Philosophical Realism in Economic Science

An integrative study on the comparative nature between post-Keynesian critical-realism and Austrian causal-realism

"Even if heterodox economics were not able to supplant the mainstream, a more realistic goal would be to aim for a new spirit of tolerance within economics, such that heterodox research was given due acknowledgement, and economics teaching covered a range of approaches."

- *Sheila Dow (2011, p. 1164)*

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Abstract

This master thesis is a study into the present fragmentation in economic science about what ideas constitute a realism-based philosophical approach and foundation for the science. With ideas for realist foundations found in both the post-Keynesian critical-realist philosophy and in the Austrian causal-realist philosophy, two independently developed strands of realist economic thought, these two are examined comparatively, to ascertain, and to make explicit, where these share intersections, complementarities, and/or differences. The aim is to identify these, to then open up for new avenues towards a philosophical integration and greater synthesis between economists on what realism is in the economic science. The method adopted towards this aim is an ontologically reflexive pluralism (Bigo & Negru, 2008), by which critical-realism and causal-realism are examined, starting with their respective ontologies, and then moving on to their epistemologies and methodologies. Given the present lack of both explicitness and awareness of realist ideas between the economic paradigms, a result of a past absence of integrative work, this present state of the economic science assigns a high relevancy to engaging with the type of integrative philosophical research. This thesis applies common definitions and understandings of philosophical terms including those of realism and nonrealism, and of broader definitions of economic ontology, epistemology, and methodology. Critical-realism is examined on its ideas of open-system theorizing; social entities in science; structured reality; determinism and non-determinism; fundamental uncertainty; structured pluralism; Babylonian mode of thought; human agency; and abduction. Causal-realist philosophy is then examined on its ideas of open-system theorizing; mental entities in science; determinism and non-determinism; ultimate givens; epistemological dualism; the logical structure of the human mind; human action; and praxeological deduction. From these examinations several comparative intersections, and also some complementarities and differences, are identified. First is shown the intersection in the shared critical-realist and causal-realist commitments to ontological world-realism and to epistemological process truth realism. Second is their similar critiques of the neo-classical mainstreams logical-positivist philosophy, critically its epistemological monism and its closed-system mathematical deductivist mode of thought. Third is then their intersection in commitments to open-system theorizing, and of recognizing social and/or mental entities as legitimate scientific objects in economic science analysis. Fourth is their intersection on the view that economic reality is a highly non-deterministic and a fundamentally unpredictable process. Fifth is their intersection of adopting an epistemological dualism between natural science and social science. Sixth is their intersection of focusing on descriptive and qualitative explanations as economic science ideals in contrast to the neo-classical focus on prescription and quantitative prediction. Seventh is their intersection on considering human agency/action as the analytical starting point for economic analysis when grounded in a realist foundation. Finally is also discussed their methodological differences, where post-Keynesian critical-realism champions the method of abduction, and where Austrian causal-realism champions that of praxeological deduction. To operationalize these philosophical findings, a case-review is finally made of the critical-realist and causal-realist argued causes and cures for the 2008 financial crisis, where the philosophical differences between the post-Keynesian concept of animal spirits as producing inherently unstable market outcomes is contrasted with the Austrian concept of entrepreneurial discovery which is seen as producing inherently stable market outcomes. This theoretical contrasts between the two is shown to be grounded in origins at the philosophical level, resulting in different business cycle theories due to contrasting reasonings on the long-term economic outcomes of human agency/action.

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1. Introduction

A couple of reasons played into my decision of choosing economic philosophy and the evident case of fragmentations between post-Keynesian critical-realism and Austrian causal-realism as the area of research for this thesis.

The first reason dates back to 2011 when I began to have growing interests in understanding economics, what it was all about, and how it served as the field of knowledge that allowed for explanations about human societies and their economies. By chance I ended up at the online American Ludwig von Mises Institute's economics bookstore, an institute that I later learned was one oriented towards teaching Austrian economics based on the scholarship of Ludwig von Mises, a most renowned 20th century Austrian economist. At the time I was fully unaware of the meaning of the term "Austrian" economics, as in the Austrian school, the Austrian tradition, or the Austrian paradigm of economic thought. Only by reading several of the books I ordered on the theories and conclusions from the 'Austrian' perspective did I come to realize this, and how these were not the theories and conclusions that reflected the perspectives of all economists across the various paradigms of thought active within the economic science community. I came to realize that several schools of economic thought with their own perspectives and ideas exists, like the Keynesian school, the post-Keynesian school, the neo-classical school, the new-Keynesian schools, the monetarist school, the new-institutionalist school, the radical-Marxist school, and the Austrian school. With these schools and all their differences and contrasts, it is now my belief that these differences in thought and the fragmentations in mutual awareness and understanding between them, is for the economic science a defining and critically relevant issue to solve in order to make the economic science more integrated, more reliable, and importantly clearer, especially when it is applied in practice.

The second reason concerns my decision to specifically engage with economic philosophy, in contrast to for example economic theory or history. It followed from how economic philosophy has proven a most interesting subject for me, especially after reading many Austrian books on the subject, including *Human Action* (Mises, [1949] 1998), *Epistemological Problems of Economic Science* (Mises, [1933] 2003), and *The Ultimate Foundations of Economic Science* (Mises, 1962), and *The Austrian Method and Economic Science* (Hoppe, 1995). During my economic studies, the comparative natures between the various economic paradigms and their different philosophies and systems of thought has been important and also enlightening for me, on the origins of these, the extent to which they agree or disagree, and the implications of especially those disagreements and how they may possibly be resolved. It is clear that problematic fragmentations prevails between the economic paradigms in how they each in their own distinct and often scattered, contrasting, and incommensurable ways, argue scientifically about economic issues. This prevailing state of fragmentation, between the many paradigms and their theories and policy recommendations, is one that ultimately reflects many deeper and yet unresolved philosophical disputes within both ontology, epistemology, and methodology. These disputes are in some cases, perhaps even most, deep-seated, tracing back to very fundamental philosophical ideas. Given these disputes each paradigm have increasingly entrenched and restricted itself to its own set of philosophical ideas, boundaries, and

vocabularies, making cross-paradigmatic awareness and communication very troublesome. This issue was therefore a defining reason for narrowing down the research approach to be about the fragmentation in economic philosophy, specifically between the philosophical systems of post-Keynesian critical-realism and Austrian causal-realism. The aim was to make the fragmentations between these systems explicit, including the implications of those, to increase mutual awareness, and to advance the integration of their realism-based philosophies.

The third reason worth mentioning regarding my decision to specifically choose the comparison of where post-Keynesian critical-realism and Austrian causal-realism have either explicitly shared intersections, complementarities, and/or differences, is how it was a decision made from how I have often noticed highly similar lines of philosophical reasoning between the two in their literatures, especially on the arguments for a realism-based foundation and approach for the economic science. As heterodox economics paradigms, it is given that both share discontents with the neo-classical mainstream system of logical-positivist philosophy, but there were other distinctly similar lines of reasoning in how they advocated for an alternative approach grounded in "realist" philosophy. These similarities were to me a curious phenomenon, especially given how critical-realism and causal-realism, by what most accounts either explicitly or implicitly would suggest, are two systems of philosophy that have been independently developed disconnected from one another. Critical-realism underlies most post-Keynesian economic thought, developed by post-Keynesian thinkers as the foundation of economic theorizing, instructing and informing post-Keynesians about how to obtain, from their perspective, both sound and reliable economic science knowledge. In the same way causal-realism is the system developed by Austrian economists, which informs Austrians about obtaining economic science knowledge. So while both systems are fundamentally realism-oriented in their approaches, the two systems evidently share very little in terms of being developed interdependently by post-Keynesian economists and Austrian economists in a collective and corroborated effort. Critical-realism and causal-realism are each developed exclusively, where in the literature no clearly identifiable origins or influences are shared, even if, as this work suggests, that critical-realism and causal-realism in their reasonings share clear philosophical intersections and complementarities (but also differences). The scholarly developments of critical-realism have relied on the use of ideas and inspirations from both past and present important thinkers, including importantly the eminently known John M. Keynes, as well as other social and economic thinkers including Adam Smith, Karl Marx, Thorstein Veblen, F. A. Hayek, Roy Bhaskar, Tony Lawson, Sheila C. Dow, Michal Kalecki, Paul Davidson, and others (Fleetwood, 1999, p. 128). Causal-realism is developed from ideas and inspirations that range a great field of social and economics thinkers as well, however different ones from that of critical-realism, including importantly Carl Menger who originated and pioneered the early critical-realist foundation Austrian paradigm. Other influential thinkers include importantly Ludwig von Mises, Murray N. Rothbard, and Friedrich A. Hayek (one critical-realist and causal-realist shared influence), Eugen von Böhm-Bawerk, John Bates Clark, Frank A. Fetter, Hans-Herman Hoppe, Joseph T. Salerno, and others (Salerno, 2007). So, while both aims at grounding economic science in a realism-based foundation, they have been developed in a separate, though parallel fashion. This is not to say however that the two are therefore unrelated, incomparable, or incompatible. In fact, it is at present not quite clear to

what extent they do relate, how much they do compare, and to what degree they are compatible and can potentially be integrated, since, as it was mentioned already, their comparative *philosophical* natures have not yet undergone, to the authors knowledge, any rigorous and in-depth examinations on the degree to which they are compatible, and the extent to which they do share intersections and differences in their ideas and explanations, meaning their presuppositions, commitments, and lines of reasonings about e.g. ontological, epistemological, as well as methodological issues. Most philosophical accounts of either system typically tends to be framed around a comparison with the neo-classical logical-positivist philosophy instead, which post-Keynesians' (see e.g. Lawson, 1994, 1997 or Fleetwood, 1999), as well as Austrians (see e.g. Hoppe, 1995 or Mises, [1957] 2007, 1962) are highly critical of. And so, striking questions remain unanswered, or lack sufficient explanation, about the degree to which critical-realism and causal-realism compare, making it difficult to properly resolve the prevailing fragmentations and the consequential theoretical differences about how to analyze and deal with real-world circumstances from a philosophically realism-oriented perspective.

While the aim herein is to make more explicit how economists understand realism in economic science, it is not the goal to elaborate and to reflect extensively on the origins and importance of such realism-oriented philosophical approaches. However, a few remarks are worthwhile to account for here. It is generally understood that realist interpretations of our existence dates back to the Greek philosophers of Aristotle and Plato, and to medieval scholastic thought, where these thinkers first set out frameworks surrounding the idea that things and objects that exists externally to the observing mind, are things that also exist independently from this mind and how it subjectively understands those objects and/or things. In this sense, realism, like its contrasts of idealism or skepticism, are rooted in a set of ontological (or metaphysical), epistemological, and methodological positions and ideas. As with all other ideas studied by science, the importance of ascertaining and of establishing what the nature of philosophical realism is, is found in the given that only by seeking the most approximate truths about something, is human affairs best equipped to act in their capacities in accordance with the true nature of the real world itself. And so when trying to ascertain what the causes and the most appropriate cures are for a real-world event like the financial crisis in 2008, the necessary condition for any theoretical proposition is that the foundation in which this proposition is grounded, is one that is as close to a philosophical understanding that reflects the approximate true nature of our world and the things and/or objects in it as possible. As is shown later in part five, a slight divergence in a realism-oriented understanding of the long-term nature of entrepreneurial investment projects, about whether these are inherently producing unstable outcomes (the post-Keynesian argument) or whether it is producing stable outcomes (the Austrian argument), entirely shifts the analysis of what causes a business cycle, and what are the most appropriate solutions to cure them and to mitigate them in the future. In short, the post-Keynesian and the Austrian theoretical contrasts, both rooted in what are claimed as realism-based philosophical foundations, is one of viewing market regulation and central bank monetary intervention as the *cure* for business cycles like the 2008 financial crisis (the post-Keynesians), and as the cause of business cycles (the Austrians). While there are certainly nuances to these presented entirely contrasting positions, the point is how it is the philosophical origins that underlie these theoretical contrasts that are the important avenue of

research in order to reduce those fragmentations and disagreements in order to therethrough resolve the theoretical disagreements and contrasts about for example the origins and the remedies for business cycles. For a deeper discussion about the nature of realism in science, including that in the science of economics, with the various positions taken on realism but also on nonrealism (i.e. idealism, skepticism), the reader is advised to visit Appendix 2.

The above reasons, the thoughts behind them, and the ongoing disputes about what constitutes a realism-oriented foundation in economic science, are my motivations for the work ahead, of specifically comparing critical-realism and causal-realism.

1.1 Research Questions

In line with the above introduction, the research questions sought answered in this thesis is aimed at identifying and then answering, based on chosen functional philosophical terminologies (see Appendix 1), how post-Keynesian critical-realism and Austrian causal-realism compares philosophically, as both use realist foundations for their economic science. In applying this obtained comparative knowledge on the real-world issue of the 2008 financial crisis, where, as explained, post-Keynesians and Austrians heavily disagrees in their theoretical propositions on the causes and the cures, the aim is to show how these theoretical fragmentations may be increasingly integrated from resolving their differences at the philosophical level. The research questions sought answered are therefore as follows:

First, based on the philosophical categories in economics of ontology, epistemology, and methodology, and on examinations of post-Keynesian critical-realism and of Austrian causal-realism, how does critical-realism and causal-realism compare, meaning what identifiable intersections, complementarities, and differences exist between them?

Second, based on their philosophical comparisons, what philosophical idea(s) can be identified as being central explanations for the current theoretical contrasts between the post-Keynesian and the Austrian explanations of the 2008 financial crisis?

1.2 Thesis Structure

To answer the above research questions, the thesis is structured in the following way. The remainder of part one will present first some scientific arguments demonstrating the scientific relevancy in this area and type of economic philosophy research. What follows is then a few notes on good research heuristics, and then part one closes with a review of the various ‘data’ sources used throughout the thesis. Moving on. part two examines the post-Keynesian critical-realist system of philosophy, covering defining ontological, epistemological, and methodological realism-oriented commitments and ideas. This examination first briefly covers the history of thought in critical-realism. Important critiques on the neo-classical mainstream is then examined as it is a defining feature of the critical-realist program. With respect to core critical-realist philosophy ideas, part two covers respectively 1) open-system theorizing; 2) ontological entities and structured reality; 3) economic determinism; 4) epistemological uncertainty; 5) epistemological dualism and structured pluralism; 6) the Babylonian mode of thought; 7) abduction; and lastly 8) human agency. In the same line as part wo, part three gives a similar brief examination of the history of thought of Austrian causal-realism, and also some select critiques of neo-classical logical-positivism. With respect to core causal-realist ideas,

part three covers 1) mental entities in social science; 2) open-system theorizing; 3) economic determinism; 4) ultimate givens in science; 5) the logical structure of the human mind; 6) epistemological dualism; 7) human action; and then last 8) praxeological deduction. In part four, the comparative nature between the examined critical-realist and causal-realist philosophy are discussed, in relation to their evident intersections, complementarities, and differences in the areas of ontology, epistemology, and methodology. Part five performs a philosophical case-review of the post-Keynesian and the Austrian explanations for the financial crisis, grounded in their respective philosophical ideas, in the aim of tracing their opposing theoretical views on the causes for the financial crisis back to the philosophical origins of those views. Part six concludes the paper.

In outlining the structural approach this way to compare the philosophical natures between two or more of the economic paradigms, the aim is that it can help to serve as a launchpad for any such similar future research on fragmentations in economic science philosophy, by first outlining the already existing intersections, complementarities, and differences between them, and then making it clearer why each of those exist.

For the reader unfamiliar with the various terms used in economic philosophy, the two appendices will bring clarifications as to the terminological meanings of those terms specifically used in this work. Appendix 1 first reviews the terminological meanings, as they are understood in this thesis, of *science* and *economics*; of *philosophy* and *economic theory*; of *philosophical foundations*; as well as of *ontology*, *epistemology*, and *methodology*, including how these latter three can be understood in relation to economic science more specifically. Appendix 1 then reviews Thomas Kuhn's concept of a *scientific paradigm*, and his explanations on the production of *normal science* as well as *extraordinary science*. Reviews are also given of the concepts of *pluralism*, and of *fragmentation* and *integration* in social science. If the reader is unfamiliar with the current state and structure of economic science and the economic science community as a whole, then, by applying all the above terminologies, this state and structure is explained as it relates specifically to the problems sought resolved herein. As a tool for integrating fragmented ideas in economics, the approach of an *ontological reflexive pluralism* (or, more broadly, a *philosophical reflexive pluralism*), is explained, which outlines the underlying reasons for choosing the method of approach as the one already explained in the previous section. For the reader unfamiliar with the terminological meanings of philosophical realism and philosophical non-realism, appendix 2 reviews these, where the distinctions between world-realism and world-nonrealism, as well as event truth realism and process truth realism are important concepts used in part two, part three, and part four. Based on the works on realism in economics by Sheila Dow (1990), and based on entries in Stanford Encyclopedia of Philosophy (2017b), appendix 2 also makes the very basic comparison critical-realism and causal-realism and how they are both systems committed to world-realism and to process truth realism. Appendix 2 also presents classifications of other economic paradigms with respect to their philosophies and the degree to which they are either realism-based on nonrealism-based, giving an initial overview on the fragmentations in economics.

1.3 Research Relevancy

This section demonstrates important arguments on the scientific relevance of engaging in the outlined type of comparative philosophical work.

A reason that could be given against the relevancy of studying the research questions in section 1.1 is that post-Keynesianism and Austrianism, in terms of their respective substantive theories and their advices for economic policy, in many ways share very little in common. For example, their longstanding contrasts was brought into the spotlight during the famous clashes between John Maynard Keynes and F.A. Hayek during the 20th century, such as what the causes and the best 'cures' for business cycles are. Such similar disagreements on theory came up again in the wake of the 2008 financial crisis. Other examples of their contrasting theories concerns their view of an inherent instability in the economic system due to animal spirits (post-Keynesians) and the inherent tendency for stability in the economic system due to entrepreneurial discovery (Austrians) (discussed in part five), their postulated effects of inflation and deflation on the economic system, and also to what extent the roles of governments and the central banks should play in managing and/or steering the economy. In order to ensure economic stability, post-Keynesians often advocate for an interventionistic role of governments and central banks, where Austrians instead argue that such interventions are primary cause, and not the solution, for any major economic instabilities especially business cycles. From this perspective of their stark disagreements on theory, it could be seen as frivolous to engage in comparing where post-Keynesian critical-realism and Austrian causal-realism share intersections, complementarities, but also differences, when it comes to their philosophies, and to attempt an integration of those philosophical ideas involved. Another argument is the perception of irrelevance some economists (mostly mainstream economists) attach to philosophical research, as many economists are already engaging themselves successfully and productively debates and analyses on the widely accept mainstream logical-positivist foundations. From this second perspective, economic philosophy carries little importance to the practical and more 'urgent' economic theory and policy works[1] (Dow, 1999, p. 16) (Holcombe, 2008, 60).

