrete reality, rooted in materialism. Sociologists analyze social patterns and regularities, with an emphasis on radical change and emancipation. Knowledge is seen as class-specific and produced in the struggle for domination. The paradigm emphasizes the totality of social formation, with enduring structures and internal contradictions. Political and economic crises indicate social transformations, replacing the status quo with different social formations. The social scientist is considered part of the class struggle, and understanding society requires a holistic view (Ardalan, 2017).

In its construction, the scheme takes into account the categorization of research based on the assumptions adopted about the nature of science and society. There is a subjective-objective classification of how this construction of scientific nature is assumed, involving ontological aspects, which contrasts realism versus nominalism; epistemological, in which it exposes positivism against representations contrary to it; methodological, which contrasts nomothetic and idiographic approaches; and human nature itself, which relates the possibility of having activities determined by the environmental situation (determinism) or the autonomous condition of the individual (voluntarism) (Lagoarde-Segot, 2015; Paula, 2016).

However, as a counterpoint to the traditional Burrell and Morgan (1979) model, which is generally limited to the dichotomy of sticking exclusively to one model and denying the others, there is a current that defends the construction of a model that seeks to integrate the ways of constructing scientific knowledge. In addition, as discussed in previous sections, incommensurability or paradigmatic rupture do not seem to be appropriate for finance.

Of course, studies such as that by Alhenawi, Hassan and Hasan (2022), which place behavioral finance alongside many other lines of general finance studies, reinforce the idea that it is much more part of something bigger than an alternative model. Their study presents the major research in finance over the first two decades of the 21st century, denotes a variety of themes and lists behavioral finance as just one of these themes which, by the way, does not even exceed 3% of general research in finance. The aforementioned authors even highlight the relationship between two or more topics in the development of new studies in order to contribute to the growth of finance studies.

In this conception, as Paula (2016, p. 33), an alternative analysis of scientific construction leads to the understanding that the incommensurability proposed by Khun and visible in Burrell and Morgan can give way to a model of knowledge construction that "develops through the mobilization of cognitive interests", combining the efforts of empirical-analytical science, typical of positivism, with the model of hermeneutic science, of a practical nature, and also recovering the role of philosophy in the epistemic process for the purposes of reflection on the knowledge generated, guaranteeing the emancipatory aspect.

In this way, a new model sees the possibility of epistemic interaction and its complementarity for the field of social sciences through the circle of epistemic matrices, as shown in the figure below by Paula (2016):

The circle of epistemic matrices is a graphical representation of how different actors in a given social or organizational context perceive and interpret a given set of information and knowledge. This tool was developed in social choice theory and has been applied in various areas of the social sciences, including finance (Loewenstein, Moore and Weber, 2019).

As Paula (2016) explains, some approaches develop in a predominantly pure way, while other approaches straddle more than one epistemic matrix, thus presenting themselves in a hybrid form. Combinations should be encouraged because they enable the integration of cognitive interests.

Explaining Figure, the empirical-analytical matrix can be called nomological and is guided by procedure and technical knowledge in order to generate knowledge to enable a predictive and controllable capacity of social facts; hermeneutics focuses on practice to understand, through communication and interpretation, the social context; critical science, in turn, has emancipation as its main motivation for promoting the transformation of scientific knowledge. Its circular design seeks organic representation and flexibility between the matrices as opposed to the Cartesian thinking of the previous model (Paula, 2016).

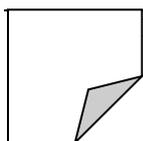
In addition, the paradigm models are allocated according to their position in each of the approaches. Thus, pure sociological approaches can be observed in a specific matrix, such as the functionalist approach, based on empirical analysis, the interpretive approach, centered on hermeneutics, and the humanist approach, based on criticism. On the other hand, the encounter or intersection between different matrices allows for new epistemological possibilities, and is referred to as hybrid sociological approaches. Hybrid approaches have the property of transiting and combining different epistemic matrices (Oliveira, 2021).

The ideas put forward by Paula (2016) help to demystify this fixation on paradigmatic incommensurability proposed and disseminated by the ideas of Burrell and Morgan, pointing out that there is often a need to extrapolate the virtually established epistemic divides. Furthermore, Paes de Paula suggests, based on the thesis of cognitive incompleteness and the thesis of epistemological reconstructions, abandoning the hitherto conceived idea of paradigms in order to propose the circle of epistemic matrices, allowing for a bridge that unites the matrices to make them more complex and more complete hybrid approaches.

This proposition, which is prevalent in other fields of social sciences, can also be thought of more specifically in the economic-financial field, allowing us to conjecture the idea of a union between modern finance and behavioral finance.

#### **IV. Conclusion**

As highlighted throughout the essay, although the epistemological characterization of each model of financial economics is relatively straightforward to classify, an appreciation of the paradigmatic characterization



from the perspective of the main models of epistemic analysis shows the great difficulty of sticking to an economic-financial model that stands out in a definitive way, both of which are, in many ways, limited to being complete.

In addition, the idea of building a circle of epistemic matrices, which combine different epistemes, in general, may prove to be the way out of the limitations of isolated models and has already been discussed in other fields of the social sciences.

It is therefore considered that the interlocution of a prevalently empirical-critical epistemological model with traditionally functionalist models should not be a problem. On the contrary, it can add to scientific knowledge in the area in question, based on the interlocution of the epistemic matrices in which each financial model is found. A reading of the perspective raised by Paula (2016) for the field of finance suggests, therefore, that new studies that interact modern finance with behavioral finance flow at the intersection of the empirical-analytical matrix, which includes functionalism, with the hermeneutic matrix, the basis of the interpretivism of behavioral finance.

Arbitrage models, typical of modern finance and of a highly functionalist nature, have also been growing in association with behavioral finance, almost always with an initial basis in modern finance models themselves, in an indication of the correlation between different epistemic models, without, however, discussing the need for one to overtake the other. In the work by Sato, Savoia and Famá (2013), in which they summarize the evolution of the financial management function, the authors, based on surveys of this evolution, consider the economic and behavioral coexistence to have a positive bias due to the major economic events that took place from the 1980s onwards.

It should be understood, however, that such a joint structuring in a new epistemic model is something to be built, but that it can take its first steps through the interlocution that exists in the first proposals for metric and arbitration models that are based on behavioral finance and that carry expressions typical of modern finance.

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