If economic science was already established on unified view by the whole economic science community, on what a sound philosophical grounding is for economics, then the above arguments arguing for the irrelevance for further philosophical research would not be inexorably counterproductive. Disagreements between economists would in that case be of more or less theoretical natures to be resolved at the theoretical level itself. However, with the

[1] On this point Sheila Dow (1999, p. 16) for example explains how mainstream economists, but also some post-Keynesian economists, perceives debates on economic philosophy as largely irrelevant, and as a distraction from theoretical developments and testing, and from attending to important policy issues. In the mainstream this view is reinforced by 'neo-classical economics' and 'economics' being seen as essentially coterminous – a consensus in which sound economic philosophy is already established – and little need therefore exists for further philosophical discussion and research. Randall G. Holcombe adds to this viewpoint how *"Although mainstream journals publish articles with varied and potentially inconsistent methodologies, economists typically do their research without considering its methodological foundations, or the degree to which their work is methodologically consistent with the work of other economists. Second, to the extent that they have given some thought to their methodologies, most orthodox economists – like heterodox economists – believe their methodology is superior to other methods."* (Holcombe, 2008, p. 60)

economic science community being far from such a unified view and consensus on a sound philosophical grounding for economic, with agreements at the levels ontology, epistemology, as well as methodology, then philosophical research would in fact be largely irrelevant to the wider discipline. But as it is explained in appendix 1.3 and 1.4, for the reader unfamiliar with the current state of the economic science community, the community is presently disunified and fragmentated philosophically, in addition to fragmentation in theory and policy advocacy. Therefore, seeing philosophical research as largely irrelevant for the science is problematic, there are no clear-cut philosophical consensus established about appropriately ascertaining true and sound economic propositions, and there are no consensus as how to gauge which theory is the 'truer' one. Economic philosophy research aimed at studying, understanding, comparing, and especially integrating the various incommensurable and contrasting ideas between paradigms, are therefore both highly fruitful, as well as necessarily relevant.

To achieve the above, mutual engagements and conversations between the paradigms must be had, and "*for that to take place we need an understanding of what divides and unites the various approaches*" (Denis, 2008, p. 151). What Andy Denis refers to is that, from a meta-perspective of the economic science community, meaning the orthodox mainstream as well as the various heterodox paradigms, the philosophical foundations, and the presuppositions in each are often inexplicit or undeclared (Dow, 2011, p. 1158). This is a problematic obstacle towards reaching philosophical consensus and advancing syntheses between paradigms about what constitutes sound and reliable economic philosophy ideas. In her article on economic philosophy Sheila Dow concludes therefore on this issue that *"the most substantive body of work needs to be the development of heterodox analysis as a credible alternative to the mainstream"* (Dow, 2011, p. 1162), meaning a body of work that considers and compares the heterodox paradigms, such as post-Keynesianism and Austrianism, and their alternative ideas, where argumentative explicitness and credibility must be obtained and then maintained through sound and impenetrable reasoning. This therefore suggests that there are significant relevancies in first examining the various philosophical concepts, in order to then compare them, and where possible to then integrate them (see appendix 1.5 if the concept of integration in social science is unfamiliar to the reader). Therefore, to for example discuss and resolve differences between post-Keynesian and Austrian theories on business cycles including the 2008 financial crisis, the prerequisite is to first understand thoroughly their individual philosophical foundations, as the level of economic theory (and then policy) ultimately flows from the deeper levels of philosophy, including ontology, epistemology, and methodology (Dow, 1999, p. 19-20). This is explained by Sheila Dow, that

"Were more analysis to be developed in relation to ontology, some differences within heterodox economics would be clarified, and indeed some contradictions exposed, aiding the further development of heterodox theory" (Dow, 2011, p. 1157).

Sheila Dow argues later that

"It is therefore of great importance that any heterodox attempts to communicate ideas to the mainstream should highlight also the underlying meta-methodological (i.e. philosophical) *differences.* ***Indeed, it has been argued again here how important it is to understand these differences in heterodox economics itself****"* (parenthesis and emphasis added) (Dow, 2011, p. 1159).

Dow's explanations underscores the scientific relevancy of the very work conducted herein, that of understanding the similarities, the complementarities, and the differences between post-Keynesian critical-realism and Austrian causal-realism, to understand where the two are similar and where they are not, in order to potentially bridge (i.e. integrate) their philosophical gaps.

In increasing the explicitness of critical-realism and causal-realism, and of their comparative nature, also lies the potential for gaining new, and hitherto unthought of inspiration for new knowledge and ideas, that can open up for new potential philosophical and theoretical integrations and cross-fertilizations of ideas (Dow, 2004b, p. 279) (Dow, 1990, p. 346) (Dow, 2018, p. 20). This turn towards increased integration and cross-fertilization of ideas is hinted at by Frederic Lee (2009) in his study on heterodox economics, where he found that heterodox paradigms are slowly taking a turn towards work that focus on pluralism, and on adopting ideas from other paradigms (i.e. integration). The result is that

This cross-fertilization of ideas is creating a new generation of scholarship in which novel combinations of heterodox ideas are being brought to bear on important contemporary and historical problems" (Lee, 2009, p. ii) (see also Dow, 2018, p. 20-21)

Lee's observation is similar to a commentary by Sheila Dow where she describes on post-Keynesianism specifically that

"*there is work arising from traditions **not directly** inspired by Keynes and Kalecki which may nevertheless share much of the scope and method of post Keynesian economics, **such that a coalescence of these various traditions could produce a richer body of theory***" (emphasis added) (Dow, 1990, p. 346).

However, it must be noted that these benefits from connecting and coalescing ideas from different paradigms "*can only be derived if there is sufficient awareness of, and understanding of, language differences, that some communication is possible*" (Dow, 2004b, p. 288). Explicitness in explanations and a comparative understanding between paradigms must precede integrative work. As critical-realism and causal-realism are each realism-oriented philosophical systems, the communication between, and the coalescence of post-Keynesian and Austrian ideas, based on "*awareness of 'otherness', which requires sufficient knowledge of alternative approaches to allow communication*" (Dow, 2018, p. 20), can lead to cross-fertilizations that may then allow for a richer and more integrated body of realism-based economic thought.

A final argument for the relevancy in this work how on post-Keynesian and the Austrian ideas, and their potential cross-fertilization and integration, was observed by Gerald O'Driscoll and Mario Rizzo (1985, p. 9), and reiterated by Tony Lawson, how

*"It is evident that there is much common ground between post-Keynesian subjectivism and Austrian subjectivism. Cross-fertilization between the two schools is, however, **exceedingly rare,** although the possibilities for mutually advantageous interchange **seem significant***" (emphasis added) (Lawson, 1994, p. 533-534)

And so, given the still scarce existing literature which systematically compares critical-realism and causal-realism, emphasizing their shared grounds and their differences, the pursuit of expanding upon this area in economic philosophy, to ensure a more robust foundation of

arguments for a realism-based economic science, is a scientifically relevant one. And on the relevance of *comparative* work in economic philosophy, Sheila Dow explains its benefits, as

"*A further role is to attempt to assist communication, and thus the settlement of disputes, by clarifying the nature of disagreements, which (if unresolved) generally stem from disagreements about foundations* (i.e. philosophy). *Further, since methodology follows from philosophy of science, the methodologist can further clarify issues by attempting to understand and explain the philosophical underpinnings of these issues … attention must be paid to easing the translation of ideas"* (emphasis added) (Dow, 1999, p. 20).

The mode of comparative examination set forth herein in the following parts of the thesis, can hopefully permit some small further steps towards understanding the comparative natures between the ontological, the epistemological, and the methodological foundations (see appendix 1.2 for their meanings) in post-Keynesian critical-realism and in Austrian causal-realism. It can hopefully help to further understand the underlying reasons for theoretical differences between the two, and to then identify a future direction for realism-based economic science research.

1.4 Research Data

To examine the post-Keynesian paradigm and its critical-realist system of philosophy, various articles and books by Tony Lawson and Sheila Dow were primarily used, in addition to some secondary sources such as Philip Arestis Malcom Sawyer, Edward Fullbrook, and Steve Fleetwood. For descriptions of the Austrian paradigm and its causal-realist system of philosophy, articles and books by Ludwig von Mises, by Joseph T. Salerno, Hans-Hermann Hoppe, and Carl Menger, were primarily used. Other sources include Uskali Mäki, Peter Boettke, and Jörg Guido Hülsmann were used. Especially Ludwig von Mises' contributions to the methodology of causal-realist praxeology (meaning the science of human action), and his arguments for an epistemological dualism between natural science and social science, stands out as rich causal-realist contributions. The comparative examination between critical-realist and causal-realist philosophy in part four is based the writings of these above sources, focusing on their used vocabularies. The review of philosophical terms in appendix 1 is based on articles published in economic journals, including the Journal of Philosophical Economics and Stanford Encyclopedia of Philosophy. For the combined analytical philosophical realism framework in appendix 2, on varieties of realism and non-realism in economics, were used articles from Stanford Encyclopedia of Philosophy and articles on economic philosophy by Sheila Dow and by Uskali Mäki.

2. The Post-Keynesian Critical-Realist Paradigm

Starting in 1950's (Dow, 1999, p. 15), and then gaining significant traction during the 1970's and the 1980's, the heterodox post-Keynesian paradigm has grown steadily into a larger economics science sub-community since its origination. As indicated by the name post-Keynesianism, it draws on significant inspiration from the works and ideas of the renowned British economist John Maynard Keynes, both in terms of his philosophy and his theory. These ideas Keynes from Keynes includes, amongst others, a strong emphasis on seeing and studying economic systems, structures, and processes, as open, historical, complex, and dynamically evolving phenomena. Keynes understood the nature and the implications of for example epistemological fundamental uncertainty (i.e. radical uncertainty) and how it affect all aspects of economic life. In Keynes' analysis concepts of expectations and conventions, of animal spirits, and of seeing human choice as essential and real, were all essential. He also advocated for taking the institutional context of each phenomena studied into consideration, where he emphasized the economic and political institutions as being highly relevant in building economic theory on for example money, law, trade, and structures of power (Lawson, 1994, p. 503, 535)[2]. In addition Keynes, other important scholarly influences has shaped post-Keynesian thought, amongst others the ideas of the late Polish economist Michal Kalecki, as well as the works of classical economists, including Adam Smith, as well as *"Malthus, Ricardo and Marx, each influencing different groups within post-Keynesian economics"* (Dow, 1992, p. 177) (See also Lawson, 1994, p. 505).

2.1 Critical-Realism

Post-Keynesian critical-realism originated partly as a result of the many critiques certain economists had of neo-classical mainstream economics, especially its logical-positivist philosophy. Over time emerged instead from these critiques the critical-realism, where *"the belief in the existence of an external reality has gone without saying"* (Dow, 1999, p. 24), where critical-realist philosophy is committed to an ontological world realism, and an epistemological process truth realism (on varieties of philosophical realism, see appendix 2). Given by these is a focus on the causes and relations, and the structures and processes, the laws, powers, capacities, and more, that form the economic system. Descriptions and qualitative explanations are emphasized, over the neo-classical emphasis on prescription and quantitative prediction. Critical-realism therefore ultimately presents an alternative system with its own solutions to the perceived inadequacies of the unrealistic, abstract, and typically idealistic neo-classical modes of thought.

When it comes to defining features of post-Keynesian critical-realism, Tony Lawson explains that first and foremost, the overarching and unifying theme is a dissatisfaction with the neo-classical mainstream, which includes its philosophical logical-positivist foundations

[2] Tony Lawson here describes how *"The characteristics of the historical and humanistic models employed by Post Keynesians may be summarized in the following three propositions: 1) The economy is a historical process; 2) in a world where uncertainty is unavoidable, expectations have an unavoidable and significant effect on economic outcomes; 3) economic and political institutions play a significant role in shaping economic events"* (Lawson, 1994, p. 504)

and the use of ontologically closed-system modes of theorizing[3] and methodological mathematical deductivism (Lawson, 1994, p. 1). Several post-Keynesian economists points out this 'negative' defining feature in their writings, where Malcom Sawyer explains that "*It has sometimes been said that the unifying feature of post-Keynesians is the dislike of neoclassical economics*" (Sawyer, 1988, p. 1). Philip Arestis writes, "*Post-Keynesians tend to define their program in a negative way as a reaction to neo-classical economics*" (Arestis, 1990, p. 222), and Sheila Dow explains that *"Some have argued that what unites post-Keynesians is a negative factor: the rejection of neoclassical economics"* (Dow, 1992, p. 176). With this defining discontent of neo-classical economics, especially its logical-positivist philosophy (sometimes termed Humean positivism or empirical-realism), and the role it plays later in the examination of critical-realist ideas, a brief review of the logical-positivist system is worthy some space for clarification[4].

2.1.1 Neo-Classical Logical-Positivism and Critical-Realist Critiques

The linear descendant roots of neo-classicism leads back to its founder Léon Walras, a French economist who was one of the 1870's marginalists[5] (Jespersen, 2009, p. 4) (Walras, 2014, p. xi). Its influences also includes ideas from the positivist philosophers of the early 20th century, importantly the Vienna Circle. The neo-classical paradigm covers justifications for a variety of approaches, including strict axiomatic general-equilibrium theorizing (i.e. formal-idealism), a blend of formal-idealism and logical-positivism, and a purely logical-positivist approach of econometric regression- and inference analysis based on empirical data (Lewis, 2005) (SEP, 2018a). This present review will not discuss the underlying reasons behind each of these various justifications, instead is reviewed the general themes in all of them[6, 7].

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[3] For example, "*the most obvious closure which is inconsistent with an open system ontology is the depiction of human behavior in terms of optimization with respect to an exogenous, complete, consistent set of preferences*" (Dow, 2004, p. 311).

[4] Sheila Dow (2011, p. 1159) explains the relevance of also reflecting on the differences between mainstream orthodox economics and heterodox economics, and the importance these reflections carry for heterodox economics. She writes, "*It is therefore of great importance that any heterodox attempts to communicate ideas to the mainstream should highlight the underlying meta-methodological* (i.e. philosophical) *differences. Indeed, it has been argued again here how important it is to understand these differences for heterodox economics itself*" (parenthesis added) (Dow, 2011, p. 1159).

[5] Léon Walras understood marginal value as being subjective, but when given enough information these valuations, a numerical general-equilibrium price vector is calculable which implies a state of fully satisfied preferences. Walras formulated to this end a mathematical framework that models the economic system, as linked together by partial markets, which through a tâtonnement process (i.e. price clearing) of trial and error ultimately ends up in the general-equilibrium between supply and demand markets (Salerno, 2007).

[6] Lawrence A. Boland distinguishes between Harvard positivism, MIT positivism, LSE positivism, and Chicago positivism, all forms of positivism. These range between applying weak to more extreme conditions in processes of experimental econometric analysis and testing (Boland, 2012).

[7] Regarding economic paradigms also adopting logical-positivist philosophy, Jesper Jespersen (2009) points out the new-classical and the new-Keynesian paradigms. These are however still independent economic research programs with their own theoretical assumptions. Their assumptions for example differ with respect to the nature and the features of the economic system, including price-rigidities and market-failures, and the extent to which economic agents can and do hold information, and how that information flows. Sheila Dow explains that *"departures from these* (neo-classical) *assumptions (e.g. full information, perfect rationality) are explored: behavioral biases, cognitive limitations, asymmetric information, and others, regarding behavior. However, this approach has simply refined the assumptions, certainly in the direction of greater realism, but still with rational economic man as the benchmark … Logical positivism and the empirical testing of deductivist theory still prevail"* (parenthesis added) (Dow, 2018, p. 16).

From the philosophical perspective, a couple of defining propositions lies at the core of neo-classical economic thought. At its very core, explains Tony Lawson, is *"a commitment to the formula that "whenever event (type X) then event (type Y), as a generalized condition, image or goal of, or ideal for science*" (Lawson, 1994, 507). This is also known as the scientific ideal of Humean positivism, of establishing what empirical regularities exist, in order to then form quantitative predictions and models based on them. Empirical regularities and predictive capacities supersedes descriptive explanations, which is why Lawson also describes logical-positivism as *empirical*-realism. The *"whenever event (type X) then event (type Y)"* approach is why neo-classical economics is classified as epistemological *event* truth realism, in contrast to the critical-realist and causal-realist *process* truth realism classification (see appendix 2). This first feature is identified by Sheila Dow as well, as the most widely accepted feature in neo-classical economics, either explicitly or implicitly (Dow, 2018, p. 2-3). This approach to economic science is equivalent to the natural science approach[8], as the French neo-classical economist and recipient of the 1992 Nobel prize in economics Maurice Allais explains it,

"*The essential condition of any science is the existence of regularities which can be analyzed and forecast. This is the case in celestial mechanics. But it is also true of many economic phenomena. Indeed, their thorough analysis displays the existence of regularities which are just as striking as those found in the physical sciences. This is why economics is a science, and why this science rests on the same general principles and methods as physics … every scientific model entail three distinct stages: 1) statement of well specified hypotheses; 2) deduction of all the consequences of these hypotheses and nothing but these consequences; 3) confrontation of these consequences with observed data. Of these three stages only the first and third – establishing hypotheses, and confronting results with reality - are of interest to the economist. The second stage is purely logical and mathematical, that is tautological*" (Allais, 1992, p. 25-26).

This mode of economic science is according to Lawson and Dow a *deductivist* one, where deductivism as the neo-classical methodology first gives a "*statement of well specified hypotheses",* followed then by a *"deduction of all the consequences of these hypotheses",* usually through mathematic expression, with then a final "*confrontation of these consequences with observed data"* [9]. Milton Friedman argues along same lines on the similarities between prediction in economics and in natural science,

"*Its (economic science) performance is to be judged by the precision, scope, and conformity with experience of the predictions it yields. In short, positive economics is, or can be, an 'objective' science, in precisely the same sense as any of the physical sciences*" (Friedman, 1953, p. 4) … *"theory is to be judged by its predictive power for the class of phenomena which it is intended to "explain." Only factual* (i.e. empirical) *evidence can show whether it is "right" or "wrong" or, better, tentatively "accepted" as valid or "rejected" … the only relevant test*

[8] In Mankiw and Taylors *Economics* textbook, they specifically compare economics to natural science, as "*Economists try to address their subject with a scientist's objectivity. They approach the study of the economy in much the same way as a physicist approaches the study of matter and a biologist approaches the study of life: they devise theories, collect data and then analyze these data in an attempt to verify or refute their theories*" (Mankiw & Taylor, 2014, p. 17)

[9] By this methodology, the scientist puts a model forward with empirically testable and falsifiable predictions. It is then empirically tested to see if real world data conform to its predictions (Holcombe, 2008, p. 57).

of the validity of a hypothesis is comparison of its predictions with experience" (parenthesis added) (Friedman, 1953, p. 8)

The methodology here described of deductivism applies pure mathematical axiomatic-deductive reasoning combined with the observable and quantifiable economic data available, where the latter is necessitated for current, as well as future verifications and/or falsifications of the predictive power of the hypothesized economic theories, where "*central to this philosophy was the notion of empirical testing, such that only those theories which were testable were to be regarded as scientific, everything else being unscientific"* (Dow, 2018, p. 14). Now these various hypotheses being tested, are initially developed first through lines of logical-deduction, which for the neo-classical approach, starts from a set of self-*chosen* axioms and assumptions (often criticized as both unrealistic and unrealizable), such as the axiom of general equilibrium, and assumptions of perfect competition, full information, and perfect rationality. This above described mode of economic reasoning lies at the very core of neo-classical philosophy[10]. Logical-positivism in economics is grounded in the idea that theories and predictions concerning true causal structures that governs economic systems can be obtained through synthetic a posteriori propositions, meaning from sense data experience and observation, analyzed in econometric time-series analyses (Lawson, 1994, p. 508, 510). Empirically observed data (i.e. sense data) are the ultimate arbiter for verification/falsification of neo-classical economics hypotheses and/or theories[11] (see also SEP, 2018a), and

"What is particularly noteworthy here is the manner in which such orthodox methods as econometrics or axiomatic-deductive reasoning, and so implicitly the "whenever this, then that" view of science, are considered by their proponents (i.e. mainstream economists) *as being so obviously universal in their legitimacy or scope that their automatic adoption, in any context, is, in effect, considered to be beyond reproach"* (parenthesis added) (Lawson, 1994, p. 508)

The outcome of this view of science is that 'sound' science in general (meaning both natural science and social science) is rooted in the same monist, opposed to dualist or pluralist, philosophy, leaving little to no space for alternative philosophies like critical-realism or causal-realism. Tony Lawson (1994, p. 511) and Sheila Dow (1999, p. 16) laments the economic mainstream for seeing little relevance in engaging in these philosophical discussions, leaving much of the economic science philosophical issues unresolved. Now a final note on mainstream economics philosophy is on the implicit view taken in theoretical models where human beings are modeled as merely mindless and passive stimuli-responding actors, where "*usually the agent of contemporary economic theory responds merely to market price "signals" or some such*" (Lawson, 1994, p. 508). Economic actors are not attributed any capacities for real human

[10] Some changes has been added to neo-classical methodology, so that for example questionnaires are now admissible as evidence. But deductivist principles still remain the exclusive methodological approach (Dow, 2011, p. 1163). Randall Holcombe identifies changes in "a*reas of inquiry that only a few decades ago were considered heterodox and outside of mainstream economics – such as public choice, the new institutional economics, and experimental economics – have become a part of the orthodoxy*" (Holcombe, 2008, p. 68).

[11] Positivism explains Tony Lawson, *"is first of all a theory of knowledge, its nature, and its limits. Specifically, it is a claim that human knowledge takes the form of sense-experience or impression … From the Humean perspective these are the only sort of generalizations conceivable. In other words, science, if it is to be possible at all, must take the form of elaborating the constant conjunctions of events"* (Lawson, 1994, p. 510).

choices and actions, essentially making neo-classical theories highly deterministic in their nature and outcomes, steered ultimately by the chosen set of variables and coefficients.

As it is demonstrated in the remaining sections of this part two, the neo-classical axiomatic-deductivist closed-system mode of thought, intertwined with the positivist conception of observable sense-data experience and verification/falsification as being the only reliable source scientific knowledge, is an approach heavily criticized by critical-realist thinkers. The critiques of neo-classicism covers for example the use of unrealistic axioms and assumptions like general-equilibrium theorizing, the stylized representative homo economicus agent, and mathematical deductivism. For example, the concept of homo economicus models people as atomistic (so deterministic), self-interested, perfectly rational, and fully informed agents equipped with all the relevant information about present and future opportunities and risk settings (people are perfect risk-takers and optimizers, adorned with perfect foresight) (Lucas & Sargent, 1979, p. 9-11). (Brown, McLean & McMillan, 2018) (Calhoun, 2002) (SEP, 2018a). Sometimes a risk-factor for agents choices is modeled in, where actions may produce several probable, but still predictable, outcomes. This homo economicus agent

"is a stylized ideal, defended as an element of economic modeling not on the presumption that individuals really do behave so precisely, but that their learned behavior over time approximates that of the rational economic actor" (Calhoun, 2002).

Homo economicus is an idealistic construct of humans, not a conceptually realistic one. Time, real human choice, creativity, uncertainty, and the potential for error, are all essentially absent.

While there are other nominal features in neo-classical philosophy, Tony Lawson finds that "*these conceptions of science, of human beings, and of the limited usefulness of methodology, captures the most enduring and fundamental"* (Lawson, 1994, p. 509). Throughout the following sections on critical-realism, critiques of these neo-classical conceptions will be demonstrated. Later in part three on Austrian causal-realism, it is shown how similar critiques are targeted at the mainstream, with a number of clear intersections between the critical-realist and causal-realist discontents and critiques.

A second feature defining post-Keynesian critical-realism is how the post-Keynesian scholarly contributions as a whole admits a large amount of space for exploring, developing, and clarifying the many aspects and levels of what they deem to be more 'realistic' philosophical foundations for economic science. This feature is mostly an outcome of the discontent with the neo-classical mainstream. About this second feature Sheila Dow (1992, p. 182) emphasize that the extraordinary science content in post-Keynesian scholarship, focusing on economic philosophy aspects, is high[12], to which she adds in a later article, "*When we think of Post Keynesian economics as a paradigm challenging the dominant mainstream paradigm, it is an exercise in extraordinary science and thus requires a focus on foundations."* (Dow, 1999, p. 19). This focus on philosophy stands in contrast to the minimal attention these issues are given in neo-classical scholarship, for reasons already hinted at in section 1.3.

A third feature concerns the lacking consensus about what constitutes the core of post-Keynesian substantive theory. As Tony Lawson writes,

[12] See appendix 1.2 for Thomas Kuhn's terminological definitions of normal science and extraordinary science.

"*Post-Keynesianism gives the impression of being little more than a collection of largely unrelated questions, aims, theories, and arguments united only in their claimed status as constituting alternatives to contemporary orthodox*" (Lawson, 1994, p. 504-505).

On this it is noted by Sheila Dow how amongst post-Keynesians there is a general sense of confusion about what post-Keynesian substantive theory constitutes in the positive (Dow, 1990, p. 346) (Dow, 1999, p. 17). Over time the post-Keynesian economists have provided a different, but still only quasi-coherent alternative to the perceived issues in neo-classical theory (Hamouda & Harcourt, 1988, p. 2). Arestis Sawyer point out that the boundaries of post-Keynesianism are not yet explicitly defined, a substantial theoretical diversity exists, and much work is still needed (Arestis, 1990, p. 222). According to Geoffrey Hodgson, *"Notably, over fifty years after the publication of the General Theory, there is still no consensus amongst Post Keynesians as to what are the basic theoretical foundations of their economics"* (Hodgson, 1989, p. 96). However, more recent developments in post-Keynesian thought have sought to remedy this issue, where much work has sought to develop and clarify post-Keynesian theory, and important on embedding these theories into being in line with critical-realist philosophy. Tony Lawson explains how the embedding of post-Keynesian thought into the critical-realist system has proved itself a significant development for the cohesion within the paradigm in general, including that of its theories (for example Lawson, 1994, 1997). On this connection between post-Keynesianism and critical-realism, Tony Lawson writes, "*It is the philosophical system critical realism ... that provides the coherence to the noted nominal features of Post Keynesian contributions"* (Lawson, 1994, p. 507). The process of embedding post-Keynesianism into critical-realist philosophy has progressed much in the works Tony Lawson (1997), Sheila Dow (1990, 1999), Steve Fleetwood (1999), and Philip Arestis (1990, see also Arestis & Sawyer 2009). This embedding into critical-realism is an outcome of the primary quest of transcending the shortcomings of mainstream logical-positivist philosophy, "*a project founded upon erroneous philosophical results*" (Lawson, 1994, p. 506), where therefore *"A central feature of critical-realism is the philosophical and methodological critique of orthodox economics"* (Dow, 1999, p. 16). To transcend the mainstream shortcomings a different philosophical alternative is required, meaning a 'scientific revolution' in Kuhnian terminology, to supplant the logical-positivist mode of thought. Within for example critical-realism, explains Lawson, economic science can, and should, be embedded for a more 'realistic' analytical framework, one that can more sufficiently capture the real nature of social reality and the economic systems in it (Lawson, 1994, 1997).

With these three points above in mind – first the discontents with neo-classicism; second the larger focus on philosophical issues in post-Keynesian writings; and third on the embedding of post-Keynesianism into critical-realism – the examination moves now from the more general post-Keynesian critical-realist features, to more concrete one. As a remedy to the first feature explained, the economic science ideal and goal with critical-realism, is to develop 'qualitative explanations' about economic issues[13] (in contrast to prescription and prediction), why critical-

[13] For example, Finn Olesen quotes a passage in the Keynes Collected Works, that explains "*in a letter to Roy Harrod written in the summer of 1938, the mathematician Keynes understood economics primarily as a qualitative rather than as a quantitative science*" (Olesen, 2013c, p. 3).

realism was classified as process truth realism instead of event truth realism (see appendix 2). Process truth realism aims for qualitative explanations about economic causalities, structures, mechanisms, powers, laws, capacities and others, about how these are part of and affect economic processes. Steve Fleetwood explains this as being *critically explanatory*, meaning critical of the mainstream and seeking alternative explanations. Critical-realism is also, besides being critically explanatory, also *developmentally constructive*, as it seeks through extraordinary science activities, to develop an alternative system of thought for economics (Fleetwood, 1999, p. 3-4). As so, as an alternative to the mainstream, its closed-system theorizing, its self-chosen idealistic axioms and assumptions, and its mathematical deductivism, the post-Keynesian critical-realist approach argues differently. It argues for the necessity an open-system mode of theorizing, for the recognition of fundamental uncertainty on the behalf of economic actors and of human knowledge in general (including economic scientists) (Dow, 2004b, p. 285) (see also Lawson, 1997, 2003), and therefore for a epistemologically structured pluralism, given such fundamental uncertainty. With the complex and time-dynamic nature of the economic causes, structures, mechanisms, powers, tendencies, capacities and so forth, post-Keynesians argue for a Babylonian mode of thought allowing a plurality of methods used within an open-system ontology. And for methods used in economic analyses, post-Keynesian economists explains that an abductive (or retroductive) methodology is compatible both ontologically and epistemologically with the nature and content of economic knowledge. These concepts are examined below.

2.2 Critical-Realist Ontology

It is explained in appendix 1.1.1 how ontology in economics must answer questions about what objects of economic being that exists, what our economic reality is formed by and made of, and what it is that constitutes the most general features and relations between these economic objects and beings that exists. To answer these by critical-realist explanations, the ontological concepts that are examined below is about an open-system mode of theorizing, the inclusion of non-material entities into economic analysis, entities that fundamentally structure social reality, and finally the view of social reality as fundamentally being non-deterministic in nature.

2.2.1 Open-System Theorizing

In addition to the three defining features above on critical-realism, a fourth feature Tony Lawson explains, is the commitment to viewing, and analyzing economic phenomena as part of an open-system social reality. Social (and thus economic) reality is understood as dynamic and complex; they are processes influenced heavily by events and outcomes of the historical past (i.e. path-dependent). Questions asked in the purview of constructing social theory, should therefore be examined from an open-system approach and mode of theorizing, in contrast to the neo-classical closed-system approach. Open-system theorizing is a primary and core contrast dividing post-Keynesian and neo-classical ontology. For example, as pointed out by Sheila Dow, the organic complexity that human agency brings to bear on our socioeconomic reality prevents fundamentally any identification of exact quantitatively observable regularities and causal laws, which the neo-classical logical-positivist mode of theorizing seeks to establish in their closed-system modelling approach (Dow, 1999, p. 22-23). And so,

"The important distinction for critical-realism is between the closed-system ontology of orthodox economics and the associated deductivist view of explanation on the one hand, and the open-system ontology of nonorthodox economics and the associated abductivist view of explanation on the other" (Dow, 1999, p. 25-26).

Dow further points out that as our economic systems have the defining characteristics of open systems, then

"*if we are to build up knowledge of it (however partial and temporary), that knowledge also should conform to an open system … This holds implications for limitations on the scope of economic inquiry for critical-realists, notably precluding straightforward prediction, but also justifying a broader scope in terms of method than mainstream economics in order to increase understanding of the various causal processes at work*" (Dow, 1999, p. 24).

And further, where mainstream economists at times "*display an open-system understanding of reality, critical-realists point out the incompatibility with their closed-system methodology*" (Dow, 1999, p. 24). Critical-realist open-system ontology allows for a broader scope of inquiry into the various causal processes at work in economies, by for example through the inclusion of important non-material ontological entities.

2.2.2 Ontological Entities and Structured Reality

In extension to its open-system approach, critical-realism builds on the conceptual idea that social reality consists of deep, but to the eye unobservable structures of causal processes and relations, which also "*in a (structured) social system, undergo transformation*" (Dow, 1999, p. 24). While in critical-realism "*the belief in the existence of an external (objective) reality has gone without saying*", this ontological worldview goes further, in being one where a deeper structural layer, of interrelated causal processes and entities, constantly change and transforms social and economic systems (Dow, 1999, p. 23-24). In *Critical Realism in Economics*, Steve Fleetwood (1999) also identifies this critical-realist ontological understanding, of social reality being 'structured', and where the primary goal is to identify and study the various social entities and their relations that form the very fabric of our structured social reality. This understanding is typically shared by other non-mainstream economists as well, given how

"*nonorthodox economists understand the world in terms of a complex set of underlying causal processes that we cannot directly perceive. Within that, as Post Keynesians, we identify a complex interaction between collective and individual activity that renders these processes indeterminate but not unintelligible or unalterable*" (Dow, 1999, s. 29).

In its structured format, social reality is essentially understood to be made of social entities, in addition to material entities, including causal connections, relations, laws, mechanisms, tendencies, institutions, capacities, powers and more (Fleetwood, 1999, p. 5). These are to the human eye more or less unobservable, yet still, to different degrees, they impact and govern that which in our economies are empirically observed as *actual* socioeconomic events. And so, while unobservable, these social entities are, according to Steve Fleetwood, still *transient* entities, meaning that once identified, they are the more quintessential and reliable explanatory entities for the observed economic events and outcomes. It is therefore the study of such social entities that are critical, to identify their nature and relations, in order to understand how, and why, each unique economic event manifest itself, and how the underlying phenomena of those

are each interconnected as parts of the ongoing dynamic and historically contingent social and economic processes.

Social reality essentially features three domains (or levels), explains Tony Lawson, domains that are ontologically distinguishable from each another. These domains are respectively the *empirical* domain (of sense experiences and impressions), the *actual* domain, of "*events and states of affairs, that is, the actual objects of direct experience*", and then the *non-actual* domain, the deepest (unobservable) domain, featuring the most critical and relevant "*structures, mechanisms, powers, and tendencies*" (Lawson, 1994, p. 513), institutions, causal connections, laws, capacities and so forth (Fleetwood, 1999, p. 5). By these three ontological domains,

"*reality is constituted not only by events, and our experience or perception of these events, but also by (irreducible) structures, mechanisms, powers, and tendencies that, although perhaps not directly observable, nevertheless underlie actual events and govern or produce them*" (Lawson, 1994, p. 513).

The three domains are interrelated, but still distinct from one another, and they are unsynchronized, meaning they are out of phase with one other[14], a point to which Lawson adds that,

"*while experiences are out of phase with events, allowing the possibility of contrasting, as well as revisions to, experiences of a given event, so events are typically unsynchronized with the mechanisms that govern them. On the latter structure/event non-correspondence, for example, autumn leaves are not in phase with the action of gravity for the reason that they are also subject to aerodynamic, thermal, and other tendencies*" (Lawson, 1994, p. 513-514).

To summarize, the three empirical, actual, and non-actual social domains are interrelated, but yet distinct, and there is a non-synchronicity between them. Another ontological feature is that the entities in operation within the non-actual domain are transfactual, meaning they may, or they may not, be manifest in their empirical and actual domain counterparts, as that ultimately depends on whether *other* non-actual entities are in effect as well which cause counteracting effects to one or more of the various operating entities at play. A growth in the money supply will not by necessity lead to price inflation if a 'counteracting' growth in real economic output outpaces growth in the money supply. A transfactual means that where prices will show deflationary tendencies following an increase in economic output, then, in the instance of simultaneous money supply growth, leading to price inflation, the effects on prices through increased output will still be in effect, in reducing (i.e. counteracting) the price inflation following an increase in the money supply. Whether price deflation or inflation is observed, depends on the dominant factor in each specific instance. Any law, mechanism, tendency, capacity etc. can, as a transfactual, counteract another such entity, meaning if one is triggered, it will be in operation despite what is observed in the empirical domain (Fleetwood, 1999, p.

[14] Tony Lawson gives the analogy that, "*not only does the autumn leaf pass to the ground, and not only do we experience it as falling, but, according to this perspective, underlying such movement and governing it are real mechanisms such as gravity. Similarly, the world is composed not only of such "surface phenomena" as skin spots, puppies turning into dogs, and relatively slow productivity growth in the United Kingdom ,but also of underlying and governing structures or mechanisms such as, respectively, viruses, genetic codes, and the British system of industrial relations*" (Lawson, 1994, p. 513)

5). In critical-realism, these ontic non-actual entities are the most relevant ones to ascertain and understand. The critical-realist ideal economics is to ultimately discover, and to make explicit, the contents of these deeper nonactual social entities, and how they each govern the observed economic outcomes and events (Lawson, 1994, p. 514).

2.2.3 Economic Determinism

Edward Fullbrook (2009) in *Economics and Ontology – Tony Lawson and his Critics* explains that, as general science goes, there are critical ontological (and epistemological) differences between natural science phenomena and social science phenomena. This difference causes natural phenomena and social phenomena to be innately incompatibility in how they are observed and cognized regarding their underlying causes and their effects. On natural phenomena, he explains,

"*if the speed of change of certain natural phenomena is sufficiently slow, then for most practical purposes that concern us, we can treat them as approximately constant, this is usually not the case regarding social developments*" (Fullbrook, 2009, p. 21).

To the human mind, most natural phenomena are perceived as invariably constant in nature (e.g. planetary movements, the impact of gravity, the effects from positive temperatures on ice melting), even if infinitesimally small changes may occur over greater lengths of time. Social phenomena on the other hand (social and economic developments), have innate tendencies to bring about continuous change, causing attempts at empirically observing social patterns at a given time to be highly variable, irregular, and therefore unpredictable, even over short-term intervals. The social realm is an arena of a continuous change, of processes that either reproduces and/or transforms it. In this sense, on the non-deterministic nature of social affairs,

"*Heterodox approaches have in common an understanding of the economic system as being open, in the sense that non-deterministically evolving structures, interrelations and creativity means that there is no scope for universal laws with respect to the economic system*" (Dow, 2018, p. 18).

Due to human creativity and activity, social and economic patterns are highly complex and innately variable. In contrast to natural phenomena, they are fundamentally spatiotemporally grounded, each event is uniquely situated within a historically contingent time and space setting. People are not atomistic beings, and any two persons may not react in the same way to the same event, and the same person may not react identically to the same event taking place at a different times (if offered water a man may for example drink it, but at a later time, his expected utility may have changed, and he may the water for washing). Between human agency (more in section 2.4.3) on the one hand, meaning "*the capacity possessed by people to act of their own volition"* (Rogers et. al., 2013), and of natural causes on the other hand, there is an ontological divide, from how humans cognize the respective nature and content of each type. To the mind, natural causes and the laws governing them seems entirely deterministic, as natural phenomena are movements of inorganic matter absent underlying intentionality causes, and so when studied by physicists and chemists, these phenomena are very predictable in their interactions and patterns of behavior[15]. In contrast, social reality, wherein human agency and

[15] In the case of natural phenomena there can be several transfactual entities at play, e.g. temperature, friction, wind, but each transfactual natural entity is understood as being constant in the given impact it may play.

economic activity take place, is ontologically different, as human agency is highly variable due to for example free-will, intentionality, choice, learning, and creativity. Social reality and how its spatiotemporal dimensions affects human agency (i.e. time and place, the situated context), is fundamentally non-deterministic. But, Fullbrook explains,

"*this does not mean, of course, that economics cannot, or should not, be theoretical. It merely follows that good social theory warrants the skillful combining of abstract and concrete history, and particularly of pure and applied explanatory endeavor …* ***I am not wishing economics to be tied to some particular method in an a priori fashion, as is the practice of the current mainstream, but instead suggesting that its orientation be tailored, at least to some degree, to ontological insight"*** (emphasis added) (Fullbrook, 2009, p. 21).

Critical-realist economics is a theoretical, but developed from reflections on the subject matter that is human agency, and the various social entities to different degrees govern it.

2.3 Critical-Realist Epistemology

In appendix 1.1.2, epistemology in economics is explained as the field which studies what our sources for economic knowledge are, how we obtain that knowledge, and what the structure, the scope, and the limits are of it. Being committed to process truth realism for studying social reality, critical-realism argues the existence of an objective social reality from which 'real' economic knowledge can be obtained, though not the empirically predictive kind, but instead a descriptive and explanatory kind of knowledge. For economics to be practical, it must seek to explain the nature of the types of unobservable, transient, and transfactual social entities laid out previously in section 2.2.2. With the fabric of economic systems governed by these entities, in a complex and unpredictable 'web' of human actions, it is relevant to explain what the sources of this knowledge are, including its structure, scope, and limits. Neo-classical logical-positivist thought was already demonstrated, from the critical-realist perspective, as ill-equipped for the descriptive and explanatory purpose. Critical-realism argues for the inclusion of two critical epistemological concepts, namely epistemological uncertainty, and then an epistemological dualism that enables a structured pluralism.

2.3.1 Epistemological Uncertainty

In the process of ascertaining economic knowledge, and applying it to real-world practical circumstances, a fundamental underlying uncertainty is inevitably conditioning all that knowledge, both for the economic actor, and for the economic scientist. This uncertainty involved in all human affairs and activities are given by how, as humans, and as economists[16], "*we each have the capacity to have a different understanding of the nature of that reality*" (Dow, 1999, p. 25-26). As new knowledge, ideas, and changing circumstances come about, any present state of economic reality change to some smaller or larger degree (Olesen, 2013b, p. 1-2). Fundamental uncertainty is argued as an intrinsic, central, and conditional feature in any mode of open-system theorizing (Olesen, 2013a, p. 126). Mainstream general-equilibrium theorizing partially avoids this condition of uncertainty, as these models at their core are deterministic, hinging on its philosophical commitments to world non-realism and truth non-

[16] Knowledge produced by economic scientists about the 'true' nature of economic entities and events, and the degree any given economic aspect plays in the complex structures, are inescapably held with some degree of uncertainty.

realism (see appendix 2.1) that removes uncertainty from the modelled 'equation'; both *"economist and economic agent alike can feasibly hold* ***certain****,* ***or 'certain equivalent'****, knowledge"* (emphasis added) (Dow, 2004b, p. 284). Critical-realism in contrast view economic systems as processes influenced by uncertainty, and economic agents and economists can only, with their limited cognitive capacities, hold limited and incomplete knowledge (humans are not omniscient). Expectations held by economic agents influencing their choices and agency, are always influenced by uncertainty, extending to knowledge about both past, present, and future economic conditions (Lawson, 1994, p. 504) (Davidson, 1980, p. 158). Therefore, according to Tony Lawson (1997, Ch. 17) and Sheila Dow (1999, p. 23), critical-realism does not claim identification of "true" socioeconomic causes and processes. While the scientific ideal, any produced knowledge is inevitably fallible and transformable, and so true and exact knowledge cannot be held about any such relation, cause etc. Critical-realism instead

"*emphasize the organic complexity of human agency and social reality, which prevents the identification of causal laws; rather, the emphasis is on studying the various causal forces at work in the system, and their evolution,* ***in order to build up knowledge that is as reliable as possible****, with a view to action"* (emphasis added) (Dow, 1999, p. 22).

Economic knowledge should be built and applied for practical purposes, such as policy, even if the knowledge is held with some degree of uncertainty.

2.3.2 Epistemological Dualism and Structured Pluralism

With epistemological uncertainty conditioning all social science knowledge, the implication becomes that no clear-cut basis can be laid out on how to best obtain sound and reliable economic knowledge. No system for economic analysis can be conclusively shown to be the best and most appropriate system in the absolute sense (Dow. 2004b, p. 283). Some degree of epistemological pluralism is instead necessary, albeit a pluralism restricted to an ontological open-system approach and understanding of social reality. Further, about economic knowledge, "*it must be the case that this subject matter is not such as to yield law-like behavior and definitive theories and methods to capture causal mechanisms or their manifestations*" (Dow, 2004b, p. 283). With the open-system complexity and changing nature of our social reality, there are features affixed to the knowledge that can be gained. If social reality is an open-system phenomena, then in analyzing it, there are epistemological problems involved, which is that it may not be possible to fully identify all the relevant variables required to develop exact and 'true' knowledge. Second, as the boundaries of this open-system are semi-permeable, where variables (endogenous and exogenous) are unlikely to be fixed through time, then any knowledge gained may not be true to the same degree over time. Third, the broader effects on the system from the variables involved may not be fully known either. Fourth, knowledge about the interrelatedness between variables are also imperfect, and their relations may change through time as well, by human volitions, learning, creativity, natural circumstances etc.[17]. If these characteristics explained befits the epistemological status of the knowledge ascertainable from our socioeconomic systems, then that knowledge will be held

[17] In contrast, a closed-system mode of thought makes all the relevant variables identifiable, its boundaries can be clearly specified with only known and exogenous variables affecting the system in a predetermined way. The interrelatedness between variables and the structures surrounding them are fully known, and they are separable, constant, and independent.

with some fundamental uncertainty. This circumstance is the argument for allowing a pluralism to secure the widest scope of knowledge possible. But, explains Sheila Dow, this does not mean that any approach is appropriate. As noted above, to best meet the criterions for studying and building open-system knowledge, critical-realism embodies an epistemologically *structured* pluralism, one open to a range of methods, though not to an infinite range. Its structured pluralism entails the range of approaches studies social reality as an open-system phenomena, meaning it excludes methods suited to closed-system inquires like the mainstream approach of deductivism (Dow, 2004b, p. 287-288). Another epistemological given is how each person perceive and understand the world in his or her own way, with uncertainty involved in all human knowledge, knowledge that ultimately transforms over time as the economic system historically goes through transformational, path-dependent, and non-repeatable processes. Individual knowledge will always be held with some degree uncertainty, and so again the argument for the outlined pluralism is necessitated to gain the widest scope of social and economic knowledge possible. With these epistemological conditions involved in social science studies, based on various starting points and conceptions (e.g. understood by individuals or classes, production or exchange, or as inherently stable or instable), the implication is that a plurality (i.e. diversity) of methods should be pursued to gather knowledge about the various unique economic circumstances, conditions, entities, and relations (Dow, 2004b, p. 276, 288). This epistemological is championed as

"the emphasis is on studying the various causal forces at work in the system, and their evolution, in order to build up knowledge that is as reliable as possible … critical realism does not claim to identify "true" causal processes. While that is the aim, it is emphasized that knowledge actually produced is both fallible and transformable; there can be no assurance of having identified the truth" (Dow, 1999, p. 22-23).

With epistemological uncertainty in all human knowledge, critical-realism argues for an epistemological dualism, with a pluralism in methods, in obtaining the greatest amount of explanatory knowledge about the essential (i.e. the nonactual) existing economic entities and objects and their relations. This epistemological commitment is taken, writes Sheila Dow, as *"A shared open-system 'pure' ontology is important for cross-fertilization of ideas … and the evolution of theorizing in relation to a changing reality more generally"* (2004a, p. 310.

2.4 Critical-Realist Methodology

Economic methodology is explained in appendix 1.1.3 as the field inquiring about the way economic science research should be conducted, which methods that scientifically are valid, and then for what reasons these methods are valid for economics. Critical-realism answers these in arguing for a Babylonian mode of thought, for using the abductive method, and for seeing and studying human agency as the methodological starting point in economics. These are examined below.

2.4.1 Babylonian Mode of Thought

The widely adopted post-Keynesian 'pluralist mode of pluralist' is described by Sheila Dow as resembling a 'Babylonian' mode of thought. A Babylonian mode of thought, explains Dow, is one compatible with both the ontological and the epistemological concepts in critical-realism, primarily its structured pluralism (Dow, 1999, pp. 21-23, p. 31). The 'Babylonian'

approach allows for, and relies on, the use of several different methods and lines of reasoning for one or more studied aspects, including partial (e.g. sectors, institutions) and whole systems analysis. The combined total knowledge gained is then comparatively reassessed, to achieve the most robust evidence and an approximately true explanation for the given phenomenon. In this way *"The Babylonian mode of thought derives coherence not from a single set of axioms, but from a holistic view as to how the system as a whole works"* (Dow, 1999, p. 21). The contrast to this, Dow explains, is 'Cartesian/Euclidian' thought, which adopt the classical logical-deductive approach in its reasonings. The logical-deductive mode begin with a set of specified axioms and some auxiliary assumptions, where the initial premises are further examined for their implications. Critical-realism points out the issue with mainstream deductivism, with its starting axioms (e.g. general equilibrium, full information) and lacking coherence with reality. The Babylonian approach is instead "*a mechanism for increasing weight of argument*" (Dow, 2018, p. 20). Another case of Cartesian/Euclidian analysis is the Austrian logical-deductive (or nomological-deductive) 'praxeological' methodological approach (examined in section 3.4.2). But neo-classical and Austrian logical-deductive reasoning, with their in philosophical foundation differences, are very different deductive methodologies. Critiques of neo-classical deductivism should therefore not be considered as applicable to Austrian praxeology. In fact, Austrians with their praxeological methodology advance similar critiques to neo-classical deductivism as post-Keynesians. But where Austrians use the praxeological logical-deductive approach, post-Keynesians rely on abduction, the methodology examined.

2.4.2 Abduction

To summarize, critical-realist methodology adopts several methods, from the idea that social (economic) processes are constantly changing. True and exact knowledge cannot be held, only approximately. And so, instead of choosing between the classical dichotomy of an inductive or a deductive approach, abduction is chosen as it is seen as more appropriate for economic analysis. At its core abduction is an explanatory method, not a predictive one. It aims at pointing to causes, as for things, "*we want to know the cause*" (Tohmé & Crespo, 2013, p. 3). Abduction is a type of *as if* reasoning, and

"*consists in the movement ... from a conception of some phenomenon of interest, to a conception of some totally different type of thing, mechanism, structure, or condition that is responsible for the given phenomenon. If deduction is, for example, to move from the general claim that all grass is green to the particular inference that the next lawn to be seen will be green, and induction is to move from the particular observations on green grass to the general claim that all grass is green, then retroduction or abduction is to move from the particular observations on green grass to a theory of a mechanism intrinsic to grass that disposes it to being green*"[18] (Lawson, 1994, p. 514-515).

Abduction means moving from the "surface" of a phenomenon (e.g. in the empirical domain), to the "deeper" cause (i.e. the non-actual domain) where the explanatory causes, entities, and

[18] Another way abduction is explained is, "*While deduction infers a result from a rule and a case, and induction infers a rule from the case and the result, abduction infers the case from the rule and the result*" (Tohmé & Crespo, 2013, p. 2).

relations are situated. Abductive reasoning draws on a logic different from the mainstream mathematical deductivist approach, a "human" logic conceptualized by Keynes, where

"Rather than using classical logic (deduction from a set of axioms) we employ 'human logic', i.e. employing multiple strands of argument, using different methods, and with multiple starting points. We cannot demonstrate our own view to be correct, but rather need to persuade by means of argument which employs reason, evidence and rhetoric." (Dow, 2018, p. 18)

Keynes' idea of a human logic means a combination of human experience, understanding, and imagination, and drawing on a range of sources for evidence. The search is aimed at identifying the causal *non-actual* entities of economic structures, mechanisms, laws, tendencies, rules and so forth (Lawson, 1994) (Dow, 2018, p. 8). This search takes account of the nature of *real* (not abstract) human agency and the surrounding social structures. With one or more of these non-actual entities uncovered, these entities and their interrelatedness can then be analyzed further, through a wider range of starting points, partial analyses, and methods, to then draw more robust conclusions from. To critical-realists, economic knowledge is thus seen as progressing forward as existing, as well as new hypotheses, theories, anomalies, hunches, and so on, are identified, expanded on, or transformed. As "*human beings intervene in and manipulate reality; they confront it on the basis of theory, through practice, through experiment, and in doing so come to transform their (always historically transient) account of it*" (Lawson 1994, p. 514). Social (economic) science relies therefore on types of experimental activity, where the gained knowledge, and the application of that knowledge, concerns the various governing social entities, including *"generative structures, powers, mechanisms, and necessary relations, and so on, that lie behind and govern the flux of events in an essentially open world"* (Lawson, 1994, p. 516). Experimental activity in economics is, explains Lawson,

"an attempt to intervene in order to close the system … to isolate a particular mechanism of interest by holding off all other potentially counteracting mechanisms. The aim is to engineer a closed system in which a one-to-one correspondence can be obtained between the way a mechanism acts and the events that eventually ensue … experimental activity can be rendered intelligible not as creating the rare situation in which an empirical law is put into effect but as intervening in order to bring about those special circumstances under which a nonempirical law, a power, a tendency, or way of acting of some mechanism can be empirically identified" (Lawson, 1994, p. 516-517).

Experimental activity knowledge, gained by such open-system ceteris-paribus (OSCP) methods, helps track what the past and the present approximately true causal relations are in the wider path-dependent economic system. An OSCP analysis holds a number of variables constant for a duration of time, while the path of selected variables are followed. This helps discover the likely non-actual entities governing those variables (Jespersen 2009, p. xv-xvi, 6, 13-14).

Abductive reasoning also draws on background knowledge, metaphors, analogies, and intuitions, as building blocks for the different models central to the process of economic reasoning (Tohmé & Cespo, 2013). In opposition to the neo-classical methodology, Sheila Dow argues that this wider range of different open-system oriented methods and knowledge sources is *"a mechanism for increasing weight of argument, a concept developed by Keynes"* (Dow,

2018, p. 20). This methodological approach Sheila Dow explains as a *structured* pluralism. It does not mean however a carte blanche to adopt any and all methods available. As the term *structured* imply, specific ontological and epistemological presuppositions limits the pluralism (i.e. plurality in methods), like the conditions of open-system theorizing and of fundamental uncertainty, and the epistemic limits to human knowledge. Sheila Dow summarize the critical-realist approach, as

"we each adopt an ontology on the basis of our personal experience of the real world and the conventional beliefs of the communities within which we function. As a generalization, nonorthodox economists understand the world in terms of a complex set of underlying causal processes that we cannot directly perceive. Within that, as Post Keynesians, we identify a complex interaction between collective and individual activity that renders these processes indeterminate but not unintelligible or unalterable … As a result, we adopt an open-system methodology that encourages a range of methods in order to build up our understanding of the different causal processes at work in relation to different issues of importance in different contexts" (Dow, 1999, p. 29)

Post-Keynesian economics ultimately relies on beliefs derived from absorbing a sense of our real economic existence, beliefs gained through observations with an understanding of human agency, and with imagination about partial *as if* closures of the various systems examined. This process of combining understandings from different individual real-world experiences is what organically evolves economic science through abductive reasoning processes, of

"*applying pure reason to generalized conceptions of human experience in order to work out what must be the case about social reality for knowledge of causal mechanisms to be possible … contingent on the experience to which the arguments are applied, and our conception of it*" (Dow, 2004a, p. 308).

It is possible given the stabilities within the system, where "*the emergence of the firm, the establishment of posted prices, contracts, rule of law and so on, provide important elements of stability*" (Dow, 2004b, p. 284). While social science knowledge is ultimately uncertain and thus fallible, there are, in addition to these entities that provide some degree of stability, also other epistemic features that compensate for the lack of certainty and exactness, as

"*the advantage the social scientist has over the natural scientist is in understanding, by introspection, the motivation of the subject matter: verstehen, as a source of scientific evidence. The possibility of a priori reasoning on this (albeit subjective) basis has been seen as compensating to some extent for the relative difficulty of testing results*" (Dow, 1983, p. 32).

As will be seen later, there are identifiable methodological intersections in this and the causal-realist approach. These intersections includes similarities in the focus on human agency (human action in causal-realism) as an important starting point in economic analysis. This is later made evident in part five in the analysis of the causes of the 2008 financial crisis.

2.4.3 Human Agency

Critical-realist methodology emphasize individual human agency as a fundamental starting point. One definition describes human agency as

"The capacity possessed by people to act of their own volition. According to social theorists, this capacity is never sui generis. Instead, all agency arises from and is relative to the options made available by a person's position in a wider culture, society, economy, and political system" (Rogers, Castree & Kitchin, 2013).

Human agency is seen as real and indeterminate, as an agent could, in his agency, have chosen otherwise. One implication is how human choice and action, often unintentionally, become reproductive and/or transformative of the current state of socioeconomic affairs and entities at play. The indeterminate and unpredictable nature of agency, due to human creativity, volition, learning, free will, and so on, are reasons why social reality is an open system, meaning outcomes could have been different if agents had acted otherwise, in that "*if under conditions X an agent chose in fact to do Y, it is the case that this same agent could really instead have done not Y"* (Lawson, 1994, p. 517). Human agency ultimately imply intentionality, with agents having goals and wants, and ideas about how to reach and fulfill those. Human agency therefore presuppose intentionality, but also valuations (i.e. preferences) and knowledge of the cause and effect conditions concerning both material and social entities involved in reaching and fulfilling those goals and wants. Tony Lawson makes the analogy that

"acid cannot corrode without materials to break down, nor can a spider set its trap without objects to hang its web on, and so human activity cannot take place without means, media, and resources of some kind - conditions which, through human agency, come to be transformed" (Lawson, 1994, p. 517-518).

Now with social reality not being of spatiotemporally constant conjunctions, as knowledge held changes over time, social knowledge is of the empirical domain. Instead knowledge which enable agency is of the nonactual level, *"at that of structures that govern, but that are irreducible to, events, including human activities, of experience"* (Lawson, 1994, p. 518). Thus, only at the moment of action, can social entities and structures be treated as given, of formal and informal social rules, laws, conventions, institutions etc. At the time of action, agents are variably knowledgeable of these social structure and of entities, which they take into account when performing their intentional goal-oriented actions. Without this knowledge,

"*The human (intentional) activities of speaking, writing, driving on public roads, cashing checks, playing games, giving lectures, and the like would be impossible without such social material conditions as rules of grammar, highway codes, banking systems, and so on.*" (Lawson, 1994, p. 518).

The epistemic virtue in social entities and structures is that both enable, but also restrict human agency, with or without agents being consciously aware of each one involved. At the same time though, human agency is what keeps these entities and structures in place, so if humans were to completely disappear, so too would the social entities and structures. There is a thus a codependent, but not fixed, relationship between them, where social entities and structures only manifests through human activity; they presuppose agency, as in "praxis", in order to be reproduced and/or transformed (Lawson, 1994, p. 520). In contrast, human agency also presuppose social entities and structures to be possible. These notions are the essence of focusing on "real" individual human agency, acting within a given social system. And so,

"*if science (and everyday life) is to proceed, we must rely on belief which derives from absorbing a sense of existence through observation of being in action, combined with imagination, where the individual is regarded as a social (rather than an atomistic) being*." (Dow, 1999, p. 28)

The phenomena to be studied by economist are at its core human economic agencies and their reproduction and/or transformation of the various social entities and structures and their interrelatedness, based on observation, and imagination, informed by understanding of the existing governing non-actual entities within their wider complex and historical open-system setting[19] (Lawson, 1994, p. 524-525).

The critical-realist methodological ideas above builds on the other previously examined epistemological and ontological ideas. In their totality, these together form crucial aspects in critical-realist philosophy as the foundation for post-Keynesian economics. Next, in part three, the same examinatory approach is conducted with regards to Austrian critical-realist philosophy.

[19] Tony Lawson describes here that "*The stipulation that economies must be viewed as dynamic historical processes, is in turn given substance, grounding, and bite, by the critical realist transformational conception of social activity. On this conception, as we have seen, social structures are inescapably geohistorically grounded, being drawn upon and reproduced/transformed through inherently transformative human social activity"* (Lawson, 1994, p. 524-525).

3. The Austrian Causal-Realist Paradigm

This part examines the Austrian economics paradigm focusing on its causal-realist philosophy. A few remarks are given first on the historical origins of it, followed thereafter by a lengthier examination of the ideas that form the causal-realist philosophical foundations underlying the Austrian approach.

The founding of the Austrian school and the causal-realist system of philosophy came about with the Austrian national Carl Menger, who in 1871 published his *Principles of Economics*[20]. Since its founding, the Austrian school is "*one of the few schools of economic thought that has consistently adhered to the postulate of economic realism*" (Hülsmann, 1999, p. 3), where its commitment to philosophical realism reflect several similarities to post-Keynesian critical-realism, with both committed to an ontological world realism, an epistemological process truth realism, and a semantic (i.e. methodological) realism (see Appendix 2). Causal-realism also see objective reality as existing independently from its observer, and social (and economics) aspects must be studied with a focus on qualitative explanations[21], in contrast to quantitative predictions. Causal-realism therefore also focus on what causal connections and processes governs economic life, such as market processes, the discovery and use of knowledge, price mechanisms, monetary systems, entrepreneurship, and more (Boettke et. al., 2016, p. 3).

In the past, notably during the late 19th and early 20th century, the Austrian School was an influential and prominent part of the then economic mainstream. On this, and its ensuing mid-20th century decline, Joseph T. Salerno explains that

"What came to be called the "Austrian School,"—coined as a term of derogation by its German historicist opponents—grew rapidly in prestige and numbers, and by World War 1 theoretical research based on the causal-realist approach was considered the cutting edge of economic theory … By the 1920s, the Mengerian approach had been overshadowed by the partial equilibrium approach of Alfred Marshall in Great Britain, the USA, and even parts of

[20] Carl Menger's *Principles of Economics* was one of three defining and simultaneous works of the marginal revolution where marginal utility analysis and subjective value became core economic science concepts. The other two were French neo-classical economist Léon Walras with his *Elements of Theoretical Economics* (Walras, 2014), who originated general-equilibrium theorizing, and then British William Stanley Jevons with his *The Theory of Political Economy* (Jevons [1871] 1970), also a proponent of mathematical formalism in economics. Carl Menger's understanding of marginal utility centered on how product prices, wages, interest rates, rents etc. were all interrelated economic outcomes in a casually linked system of processes based in individual and real human valuations and actions, where choices are made 'on the margin' between concrete units of goods (Salerno, 2009, p. 2-3). On Carl Menger's contributions, American Austrian economists Peter Boettke highlights that "*Some of the uniquely Austrian concepts that Menger developed include the means-end framework, the relationship between the specificity of goods and their value, and the temporal distinction between goods of higher and lower orders. Menger's emphasis on the temporal element inherent in economic production would be an important distinguishing characteristic of the Austrian school. In addition, Menger stressed the marginal aspect of the value of goods which, in turn, led to the famous Law of Marginal Utility. Menger described an innovative theory of exchange that stressed price formation in the real world as opposed to price determination in general equilibrium. This led Menger to criticize the pricing analysis of his contemporaries, as well as their use of the unrealistic assumption of continuous mathematical functions to describe exchange*" (Boettke et. al., 2016, p. 11).

[21] Uskali Mäki describe that *"most Austrians subscribe to the view that:* ***1)*** *it is the task of economics to provide explanations; 2) explanation and prediction are very different endeavors; and* ***3)*** *Austrian theories are explanatory."* (Mäki, 1990, p. 313)

Continental Europe. Its star fell further with the importation of the mathematical general equilibrium approach of Léon Walras into the English-speaking world in the early 1930s. A little later, the causal-realist paradigm was nearly buried by the Keynesian Revolution. Thus, by the advent of World War 2, there ceased to be a self-conscious, institutionally embedded network of economists actively engaged in teaching and research in the Mengerian tradition" (Salerno, 2009, p. 3).

While a few Austrian contributions where produced following the second world war, such as Ludwig von Mises' monumental treatise *Human Action* in 1949, it was not until after the publication of Murray N. Rothbard's *Man, Economy and State* in 1962, and the receival by F.A. Hayek in 1974 of the Nobel prize in economics[22], that the Austrian school underwent an academic revival. And so, whereas the Austrian approach is practiced less widely today than the neo-classical mainstream is, the Austrian paradigm has, since its founding, seen consistent developments (Salerno, 2009, p. 3).

Similar to how the works by John Maynard Keynes' have influenced both past and present post-Keynesian thought, so too have the works of Ludwig von Mises influences past and present Austrian thought, including especially Mises' contributions to its causal-realist foundation. Through Mises' laborious corrections, extensions, and clarifications on earlier Austrian causal-realist contributions[23], he systematically structured this causal-realist system of thought (see e.g. Mises, [1912] 1953, [1933] 2003, [1949] 1998, [1957] 2007, 1962). An important part of his work includes his development of causal-realist methodology as grounded in what he coined 'praxeology', meaning the science of human action (more in section 3.4.2) (Salerno, 2009). These both philosophical and theoretical contributions by Mises has widely influenced the later works by Austrian economists[24].

3.1 Causal-Realism

Since the time of Carl Menger, Austrians have shared in the notion that economics is a science which studies, and explains, the *causal* connections and the laws that govern economic phenomena as they are in *reality*. Hence the name *causal-realism*. In this sense Austrian economics embodies the study of the *real* governing entities at play in economic systems and their *causal* connections, relations, laws, and so forth. Further, to Austrians, the science of economics has always been concerned with study of human action, meaning the implications of individual human actions and how these originate causal (teleological) connections between them, such as institutions and qualitative tendencies. These approaches Carl Menger initially

[22] Joseph T. Salerno (2009, p. 4-5) notes how it was Rothbard's treatise *Man, Economy and State* (Rothbard, [1962] 2009) that first sparked the "Austrian revival" in the 1970's. Friedrich von Hayek's later receival of the economics Nobel prize in 1974 furthered that revival (Hayek received the Nobel prize for his pioneering work on money and economic fluctuations, and his penetrating analysis on the interdependence between economic and social institutions).

[23] Causal-realist philosophy was initially formulated by Carl Menger (see Menger, [1871] 1976, [1883] 1963, [1883] 1985), and then later by second-generation Austrian thinkers including Friedrich von Wieser and Eugen von Böhm-Bawerk (Wieser is known for originating the concept of opportunity cost; Böhm-Bawerk is known for his capital theory focusing on stages of production).

[24] Students of Ludwig von Mises, including Murray N. Rothbard and Friedrich von Hayek, adopted Mises' praxeological system in formulating their treatises on economic theory, where they also expanded upon it. In recent decades, causal-realist thought has seen advanced in the works of Hans-Hermann Hoppe, David Gordon, American Austrian economist Peter Boettke, and others (Boettke et. al., 2016).

outlined in his *Principles of Economics* (Menger, [1871] 1976) on the causal natures of exchange, value, money, rent, production, capital and time, thoughts he grounded in his causal-realist philosophy given in his *Investigations into the Nature and Method of Social Science* (Menger, [1883] 1985). Austrians argue that the causal connections in place within human economies appears to distinctly abide by a range of regular causal economic laws (again teleological laws, not quantitative empirical laws), laws that are universal and valid for all times and places[25]. According Salerno (2009, p. 2), the meaning of causal-realism therefore originates from Menger's approach, on which Menger himself wrote in his *Principles of Economics* that,

"I have devoted special attention to the investigation of the ***causal connections*** *between economic phenomena involving products and the corresponding agents of production, not only for the purpose of establishing a price theory* ***based upon reality*** *and placing all price phenomena (including interest, wages, ground rent, etc.) together under one unified point of view, but also because of the important insights we thereby gain into many other economic processes heretofore completely misunderstood."* [Emphasis added] (Menger, [1871] 1976, p. 49)

Philosophical aspects of the causal-realist system, including its differences from the mainstream approach, and critiques thereof, are examined in the sections below.

3.1.1 Neo-classical Logical-Positivism and Causal-Realist Critiques

On critiques of the neo-classical mainstream, Austrian economic thought share many of the concerns post-Keynesians have as outlined in section 2.1.1 about neo-classical mainstream economics. For the sake of brevity, these points are be repeated, a selection of arguably complementary critiques by Austrians are instead briefly examined in order to add weight to the argument for an alternative world realist and process truth realist approach.

One realism-based complementary critique of neo-classical logical-positivist deductivism are given by Austrian economist Hans-Herman Hoppe (1995), who explains that the nature of logical-positivist deductivism and empirical testing does not allow any universal and time-invariant truths to be ascertainable, only contingent truths can be uncovered, ones that must be repeatedly tested for verification/falsification. Positivist philosophy holds that history is the ultimate source for empirical knowledge, which ideally is quantitative, and it is against this knowledge that economic hypotheses must be tested. In the mainstream approach, argues Hoppe, it is impossible to conclude anything definitively, such as whether a time-invariable relationship between phenomena do exist, or if does not exist. This is so as any empirically ascertained relationship can and may change at any point in time[26] (Hoppe, 1995, p. 33, 56).

[25] The limitation to claims of universal validity for all times and places are restricted to a potential evolution of the human species it its structure of the human mind (see section 3.3.3), meaning how the human mind perceives the world as governed by cosmological and teleological causality. On these limitations to universality and exactness in economic reasoning see (Mises, [1933] 2003), [1949] 1998, 1962) and (Hoppe, 1995).

[26] In *Live and Dead Issues in Economic Methodology*, Lionel Robbins quotes Arthur Pigou, who in his *Economics of Welfare* explains that "*Even if the constants which economists wish to determine were less numerous, and the method of experiment more accessible, we should still be faced with the fact that the constants themselves are different at different times. The gravitation constant is the same always. But the economic constants - the elasticities of demand and supply - depending, as they do, upon human consciousness, are liable to vary … This malleability in the actual substance with which economic study deals means that the goal sought is itself*

And so, according to logical-positivist thought, economic theory and history must be continuously tested and/or revised, based on empirical sense evidence, since theories and models about causal economic connections, relations, laws, and so on, at any time may be falsified, as their underlying evidence is based on an ongoing historically changing economic process. On this point Salerno (2002, p. 10) adds that "*the intimate relationship between measurement and theory is in reality the vicious circle that ensnares all attempts to invoke positivists precepts in the interpretation of history*". Any variable, any circumstance, including those hitherto unnoticed, may at any point in time change everything about any previously drawn conclusions. Another second critique, and perhaps more destructive critique that Hoppe points out, against logical-positivist instrumentalism and/or empiricism), is that, as logical-positivist claims, only real *observed* experience can be true sources for synthetic statements that describes the real world, and if, as it also claims, that analytical statements are not knowledge about the *real* world, then, inquires Hoppe, what type of knowledge are these claims themselves, that only empirical sense-experience can be of real and true knowledge? Is it a synthetical or analytical proposition? If the epistemological status of this proposition is synthetic, so that only real sense-empirical experience can verify/falsify it, then, by logical-positivist standards, it is a proposition that can never be an apodictically true statement, instead it is will always be a tentative hypothesis that, like all other synthetic propositions, must be continuously tested as to whether it is still a 'true' synthetic proposition (i.e. not yet falsified). The question must also be raised about how one may go about 'testing' it in the first place. The reasoning become circular. If on the other hand is an analytical proposition, then, in line with logical-positivist epistemology, it is proposition that does not reflect *real* knowledge about the world, and thus, in accordance with logical-positivist standards, it is a proposition which is inadequate, unsuitable, and unreliable for building how economic science should be conducted. These two critiques, and critiques in line with those of critical-realists, are to Austrians important reasons for adopting the alternative causal-realist philosophical foundation for economic science.

3.2 Causal-Realist Ontology

Similar to the approach of examining the ontological aspects critical-realism in part two, below are examined causal-realist ontology, on the ideas of including mental entities into economic science; on the necessity of open-system economic theorizing; on 'ultimate givens' in science and its implication for social science; and lastly on the non-deterministic nature of socioeconomic phenomena.

3.2.1 Mental Entities in Social Science

Similar to post-Keynesian critical-realism, Austrian causal-realism is committed to an ontological world-realism. Thus, most economic entities postulated in Austrian theoretical thought, are entities which reflected in reality (Mäki, 1990, p. 315). This also reflects a commitment to semantic (i.e. methodological) realism, meaning "*a literal interpretation of*

perpetually shifting, so that, even if it were possible by experiment exactly to determine the values of the economic constants to-day, we could not say with confidence that this determination would hold good also of tomorrow … In other words, our fundamental laws, and, therefore, inferences from these laws in particular conditions, ***cannot at present be thrown into any quantitatively precise form***" (emphasis added) (Robbins, 1938, p. 350)

scientific claims about the world. In common parlance, realists take theoretical statements at 'face value'" (PES, 2017).

On scientific phenomena relegated to economic investigation, causal-realism, in addition to material entities, also recognize the importance of *mental* entities. In Austrian thought, mental entities are accorded the same status of legitimacy in areas of inquiry. Amongst others, mental entities include that of valuations, intentions, expectations, risk assessments, tastes, knowledge, ideas, and beliefs. In including mental entities, causal-realist ontology allows for a priori synthetic propositions, and not only a posteriori synthetic propositions, about the phenomena studied. A priori synthetic propositions are ultimately theoretical claims that, if sound and true, are universally valid and applicable for all times and places wherein the conditions underlying the propositions are present. An important characteristic of mental entities is that, in being entities 'of the mind', these cannot, unlike most material entities, be phenomenologically observed through sense-observation. But still, in terms of externality and of independence from the scientists' own mind, such mental entities do objectively exist, and they in a very primordial sense impact the individual subjective choices and modes of action of any one person. In contrast to material entities, mental entities helps explain human purposeful/intentional behaviors, as they can be perceived, cognized, and understood, through introspection (i.e. *verstehen*) by other persons on the meaning and reason for such behavior. Mental entities are to Austrians therefore a critical source for economic knowledge, as mental entities are important for interpreting and ascertaining the phenomenological socioeconomic fabric in each *sui generis* (i.e. unique) event taking place, meaning how each historically unique event has come about, and what intended and unintended future consequences it will bring about. Thus, in causal-realism, mental entities, in addition to material entities, take a significant ontic role in the development of economics theory (Mäki, 1990, p. 315-316). The 'ontic furniture' (i.e. what there is) in Austrian causal-realist economic theory essentially relies on individuals and their subjective wants, intentions, choices, actions, beliefs etc., even if these subjective objects are unobservable entities to the human eye (Mäki, 1990, p. 321).

When money, money stocks, interest rates, price levels, purchases, or exchanges of goods are observed, they ultimately lead back to each individuals' subjective and purposeful human actions, where in theories these actions are in a sense aggregated as economic entities based on averages and/or on their causal relations and implications. An example of this aggregation principle is in the statement by Ludwig von Mises where *"the demand for money of the economic community* ***is nothing but the sum of*** *the demands for money of the individual economic agents* ***composing*** *it"* (emphasis added) (Mises, [1912] 1953, p. 131-32).

Mises above statement is an example of an essential causal principle uncovered by microreductionist inference. This process of searching for the 'deeper' essences and their causal connections is a defining characteristic in causal-realist thought. The aim is to explain the different existing ontological objects and beings through processes of phenomenological reduction to explain the more 'fundamental' entities that economic reality is made of. Similarities with critical-realist concepts of empirical, actual, and non-actual domains are evident. In causal-realism, through descriptions at one level, a given phenomenon is reduced to descriptions at a deeper more fundamental level. As the various 'ontic furniture' in economic reality leads back to individual subjective human actions, ones that maintain and/or evolve

social and economic structures and institutions, Uskali Mäki finds Austrian realism to not only embrace methodological individualism, but also ontological (i.e. metaphysical) individualism. The fabric of social reality consists in individual human actions, that when combined, morph into intended and unintended real outcomes. So, summarizing the above, Austrian thought "*can be analyzed as reductive theoretical redescriptions of economic phenomena using ontological identification statements and pursuing ontological unification of apparently diverse phenomena"* (Mäki, 1990, p. 310). Uskali Mäki further interprets Austrianism as a subscription to the combination of ontic subjectivism, as well as ontological objectivism. For Austrians, ontic subjectivism comes from taking individual subjective human actions as its analytical starting point (more in section 3.4.1). Ontological objectivism is based in its common-sense realism. Common-sense realism follows from how common-sense human observation and insight allows for inferential inquiries through introspection of the former subjectively understood (but unobservable) realities within which each individual act (Mäki, 1990, p. 337). At times natural science postulate entities that to the human eye are also unobservable, like magnetic fields, gravity, and quarks, and yet despite those being unobservable, given their explanatory capacities, natural scientists are nonetheless generally convinced of their existence. In a similar reasoning, Austrians postulate that the unobservable mental entities used in their theories are real as well, including those of beliefs, valuations, and intentionality. But unlike natural scientists, Austrians do not infer their claims about the real existence of these mental entities based only on their explanatory capacity, instead these are inferred by their implied existence as part of any real human purposeful action. And so, where neo-classical theory rely on self-*chosen* axioms in their deductivist reasoning, Austrians, as is shown section 3.4.1, rely on the real and self-*evident* axiom of human action.

3.2.2 Open-System Theorizing

A second causal-realist ontological commitment, similar to the commitment in critical-realism, is the view of social reality as being an innately open-system process. Certain conditions about social reality informs this commitment. First, as social reality and the economic processes in it are not isolated from external influences, and as these influences are not constant through time, the extrinsic condition for social reality being a closed-system phenomenon is not met. The intrinsic condition for system-closure necessitate that its internal structures remains constant, and causal-realist ontology similarly claims that this condition is not met either. Without these extrinsic and intrinsic conditions met, any strictly exact and universally true empirical regularities absent any deviations cannot be ascertained when trying to establish predictive propositions about for example future socioeconomic processes and event outcomes. In fact, argues Austrians, in our economic open-system reality, there are no constants (e.g. some exact constancy in monetary movements), instead there are only variables. Austrian economists are therefore highly sceptic of claims of the possibility for quantitative predictions about future. The conditions for a system closure is for examples violated by ongoing legal, political, and economic changes, primarily due to human volition, creativity, free will, and learning, but the extrinsic condition is also violated by the unpredictable future states of our natural surroundings (Hayek, 1964, p. 332-333). Because of the open-system nature and high degree of complexity in economic processes, Austrian theory on money states for examples that money is non-neutral entity. The relations between the quantity of money, of

prices, and of the purchasing power of money, are not invariably constant. Changes in the money supply affects prices on different goods in a dynamic spatiotemporal fashion, where some prices in some sectors are affected to a lesser or higher degree than prices in other sectors[27] (Mises, [1933] 2003, p. 128). Price changes are relative and dynamic, and the distributional consequences from a change in the money supply takes place spatiotemporally throughout an economy. In essence, economic events depends on a voluminous multitude of constantly spatiotemporally changing variables and circumstances, so that it becomes impossible to empirically ascertain them and their degrees of interrelatedness and importance. On constancies in any empirically observed economic regularities, F.A. Hayek explains that

"not only must the ideal of prediction and control remain largely beyond our reach but also the hope remains illusory that we can discover by observation regular connections between the individual events" (Hayek, 1964, p. 343).

Consequentially, economic science must instead focus on descriptive explanatory accounts of economic reality including the nature, the causal relations, and the implications of the 'deeper' and unobservable mental entities. It must give accounts of how these entities function, how they are structured, and how they bring about for example prices, price mechanisms, economic calculation, market processes, economic growth, business cycles etc. Descriptive explanatory theories of a qualitative nature can, to some degree about qualitative tendencies, predict economic outcomes, but not in the sense of quantitative prediction.

In its open-system approach, Austrian economics aim for 'redescriptions of explanada', meaning redescribing some phenomena through its deeper more 'essential' nature. Again this touches on the argument of Austrian economics being an essentialist mode of thought, given its pursuit for redescriptions that gets closer to the deeper 'essence' of some current explanation. The idea of something being redescribed requires some already existing explanation of that phenomena, where the original explanatory description is often cognized by some outward empirically observed phenomenon (Mäki, 1990, p. 320). Essentialism then seek redescriptions of such initial cognition of a phenomena, in the aim of a deeper *understanding* of it and its underlying 'essential' nature. As Carl Menger put it,

"*We have gained **cognition** of a phenomenon when we have attained a mental image of it. We **understand** it when we have recognized the reason for its existence and for its characteristic quality (the reason for its being and for its being as it is)"* (emphasis added) (Menger, [1883] 1963. p. 14).

It was common to blame 'greedy' businessmen when prices on their goods would rise (an explanada), until economic scientists began to better understand the causal connection between how increasing prices were partly related to and explained by a growing money supply (a redescription of explanada). Money was also merely seen as an entity exchanged for something else, where only later economists 'redescribed' it as a medium of exchange, a store of value, and a unit of account, in a broader theory money. Economic objects initially manifested and cognized at the empirical level become redescribed when a deeper level of understanding is obtained, for example of how mental entities like valuation, choice, and action play a role in

[27] For more on the Austrian theory of money and money non-neutrality see *Human Action* (Mises, [1949] 1998), and *Money, Bank Credit, and Economic Cycles* (De Soto, 2006).

the empirically observed phenomenon. This analytical process helps navigate open-system processes, in understanding the deeper 'essence' of an object, being, thing etc., of e.g. an exchange, the nature of a price, an interest rate, value, or consumer and capital goods (Mäki, 1990, p. 320)

3.2.3 Economic Determinism

Determinism asserts regularity in the successions of events. As in the critical-realist epistemology (see section 2.2.3), with the outlined ontological and epistemological differences between natural and social science phenomena, the unbridgeable gab between how measurable movements of inorganic (physical) matter brings about specific conscious volitions in the minds of men, there arise a requirement for some dualistic interpretive classification of determinism in science as a whole. Ludwig von Mises coined his causal-realist dualistic interpretation as *fatalistic* determinism for natural sequences of events, and *activistic* determinism socioeconomic events (Mises, [1957] 2007, p. 73, 81, 90, 93, 177). An account of the reasoning behind this follows below.

To humans, everything in the universe is interconnected, everything is caused by a change to some preceding state, all facts and effects are dependent on an underlying causes. To the perceptive and cognizing human mind, apprehension of something undetermined in the universe is categorically impossible. Everything in a men's external natural environments are fundamentally deterministic, or in causal-realist terminology, fatalistically deterministic. The biological nature of human evolution, and its innate capabilities, are for example shaped through the process of human evolution. In a sense, human evolution is also deterministic. The human body and its faculties are, in the wider sense, evolutionarily determined by its past influences and environments. But this natural fatalistic determinism ends where the human consciousness begin.

In the sociophenomenological sphere, conscious human choices and actions are resultants of the ideas and values that men have been exposed to. Men borrow ideas, sometimes they originate entirely new ones, and through those, they adopt and change their choices and actions if they discover that other actions or habits are superior for reaching their sought ends. Humans, unlike inorganic matter, can change their actions accordingly (Mises, [1949] 1998, p. 47). This (teleological) causation, by humans imposing their will through applying means, brings about change, small or big, on the surrounding natural world, it interferes with cosmic becoming (Mises, [1957] 2007, p. 73-74). Human action, therefore, is deterministically different from fatalistic determinism, it is an activistic determinism, it is conscious will, where

"if you want to attain a definite end, you must resort to the appropriate means; there is no other way to success … activistic determinism is a call to action and the utmost exertion of a man's physical and mental capacities (Mises 2007, 177).

With these conceptions of fatalistic and activistic determinism, Murray N. Rothbard for example critique Milton Friedman's instrumentalist idea of natural and social science being studied by the same methodological procedures (Friedman, 1953). The unfoundedness in this claim, Rothbard points out, is that *"Positivists rests their case on misleading analogies from the epistemology of physics"* (Rothbard, 1957, p. 2). The problematic view in this is how (fatalistic) natural inorganic matter and (activistic) social conscious matter are studied as if

both share the same fatalistic deterministic nature. As human subjective preferences, goals, and knowledge changes constantly, by creativity and learning, social matter makes *"facts of human history non-repetitive, complex and resultant of many causes"* (Rothbard, 1957, p. 2). In the social sphere, in the events of human economies, no *empirical* constancies can be ascertained[28]. Friedman's methodological instrumentalism is unfit for handling economic phenomena[29], as

"Each historical event is not simple and repeatable, each event is a complex resultant of a shifting variety of multiple causes, none of which ever remains in constant relationships with the others – every historical event is heterogenous, and thus cannot be the base of testing theories or constructing laws of history, quantitative or otherwise, which require constant homogenous entities – there are similarities, but no homogeneity" (Rothbard, 1976).

Thus, without assuming constancy in all social affairs, positivism is inappropriately applied. The economic scientist, when adhering to positivist philosophy, would implicitly presume his own knowledge as constant through time, but this presumption invalidates his own mind being critically 'free-thinking'. If he does not presume such, if he ascribes himself consciousness, but then not to his subjects of inquiry (i.e. other people), his proposition becomes self-contradictorily. There are innate issues with positivist premises in handling conscious matter phenomena. Mises explains that the human mind cannot perceive itself as (fatalistic) deterministic in this way, it would invalidate any and all intentionality in actions taken. The conscious mind is necessarily prior to a cognitive reflection about whether human action itself is deterministic in nature. And so, to avoid this issue, causal-realism assigns an activistic determinism to human consciousness, in their intentional actions taken. Causal-realism acknowledge the fatalistic (i.e. unconscious) determinism in natural cause and effect regularities, but also the activistic nature in human causal (i.e. teleological) actions (Mises, 1957, p. 177-180).

And so, humans act within their innate restrictions and the confines put on them by their natural surroundings. But, within this setting, their actions are 'activistic', not 'fatalistic', and so action is *another* primordial source for real and invariably unpredictable cosmic change (Rothbard, 1976). Economists cannot predict and know the future contents and outcomes of any human actions, just as they cannot predict their own future state of mind, of valuations and ideas, and the resultant actions those will bring about (Hoppe, 1995, p, 45). In fact, "***only in one respect can acting be constant: in preferring the more valuable to the less valuable****. If the valuations change, acting must change also. Faithfulness, under changed conditions, to an old plan, would be nonsensical."* (emphasis added) (Mises, [1949] 1998, p. 103).

Neo-classical logical-positivism is unfit for sound economic reasoning, as *"the process of discovering whether some propositions is true or not – is different in one field of inquiry than*

[28] Austrian Guido Hülsmann explains on the absence of constancies in human affairs that *"the invention of new ideas again and again changes the way human beings act under otherwise equal circumstances. As a consequence, there are no constants but only variables in human action. The very existence of the innovator prevents any attempt to establish regularities of what human beings choose … man is free to change his mind and act in a different way under otherwise equal conditions"* (Hülsmann, 1999, p. 12-13).

[29] The Austrian opposition to positivism (e.g. instrumentalism) is that where *"many instrumentalists present predictive success as a defining feature of scientific economics, Austrians deny this and seek to expose the radical limits to predicting human affairs*" (Mäki, 1990, p. 312)

in the other" (Hoppe, 1995, 13). Prescribing positivist philosophy to social science ultimately means an epistemological monism between natural and social science, meaning the same approach. But as natural and social science phenomena are, as demonstrated, distinctly different, invoking an epistemological monism in science is an inconsistent and faulty conclusion. This inconsistent interpretation of determinism in the events of the unconscious and fatalistic physical realm, and the events in the mental/conscious activistic social realm, is why causal-realist epistemology adopts an epistemological *dualism*, meaning it relies on a different epistemology for studying social phenomena, than logical-positivist epistemology. This epistemological dualism is explored in the sections below.

3.3 Causal-Realist Epistemology

Causal-realist epistemology centers on core ideas examined below, including the concept of an ultimate given in science; of how knowledge is cognized through the logical structure of the human mind; and last, based in these first ideas, the necessity for an epistemological dualism between natural and social science, as also demonstrated in the last section on economic determinism.

3.3.1 Ultimate Givens in Science

The concept of an 'ultimate given' in science has an important explanatory role for causal-realist epistemology, which ultimately translates into methodology. The concept helps to elucidate the critical distinction, or the split, between the distinct natures and contents in natural and social science knowledge.

The progress of scientific reasoning always seeks to go further in its explanations, "*until it reaches a point beyond which it cannot go*" (Mises, [1933] 2003, p. 29). Such a point, at which science can go no further in its explanation about a given phenomenon, is an *ultimate* given, a given about something which is yet to be explained. Such ultimate givens will inevitably always exist, even as science expands its collection and categorization of knowledge, points at which scientific explanation cannot yet go beyond. Ultimate givens signify the outer edges of science with regards to what can be explained and what cannot, and they remain until new discoveries push these frontiers, whereby new ultimate givens necessarily will emerge as the new outer edges. Causality and finality in the universe can never be exhausted by scientific reasoning. An example is that of atomic particle theory in physics (Mises, 1962, p. 23, 35, 53; Mises, [1949] 1998, p. 17). It is known that atoms forms into molecules, into elements, and so on, and their structures are also known. But the underlying causal forces and the regularities steering these atomic particles, are yet fully known, from there physics cannot go further (quantum physics have opened up some new frontiers, but the point remains). The theory of atoms is an ultimate given in physical science until new and more final knowledge comes about, the timing of which is unknown.

The ultimate given emphasized by causal-realists is the inability by science to explain at the present which movements in physical matters causes men to take particular courses of action over other courses available to them. Mises explains the issue succinctly,

"we explain a phenomenon when we trace it back to general principles. Any other mode of explanation is denied to us. Explanation in this sense in no way means the elucidation of the final cause, the ontological basis, of the being and becoming of a phenomenon. Sooner or later

we must always reach a point beyond which we cannot advance. ***Thus far we have been unable to succeed in grasping in any way the relationship that exists between the psychical and the physical****. We are not at present in a position to provide any explanation of it in terms of general principles. Hence,* ***in spite of the unity of the logical structure of our thought, we are compelled to have recourse to two separate spheres of scientific cognition: the science of nature and the science of human action****. We approach the subject matter of the natural sciences from without. The result of our observations is the establishment of functional relations of dependence. The propositions concerning these relationships constitute the general principles by which we explain the phenomena of nature. Once we have constructed the system of these principles, we have done all that we can do. In the sciences of human action, on the other hand, we comprehend phenomena from within. Because we are human beings, we are in a position to grasp the meaning of human action, that is, the meaning* (i.e. mental entities) *that the actor has attached to his action. It is this comprehension of meaning that enables us to formulate the general principles by means of which we explain the phenomena of action"* (emphasis and parenthesis added) (Mises, [1933] 1978, p. 137-138).

Natural phenomena and social phenomena are examined and cognized differently in the human mind; they are grasped in widely distinct ways. How the successions in natural processes bring about specific social outcomes like thoughts, valuations, choices, and actions, has not yet been established by science. It is scientifically an unbridged knowledge gap. And so, human action as a social phenomenon, is to science an ultimate given, where therefore actions are at the present *"final causes that can be accepted without further explanation"* (Kirzner, 1976, p. 177). In the study of human action, of teleology, the fact that humans in their actions employ specific means to reach their sought ends, is an ultimate scientific given, which in this case is one critical to the science of economics (Mises 1998, 18, 25). The reason is that connection between the physical and the mental is simply not yet known, to which Mises therefore declare,

"as long as we do not know how external facts—physical and physiological—produce in a human mind definite thoughts and volitions resulting in concrete acts, we have to face an insurmountable methodological dualism. Reason and experience show us two separate realms: the external world of physical, chemical, and physiological phenomena and the internal world of thought, feeling, valuation, and purposeful action. ***No bridge connects—as far as we can see today—these two spheres****"* (emphasis added) (Mises, [1949] 1998, p. 18)

Science are at a loss of establishing which natural causes (e.g. neurophysiological processes) that cause a man to value French wine over Italian wine, or what causes his mind to change at a later time. To different people, identical events often result in unique understandings, valuations, and ideas, and therefore in turn actions. To one, identical events, but at different points in time, also often lead him to take different actions. Aiming for quantitative relations and predictions in economic affairs is therefore pointless, according to causal-realists, this task is relegated to the speculators and to the statistical historians (Mises 1962, p. 59, 62, 116, 125). Science for now only knows that human beings do in fact act, but it cannot be explain why, especially not by recourse to the natural sciences, including for what reasons they value and choose particular courses of action over others. Human action is, for the time being, a point of finality. It is an ultimate given in science.

3.3.2 Epistemological Dualism

With the unbridged knowledge gap between the natural and social sciences outlined above, an alternative epistemological grounding for economic science is needed than positivism given its inability to reliably establish universally true and exact causal relations and laws between economic entities. Adopting an alternative epistemology than that in positivism implies at least an epistemological *dualism* in science between natural and social inquiry (the same conclusion was made in critical-realist epistemology). The current monism (i.e. neo-classical economics adopting positivism as used in natural science) has misguided the economic science along the problematic path of prescription and quantitative prediction (i.e. event truth realism) over description and qualitative explanation (i.e. process truth realism). The natural scientist examine the observable and measurable constancies at play in the succession of natural external events, stimuli and response patterns, the same method neo-classical economists adopts for their analyses. With its alternative epistemology, the Austrian causal-realist economists instead studies what (empirically unobservable) mental entities and a priori categories are involved in human action, no matter the time and place. These mental entities and/or economic categories are then used in analyses of how individuals employ scarce means in order to reach their sought ends. Natural science and social science epistemology are widely different in their natures and contents (Mises 2007, 5, 8, 11). It cannot be rejected that in the future, some almighty and omniscient being may know of the relationship between how physical events bring about specific human valuations, choices and actions. For the time being, however, this potential future knowledge is irrelevant to current economic science. Economic science must settle with what is currently known, that of human action being at present an ultimate given.

Adopting epistemological monism in science is by no means a necessary given and an established scientific fact[30]. As pointed out by Lionel Robbins,

*"There could be no worse example of apriorism in methodology (*i.e. philosophy*) than the calm assumption that what may be true of one branch of knowledge is necessarily true of others, without detailed examination of the body of knowledge which it is desired to classify"* (parenthesis added) (Robbins, 1938, p. 348).

In classifying the epistemological nature and content of social science knowledge, Mises is quite explicit when arguing for a dualism between natural science and social science, since social science

"*has a rather unique logical and epistemological nature. In distinct contrast to the natural sciences it is not based on observation or any other information gathered through the human senses. It relies on insights about certain structural features of human action, such as the fact that human beings make choices or that they use self-chosen means to attain self-chosen ends. The validity of economic theory does therefore not stand and fall with empirical investigations. Rather, economic laws are a priori laws that cannot be confirmed or refuted by the methods predominant in the natural sciences. They exist independent of the particular conditions of time*

[30] The logical-positivist philosophers of the Vienna Circle argued for this monistic unity in science, in contrast to a dualism or a pluralism. Already in the early 20th century did philosophical debates take place between these logical-positivists and the causal-realists (Boettke et. al., 2016, p. 18)

and place, and the social scientist comes to know them through pure deductive reasoning" (Mises, [1933] 1978, p. ix-x).

Economic laws are a priori laws, that exist independent of time and place, meaning they are universally true and exact laws. They are given by the a priori economic categories brought about by the structural features in all human action. It is this very condition, that people with their thinking, valuation, resultant choices and *actions* – conditions which cannot be explained by the use of natural science methods – that severs any current understanding of how the movements of physical matter leads to particular mental contents in the mind. And so, for economic epistemology,

"as long as we do not know how external facts—physical and physiological—produce in a human mind definite thoughts and volitions resulting in concrete acts, we have to face an insurmountable dualism. Reason and experience show us two separate realms: the external world of physical, chemical, and physiological phenomena, and the internal world of thought, feeling, valuation, and purposeful action. No bridge connects—as far as we can see today—these two spheres." (Mises, [1949] 1998, p. 25)

The traditional epistemologies of logic, and of natural science, are entirely incapable of analyzing the underlying causal economic laws, the regularities, and the connections, brought about in the real world from the categories and structures involved in human action. As Mises states

"The discovery of a regularity in the sequence and interdependence of market phenomena went beyond the limits of the traditional system of learning. It conveyed knowledge which could be regarded neither as logic, mathematics, psychology, physics, nor biology" (Mises, [1947] 1998, p. 1).

Economic knowledge has its own epistemological status, it is 'experienced' in a distinct way than that of sense-experience relied on in natural science. Epistemological dualism therefore

"starts from the premise that there are two types of experience. One is an external experience through which we grasp objects and events of the exterior world. The empirical sciences—thus above all the natural sciences—start from here. Then there is inner experience, of which there are two: intuitive understanding and intellectual conception of evident processes. The conception of human actions falls into the latter category" (Mises, [1933] 1978, p. xliii-xliv).

Economic science must formulate and rely on the epistemological status and content involved in such introspective intellectual conceptions of the evident processes involved in human action, and based on this formulation, it must then outline the methodological system suited for this analytical approach. The epistemological status of economic science knowledge necessarily deals with the logical structure of the human mind that human action springs from, this is studied in the following section. The approach for dealing with this type of knowledge, is outlined in the Austrian causal-realist methodological system of praxeology, the science of human action (Mises, 1962, p. 20-22, 41).

3.3.3 The Logical Structure of the Human Mind

Human action brings about external change through the ideas held and applied by people. These actions are guided by the underlying and universally shared logical structure and causal (i.e. *teleological*[31]) a priori categories of the human mind. In our current evolutionary state, each human being is equipped with, and shares, a particular logical structure of the mind. The logical structure of the human mind has unique faculties allowing for perception, cognition, reasoning, imagination, comparison, abstraction, classification, reflection, valuation, choosing, and others. It is through these different human faculties that action is brought about to manifest itself in real social outcomes. This shared structure and the features of the human mind, is integral to what defines a human being. No human being can even conceive of a logical structure at variance with his own. For this reason, Ludwig von Mises describe humans as *homo agens*, essentially meaning the *acting* animal (Mises, 1962, p. 5) (Mises, [1949] 1998, p. 13, 24), and thus the causal-realist conception of a human actor takes different starting points than the neo-classical stylized homo economicus does. The logical structure of the human mind is what enables men to engage in their purpose-oriented actions, and as they share in this structure, it allows one man to understand, through introspection into the nature of intentional action, the purposes behind actions taken by other men.

Through the ages, even the causal relations in physics considered constant will, on at least some infinitely small scale, undergo constant change, as everything is in cosmic flux. But science in general, and especially social epistemology, must, as a fundamental and primordial fact, consider the innate a priori structure of the human mind as a constant feature shared by all humans (until human evolution potentially changes this structure in some unknown future). If this structure is not taken as a shared feature, the faculties of human perception, cognition, reasoning, imagination, comparison, and so forth, then science would have no common logical starting ground for reasoning towards some consensus. German and American scientists, French and Dutch bakers, the Japanese martial artist, Napoleon Bonaparte, Shakespeare, the Queen of England, all these and every other person share in this logical structure of their minds, even if their political opinions, their tastes in food, or any other valuation may vary completely. If the human logic mind are not considered as the constant in all science, it would be impossible to talk about the human intentions about past events, or talk about future potentialities (Mises 1962, p. 19, 49) (Mises, [1949] 1998, p. 22). Without a constant logical structure, no person could cognize sequence or regularity in anything. If the structure of the mind changes, all reality would be in chaotic flux, and it would be impossible to know about cause and effect relations to intentionally interfere with to bring about a given sought state of affairs. With everything in a constant chaotic flux, with no succession in cause and effect outcomes, then perception, reasoning, argumentation, economic exchange, production, or another other type of active human interference, would be impossible, nothing would have meaning (Mises, 1962, p. 1). In essence, equipped with their a priori logical structure of the mind, in addition to their senses, humans perceive, understand, and interact with their external world. The minds logical

[31] According to Mises, human action is teleological. This conception is based in the presupposition that all action is caused, and governed, by the existence of any persons own chosen ends. Individuals choose what they believe are the most appropriate means for achieving a sought end. Teleology a category of causality, as "*no action can be devised and ventured upon without definite ideas about the relation of cause and effect, teleology presupposes causality*" (Mises, 1962, p. 7).

structure and the human senses precede any reasoning and experience. But a man also relies on his past experiences, as experience is new knowledge (that may err), about where and how he must interfere with his surroundings to achieve a particular valued end (Mises, 1962, p. 17, 49). Austrian causal-realist philosopher David Gordon writes, *"the logical structure of the human mind is categorically shaped so that it is by its structure that knowledge is gained, and not experience that shapes its structure"*, a point Mises also made, that

"the human mind is not a tabula rasa on which the external events write their own history. It is equipped with a set of tools for grasping reality. Man acquired these tools, i.e., the logical structure of his mind, in the course of his evolution" (Mises, [1949] 1998, p. 35).

To understand the causal relations, the laws, the various structures, institutions, and so forth, in human economies, economic science must begin its analysis with the given that humans share the same logical structure of mind as well as senses, through which they each grasp the features of reality. In their endeavors, humans act with intentional purpose, based in these shared structural features and the various categories implied in action itself. And it is from these individuals, but interrelated actions, that human civilization have developed into what we now conceive of as nations, states, and classes, and into exchange relations, monetary systems, price mechanisms, capital accumulation, national income accounting, banking institutions and so on. Such social and economic entities and historical phenomena can only be understood in a recourse to the underlying actions that forms them. As such, to causal-realists, human action is the methodological starting point for economic science and the construction of theories.

3.4 Causal-Realist Methodology

Causal-realist methodology is given in the system of praxeology, the terminological definition of which is the science of human action (i.e. the logic of praxis). Praxeology is a process that relies on verbal logical-deductive, which comes with its own unique starting point in the ultimate given of human action. The conception of human action, and that of the Austrian process of praxeological deduction, are examined in the last two sections of this part three.

3.4.1 Human Action

Austrian economists, in constructing theory grounded in causal-realist thought, rely on a processes of verbal logical-deductive reasoning, processes which takes starting point in what is defined as the self-*evident* axiom of human action[32]. The axiom of action states simply that *human beings act purposefully*. Sometimes the statement is extended to say *human beings act purposefully applying their scare means for achieving sought ends* (Stolyarov, 2006) (see also Robbins, 1932, p. 15). Purposeful in this sense implies conscious action, in contrast to unconscious knee-jerk reflexive behavior[33]. To 'proof' the axiom of action as the methodological starting point in Austrian economics theory, the reasoning take the premise of human existence as real. Human existential reality can be stated in two self-*evident* axioms,

[32] For a lengthier discussion on the reasoning behind using human action as the starting point in economic theorizing, see *The Ultimate Foundations of Economic Science* (Mises, 1962).

[33] Famous sociologist Max Weber also saw purposeful conscious action as the foundation for building social science knowledge. To Weber, conscious action was very distinguishable from unconscious action (PES, 2015). The distinction is e.g. between unconscious reflexive knee-jerk behaviors, and the consciously intentional actions of drinking water to reduce thirst.

first that; *existence exist* (Mises, 1962, p. 17). It is the same as saying reality exist, the core ontological premise on philosophical realism. Humans know that *something* exists, in contrast to *nothing*. The second axiom states; *the mind exists.* In any scientific reasoning, this human logical mind must, as already explained, be taken as a structurally constant entity. Monologism classifies the structure of the logical mind shared by all men, not a polylogism. Regarding the axioms, any arguments made denying their truth will, necessarily, confirm their validity, as arguments takes place in the mind, and human minds very much exist in reality. Finishing the 'proof', the first mentioned axiom of action, which Austrians deem highly relevant to the science of economics, stated that; *human beings act purposefully*. All purposeful (i.e. conscious) human action is, as described in the previous section 3.3.3, a social phenomenon which is ultimately grounded in and brought about through the structural faculties of the human logical mind, including, but not limited to; perception; cognition; reasoning; imagination; abstraction; classification; reflection; valuation. These are all types of actions that assist in the materialization of real-world human impactful activity. Attempts at disproving the axiom of action, as it was the case with the other two axioms, necessarily confirms its validity – attempts at disproving it are purposeful actions themselves, actions with a goal in mind (the disproof), by applying means (logical reasoning) (Stolyarov, 2006). Mises explains the action axioms validity for constructing economic theories from it, as

"He who wants to attack a praxeological theorem (i.e. economic theory deduced from the axiom of human action) *has to trace it back, step by step, until he reaches a point in which, in the chain of reasoning that resulted in the theorem concerned, a logical error can be unmasked. But if this regressive process of deduction ends at the category of action without having discovered a vicious link in the chain of reasoning, the theorem is fully confirmed"* (parenthesis added) (Mises, 1962, p. 71).

In combining these three axioms, it can be simply stated that; *man, equipped with his mind, acts in existence* (Mises, 1962, p. 35) (see also SEP, 2014). This presentation of 'proof' was but a brief summary of the wider causal-realist philosophy arguing for the axiom of human action as the fundamental theoretical starting point for economic science.

Contrasting in ways the Austrian use of the self-*evident* human action axiom, neo-classical economics adopts idealistic self-*chosen* axiomatic starting points, such as the stylized axiom of perfectly rational and fully informed economic actors, and the axiom of general-equilibrium. For Austrians, nothing calls for the use of self-*chosen* axioms and unrealistic auxiliary assumptions. With the soundness of the self-*evident* nature of human action, the ultimate catalyst for any and all social phenomena, this starting point is a much stronger one, as it is rooted in *real* human action, and not a highly abstract and stylized version of it used for mathematical convenience (Mises, 1962, p 4). In the next section are outlined examples of how Austrians use praxeological reasoning to develop economic theory, not through the use of logical-positivist mathematical deductivism, but instead through verbal lines of logical-deductive reasoning. To study, understand, and develop theories about economic entities and phenomena, from the Austrian approach described so far that is based in action, Austrian economists work within the methodological system of *praxeology*, the science of human action.

3.4.2 Praxeological Deduction

In *Epistemological Problems of Economics*, Mises argues the Austrian view of economic science as a deductive science (Mises, ([1933] 2003). It begins its deductions from the axiom of human action, which, as explained in section 3.3.1, is an ultimate given that, at least for now, is without any deeper and more final causal explanation. Inductive quantitative methods, like positivism, was described as deemed unfit for sound economic theory[34]. Focusing instead on deduction, of deducing economic theorems by the implications of human action, descriptively, with qualitative explanations, Austrians view as the proper method, as human action is both the ultimate beginning and end of all economic activity that economic science studies (Mises, 1962, p. 34, 43). Intended and/or unintended outcomes are examined from human action as the starting point, including theories of production, consumption, exchange, prices, market mechanisms, employment, savings and investments, economic growth, the emergence of formal and informal economic institutions like money and banking, of interests, inflation, and so forth[35]. Through logical deductions (i.e. praxeological deduction, not mathematical deduction), it is possible to establish descriptive explanations about such entities and causal laws that governs and influence their paths as economic processes and outcomes. Such theoretical explanations are developed through studying human action within settings of personal exchange (i.e. Crusoe economics[36]) and interpersonal exchange (i.e. catallaxy) as both direct and indirect exchange systems (i.e. barter and money systems).

At its core, praxeology very much entail the study of human action. It studies *real* human action taken by *real* people, meaning with all their faculties, their faults, their limits, powers, weaknesses etc. As Mises in his *Human Action* treatise explains,

"*Economics deals with the real actions of real men. Its theorems refer neither to ideal nor to perfect men, neither to the phantom of a fabulous economic man (homo oeconomicus) nor to the statistical notion of an average man (homme moyen). Man, with all his weaknesses and limitations, every man as he lives and acts, is the subject matter of catallactics (i.e. economics). Every human action is a theme of praxeology*" (parenthesis added) (Mises, [1949] 1998, p. 646-647).

Austrians do not affix to economic actors any abstract and unrealistic features as neo-classical methodology does, like perfect optimization and full information. Another aspect is that, in

[34] The reason positivist empirical sense-based methods are unfit, is that economics "*is concerned with both visible matter and invisible choices and intentions. But it is primarily concerned with choices and intentions, and deals with matter only incidentally. And the knowledge we possess about choices and intentions is derived from sources other than the human senses. It is therefore not empirical knowledge, at any rate, not empirical in the same sense in which the knowledge we gain through watching, listening, smelling, and touching is empirical*" (Mises, [1933] 1978, p. xlv-xlvii).

[35] The entirety of Austrian economic theory developed through praxeological deduction is too vast to cover here, it defies any brief summary. For such detailed expositions, of theory deduced logically from human action, see the treatises *Human Action* (Mises, [1949] 1998) and *Man, Economy, and State* (Rothbard, [1962] 2009).

[36] Robert Nozick explain Crusoe economics as "*the theory of Crusoe's interaction with the inanimate and nonhuman animate environment. Crusoe faces scarcity, allocates time and resources to some uses and foregoes others, does what he prefers, satisfies the principle of diminishing marginal utility, exhibits time-preference, saves from current consumption to increase future consumption, and so on. Crusoe theory will include the theory of individual decision under risk and uncertainty. It will talk of various dimensions, such as actions, alternatives, expected consequences, estimates of likelihoods of expected consequences, and expected utility*" (Nozick, 1977, p. 354)

studying real people and their actions, Austrians are not concerned with the particular circumstances and the details that has *resulted* in particular courses of action. Such details are relegated to the field of psychology and to historical study of each past unique events. Praxeology is concerned with the content *in* an action itself, that is, what is universal to action in general, what is implied in it no matter where and when it occurs (Mises, [1949] 1998, p. 39, 44, 646) (Mises, 1962, p. 50). So, the primary question for theory is not *"Why did this person do what he did?",* but instead "*What are the objective consequences of this action?*" (Mises, [1933] 1978, p. xlviii). Economic theory must answer the latter in generalized terms, not on a case by case basis. Economic history studies events on a case-by-case basis, about why one or more actors did what they did given their unique circumstances, and what the unique outcomes were, as historical explanations informed and guided by pre-established theory. Theory enables an understanding of history, not vice versa.

Critics of the Austrian praxeological system and the focus on human action deems it as essentially psychology. But this is not true. In fact, praxeology begins where psychology ends. Psychology ask what caused a man to act in this way, meaning it studies what came before an action (mentally, not physiologically). Praxeology take human action as given, and then it studies its consequential implications (Hülsmann, 1999, p. 4). Action can be altruistic or egoistic, materialistic or idealistic, it can be moral or immoral, but economics is not concerned with the origins of these motivations or a persons' goals (psychological or physiological). Economics only studies *"the fact that men have goals and act in order to attain them – not the origin of these valuational choices"* (Rothbard, [1976] 2019). Praxeology therefore entails a positive economics, it does not make normative statements about whether an action was e.g. right or wrong, good or bad, or moral or immoral. To Austrians, economic theory can only explain whether the means being applied in a given course of action, are in fact the suitable means to achieve the ends sought. Should the money supply for example be increased, or should it not, if the aim is to increase national productivity. Economics is studies the fact that people have goals, and that in seeking their goals, people introduce real change through their goal-oriented activities.

Praxeology proceeds from the idea that sound and exact theory is necessarily revealed through *verbal* (not mathematical) logical-deductive reasoning. Theory is then applied when interpreting the historically unique and nonrepeatable economic event. Austrians argue that these theories are, due to the nature of deductive reasoning, universally true and exact, as *"the validity of these laws—or, better yet, their truth—can be established with certainty by praxeology, a science based on the universal experience of human action that is logically anterior to the experience of particular historical episodes"*. Given this, Austrians see economic science as an a priori science, by the epistemological status and content of human action being logically anterior to any particular unique economic event. A priori theorems are not subject to empirical verification and/or falsification in the sense of positivist claims for knowledge to be about the *real* world. Economic theorems precede any comprehension of economic reality itself (Mises, [1949] 1998), p. 26, 32, 34) (Mises, 1962, p. 4, 6). Austrian praxeological deduction allows for the construction of sound, exact, and universal true and time-invariant theorems (see e.g. Hoppe, 1995). Mainstream mathematical-deductivism is as such seen as highly problematic, it emulates a closed-system analytical tool, and relies on "*the*

application of high-powered statistical methods to the analysis of quantitative relations within economic data" (Salerno, 2002, p. 8). It reflects the view that economic history is the true and only 'laboratory' in which theory can be revealed and tested. Where the neo-classical economist rely on historical data to develop his theory, the Austrian economist rely on theory that is deduced a priori, with which he accounts for the historical a posterior observed data. Austrians treat the observed economic data as consisting of highly unique, dynamic, and complex aggregated historical outcomes, all leading back to actions taken by individual people (Salerno, 2002, p. 7). In economic affairs no constants exist, only variables, and so economic lawlike theories cannot be identified by high-powered statistical regressions and testing, each human action is a nonquantifiable entity based in continuously changing individual values and goals. Praxeology deduces theories about the many various economic entities that surrounds and ultimately arises from human action. It studies their causal connections, the causal laws governing them, the processes they are involved in, and the tendencies they set in motion. By this approach, the praxeological method does not disregard the importance of economic a posteriori quantitative data, for example of money supplies, prices, outputs, and employment numbers. These data-types however are handled differently. They are, based on a priori theory, interpreted in their historical setting in conjunction with the motivations and the actions of those who contributed to their formation. This is the process of using economic theory to explain the empirically observed economic data and to give historical accounts of their origin. According to Mises,

"*History is the record of human action. Human action is the conscious effort of man to substitute more satisfactory conditions for less satisfactory ones. Ideas determine what are to be considered more or less satisfactory conditions and what means are to be resorted to to alter them. Thus, ideas are the main theme of the study of history*" (2007, p. 224-225).

And ideas and how they manifest themselves into human action are, as was described earlier, an ultimate given for economic science. Ideas are primordial facts; they have no physiological explanation.

For illustrative purposes, some initial key implications logically deduced from human action, are presented here, to inform the reader with a sense of how the Austrian praxeological method proceeds. The starting point is that human action is conscious, it is *purposeful*. Such purposeful actions flows from, and directly reflects a person's individual *valuations*, sometimes also referred to as *judgements*, *preferences*, or *scales of value*. The extension of individual valuations is thus that human action is aimed at attaining some definite end or goal. As action is conscious will, it means a *choice* between incompatible ends, like eating, playing, or engaging in labor. Action is also alteration, it is *exchange*. It is exchanging some current state of affairs for another. The renounced ends sought are the *cost* for the ends sought, and the attainment of that end brings a person a psychic (or economic) *profit* if it is successful, or it brings psychic (or economic) *loss* it if is unsuccessful (Rothbard, [1962] 2009, p. 1-2). To attain a sought end, an acting person must in the process employ some type of *means* (economic goods), and these means must be *scarce*. Without scarcity, those means would be in superabundance, and they would instantly be available anywhere, and at any point in time (e.g. as air generally is). No economizing is necessary on superabundant means, these become general conditions of human welfare. For there to be a scarcity in means, means must be limited

in relation to the ends sought where they are applied (Mises, 1998, p. 100-101). In all human action there is *uncertainty* involved, and so, any action may result in either profit or loss. Uncertainty also imply the possibility of *error*, meaning that knowledge, or any actions taken, may be erroneous towards the sought end. The anticipation of what actions other people will take, the anticipation of one's own future preferences, and the anticipation of the successions in natural events, may all be erroneous (Mises, 1962, p. 8, 47, 50-51). And uncertainty is not bounded, *"Even in short-run activities this uncertainty prevails. Nobody can know whether some unexpected fact will not render vain all that he has provided for the next day or the next hour"* (Mises, 1962, p. 51). If uncertainty did not exist, if people were fully certain about their future, meaning they would be omniscience about all things, then they would have no volition to act, for if the future was certainly true, then no action could change the future course of events (Mises, 1998, p. 105). But people are not omniscient beings, they may even adopt a course of action that results in total error with regards to their goals. It is the fundamental uncertainty in all things about the future that inspires people to act, as they seek to interfere with the currently expected succession of events, either natural or social, to instead achieve a more satisfactory future state of affairs. Action also always takes place through *time*[37], where ends can only be reached in some either close or distant future. Due to humans being mortal beings, time is also always a scarce means to be economized, meaning that in any action time will always be a scarce factor. Besides some felt dissatisfaction with current affairs, action also require some *idea* (or knowledge, recipe) in a person's mind about how to bring about a better state of affairs. Without ideas, whether they are fit or unfit, no person can initiate a course of action (Rothbard, [1962] 2009, p. 3).

Through praxeological reasoning starting with the simple axiom of action, it has been shown how, through praxeological verbal deductions, how Austrians uncover the economic categories implied in all action, of *purposefulness, value, choice, exchange*, *cost, profit, loss, means, uncertainty, error, time,* and *ideas*. In any human action, no matter the time and place, these praxeologically uncovered categories implied in action, will always be true. They are not theories that need to be 'tested', they are unequivocally implied in action itself. Economic laws, like the law of marginal utility and the law of comparative cost, are laws that are then later deduced based these categories, and where for the latter, two or more persons engage in interdependent exchange relations[38]. In order to 'steer' the deductive process towards what is

37 Murray N. Rothbard explains, on the relation between action and time, "*the fundamental and constant truth about human action is that man prefers his end to be achieved in the shortest time. Given the specific satisfaction, the sooner it arrives, the better. This results from the fact that time is always scarce, and a means to be economized. The sooner any sought end is attained, the better. Thus, with any given end to be attained, the shorter the period of action, i.e. production, the more preferable for the actor. This is the universal fact of time preference*" (Rothbard, [1962] 2009, p. 15)

38 Hans Herman-Hoppe gives other examples of a priori economics laws "*necessary facts and relations" in economic processes. Hoppe writes, "Human action is an actor's purposeful pursuit of valued ends with scarce means. No one can purposefully not act. Every action is aimed at improving the actor's subjective well-being above what it otherwise would have been. A larger quantity of a good is valued more highly than a smaller quantity of the same good. Satisfaction earlier is preferred over satisfaction later. Production must precede consumption. What is consumed now cannot be consumed again in the future. If the price of a good is lowered, either the same quantity or more will be bought than otherwise. Prices fixed below market clearing prices will lead to lasting shortages. Without private property in factors of production there can be no factor prices, and without factor prices cost-accounting is impossible. Taxes are an imposition on producers and/or wealth owners and reduce production and/or wealth below what it otherwise would have been. Interpersonal conflict is possible*

reflected in the real world, the praxeological lines of deductions introduces, in addition to the action axiom, also a few select subsidiary assumptions, assumptions that are *"(a) small in number, and (b) so broadly based as to be hardly "empirical" in the empiricist sense of the term … they are so generally true as to be self-evident*" (Rothbard, 1957, p. 3-4). Rothbard goes on to explain that these assumptions are used to navigate the lines of reasoning towards phenomena and economic settings that are relevant to understand about the real world - are for example that individuals vary in their traits and faculties; that humans regard leisure as a valuable (consumption) good; that natural land varies in its composition of resources, depending on the time and place; and that money exist and is used as a means of facilitating indirect exchange (Rothbard, 1957, p. 3-4). These and other assumptions only steer the paths of economic reasoning that is practical to examine, so that theories reflects their real counterparts and their practical circumstances. These assumptions can be real and empirical, and in some few cases unreal and hypothetical (for example illustrate what is *not* true). If the subsidiary assumptions are real, then the deduced conclusions will necessarily explain a priori something that is reflected in economic reality, where those assumptions are present (Salerno, 2007) (Mises, 1962, p. 42, 44). Economic propositions, build on praxeological reasoning, are, as Lionel Robbins describes, *"scientific and if their postulates are found in the real world, their implications necessarily follow"* (Robbins, 1932). The human mind allows for this type of introspection into the action and its categories e.g. scarcity, value, profit (success) and loss (error), choice, uncertainty etc., and then their wider theoretical implications. Positivist philosophy is entirely incapable of uncovering and proving these categories, and their causal links, in fact its monistic philosophy does not deem introspective methods scientific[39] (Mises, 1962, p. 59, 79). Based on the structural categories of the logical mind (perception, cognition, imagination, abstraction, comparison etc.), combined with the axiom of action and its universally implied categories (means, ends, choice, valuation, uncertainty, time, etc.), guided finally guided by a select few subsidiary assumptions, Austrian economics does allow for theoretical a priori synthetic propositions[40]. These are propositions that are true without the

only if and insofar as things are scarce. No thing or part of a thing can be owned exclusively by more than one person at a time. Democracy (majority rule) is incompatible with private property (individual ownership and rule). No form of taxation can be uniform (equal), but every taxation involves the creation of two distinct and unequal classes of taxpayers versus taxreceiver-consumers. Property and property titles are distinct entities, and an increase of the latter without a corresponding increase of the former does not raise social wealth but leads to a redistribution of existing wealth" (Hoppe, 2001, p. xv-xviii).

39 Mises explains elaborates that "*one could not come to know these (praxeological) facts by watching, listening, smelling, or touching them. And propositions about them could therefore not be verified or falsified by the evidence of the senses ... They could be known, and could only be known, through an act of self-reflection on the imperceptible structural features of human action … We somehow "know that" all human actions, at all times and all places, involve choices and the use of self-chosen means to attain self-chosen ends. But how do we know this? Can we see, hear, smell, or touch choices? … It is only because we know about the existence of human choice through an act of self-reflection on the invisible characteristics of human action that we can (correctly) interpret the observed fact as resulting from a sequence of choices. In short, the visible features of human behavior, such as the relative position of a human body in space and time, are anything but self-explanatory. They can only be properly understood in conjunction with what we know about certain invisible "a priori" characteristics of human action*" (parenthesis added) (Mises, [1933] 1978, p. xliii-xlv).

40 Austrians see the goal of the science of human action as intelligibility, and not prediction, where "*we seek to understand human behavior, not predict it. Social scientists can gain some measure of intelligibility because as humans, we are what we study; we possess knowledge of our topic from within. In contrast, those who study the natural sciences cannot pursue a goal of intelligibility because they rely on knowledge from without. We can*

need for positivistic empirical verification and/or falsification processes. They are not discovered through positivist methods, instead they *"flow directly from our reflectively gained knowledge of action; and the status of these propositions as a priori true statements about something real is derived from … the axiom of action"* (Hoppe, 1995, p. 23). And Ludwig von Mises wrote that when it comes to action and economics, *"Praxeology conveys exact and precise knowledge of real things"* (Mises, [1949] 1998, p. 39).

It has been shown that Austrian causal-realist economics represents a paradigm in economic science committed to ontological world-realism, and to epistemological process truth realism. Austrian theory focus on qualitative explanations about the causal connections that govern in real (and not idealistic) economic events, based in the starting point of human action, to ultimately build knowledge about the real, but in most cases unobservable, underlying economic entities, causalities, laws, processes, structures, regularities, tendencies, and so on. This approach to economic thought is a stark contrast to the neo-classical approach with its logical-positivist research program. Instead of a monism in science, causal-realism argue for and adopt an epistemological dualism, where the logical structure of the human mind, and the categories implied in all human action, are critical analytical starting points. Its praxeological methodology relies on a line of verbal deductive reasoning, where Austrian theory, with the use of select few subsidiary assumptions, deduce a priori theory, both basic and advanced, about e.g. exchange, production, saving and investment, money, market processes, price mechanisms, banking, business cycles, entrepreneurship, and many more.

understand the plans and purposes of other human actors because we ourselves are human actors" (Mitchell & Boettke, 2017, p. 33).

4. Discussion – Comparing Critical-Realism and Causal-Realism

With the lengthy examinations of critical-realism and causal-realism, depth in this comparative discussion is somewhat limited. This weighing was made given the necessity of having sufficient and explicit knowledge about both systems beforehand, to back up the findings on their intersections, complementarities, and differences. A philosophical explicitness must necessarily precede a philosophically reflexive comparison. The findings below are as such the preliminary and more 'obvious' findings, but these must themselves precede a more rigorous in-depth comparison of the ideas examined. Regardless, any integrative advancement for this hitherto unintegrated (or fragmented) state between critical-realism and causal-realism, should, as outlined in section 1.3, be seen as positive.

In their more general commitments to realism in economic science, the most obvious intersections are their shared subscriptions to first an ontological world realism (in contrast to world *non*realism), meaning the idea that 'reality exists, independent from its observer'; second to an epistemological process-truth realism (in contrast to event-truth realism and truth nonrealism), meaning a focus on description and qualitative explanations of the various economic processes in play governing economic events and outcomes. Both systems stands in contrast to the mainstream event-truth realism focusing on quantitative predictions (Mäki, 1990); and third, both intersects in adopting a semantic (or methodological) realism, the position that theoretical statements and entities in most cases should be recognized as literal descriptions of real-world phenomena. In essence, both critical-realism and causal-realism adhere to the idea of philosophical realism one that gives "*true or approximately true descriptions of observable and unobservable aspects of a mind-independent world"* (PES, 2017). That critical-realism and causal-realism are independent and uncorroborated scientifically fragmented systems, with very little integrative work done so far, despite these above evidently shared intersections, is a state of fragmentation that is due to *non-assembly*[41], meaning it is knowledge that is yet not integrated despite sharing philosophical foundations and presuppositions (i.e. ontological, epistemological, methodological) concerning the social realm and the objects and entities located within it (see appendix 1.4 & 1.5 for more on fragmentation and integration terminology) (Bigo & Negru, 2008, p. 145). The solution to non-assembly is an integration by assembly, meaning a process of combining insights from hitherto compartmentalized and specialized works on related subjects, fields, and realms, to advance synthesis. Again, presupposed in an integration through assembly, is that such non-assembled ideas and insights must all be based in some shared philosophical presuppositions. If that requirement is found to be fulfilled, then insights previously fragmented may be combined and merged to "*acquire a bigger n-dimensional, and also a deeper, picture"* (Bigo & Negru, 2008, p. 145).

In their discontents with the neo-classical logical-positivist mainstream research program, both critical-realist and causal-realist thought shares lines of critique that are both grounded in alike realism-based argumentations. While the neo-classical paradigm and its methodological

[41] The contrast to non-assembly is fragmentation due to *non-resolution*, wherein ideas are set in different and incompatible philosophical presuppositions (see appendix 1.4).

logical-positivist approach is regarded as the mainstream and orthodox, other heterodox (i.e. non-orthodox) economic paradigms finds the economic mainstream as scientifically problematic and inadequate to capture the true philosophical nature of economic knowledge. The line of thinking applies to the post-Keynesian and Austrian paradigms, which both lament the neo-classical economics for its manifest lack of realism in its economic system, a lack of realism they argue, which spans across issues involved in both neo-classical ontological, epistemological and methodological reasoning. Both post-Keynesian and Austrian economists raise issues for example with the mainstream's adoption of logical positivism, its insistence on formalism for scientific validity, and prescribing a scientific monism to scientific inquiry. Other issues include the application of closed-system modelling; of atomistic agent modelling; the introduction of highly idealistic and problematic assumptions, where economic categories of time and uncertainty are omitted features of economic analysis.

In addition to this initial identification of a shared general approach and understanding, there are also, both ontologically, epistemologically, and methodologically, other concrete identifiable instances of intersections, but also a select complementarities, and then some differences as well. These are discussed in the following sections.

4.1 Comparing Critical-Realist and Causal-Realist Ontology

Between post-Keynesian critical-realism and Austrian causal-realism, there are clear identifiable intersections with regards to a commitment to an ontological *open-system* mode of theorizing, to an inclusion of non-material entities ('social entities' in critical-realism, and 'mental entities' in causal-realism), and finally to a view of social reality as highly non-deterministic in its nature (i.e. non-repetitive, unpredictable).

In critical-realist as well as causal-realist ontology, social reality is understood as an open-system process that is dynamic, historically contingent, and complex[42]. Social phenomena are not formed by a fabric that acts in atomistic predictive ways (as is implied in the neo-classical philosophy). Its fabric is instead of an organic complexity that consists in the unceasing realizations of individual human agencies (or actions). This understanding opens up for a broader scope of economic analysis, one that studies causal processes, not quantitative constancies, in order to ultimately form descriptions and qualitative explanations about that which is economic in nature. Neither the extrinsic nor the intrinsic conditions are met for qualifying social reality as a closed system, as neo-classical predictive modeling must for example implicitly assume (socioeconomic processes are not constant through time due to e.g. legal, political, economic, and other institutional changes, as outcomes of human activity) (Hayek, 1964, p. 332-333). Economic events depends on such a multitude of continuously changing variables, making them highly unique and heterogenous. And so, critical-realism and causal-realism intersect in sharing the position that in terms of empirically observed regularities in the social realm, no exact and universally true laws can be ascertained, making empirical

[42] On the various heterodox paradigms and commitments to open-system theorizing, Sheila Dow explains that "*each school of thought, and its selection of methods and techniques, has a binding force or holism which gives it its identity. This binding force is its world view, its perception of reality, its vision. Vision is entailed by realism. Political economists have been defined here as sharing a position on realism which emphasizes process, such that the vision is one of an open system requiring understanding of causal process*" (Dow, 1990. p. 354).

predictions in quantitative terms meaningless. Quoting from the collected works of Keynes, Finn Olesen describes that in economic science,

"unlike the typical natural science, the material to which it is applied is, in too many respects, not homogeneous through time … In chemistry and physics and other natural sciences the object of experiment is to fill in the actual values of the various quantities and factors appearing in an equation or formula; and the work when done is once and for all. In economics that is not the case, and to convert a model into a quantitative formula is to destroy its usefulness as an instrument of thought" (Olesen, 2013c, p. 4)

This view implies the non-deterministic nature of economic processes and events, as acknowledged in both critical-realist and causal-realist philosophy. So, in extension of their views of social reality being an open-system process, they intersect in the idea that these processes are non-deterministic in nature. Where natural science phenomena are material entities deterministic in their nature, lacking any ascertainable consciousness, volition, and free-will, what the causal-realism interprets as fatalistic determinism, the same is not true for social science entities (i.e. people), what is interpreted as activistic determinism. Through agency/action, people interfere actively through volition, free-will, creativity, and so on, changing the external deterministic world. This intersection is one more broadly identified by Sheila Dow between heterodox economics paradigms, where "*Heterodox approaches have in common an understanding of the economic system as being open, in the sense that non-deterministically evolving structures, interrelations and creativity mean that there is no scope for universal laws with respect to the economic system*" (Dow, 2018, p. 18). That no universal and exact economic laws exist within economic systems, is a point with some nuanced, discussed later in section 4.2, when comparing critical-realist and causal-realist epistemology. Dow essentially refer to quantitatively ascertained laws, not laws that are uncovered as praxeologically deduced economic laws (at least she does not refer to praxeologically deduced laws in her article).

A final ontological intersection is in their inclusions into economic analyses of social/mental non-material entities. Critical-realism views the social realm, including economic processes, as essentially structured by different domains, with the important deeper non-actual domain, a domain where the processes are unobservable to the human eye, and is formed of interrelated causal processes, structures, tendencies and so on (Dow, 1999, p. 23-24). A main goal is to identify these non-actual entities, where "*as Post Keynesians, we identify a complex interaction between collective and individual activity that renders these processes indeterminate but not unintelligible or unalterable*" (Dow, 1999, s. 29). This identification includes knowledge about entities such as human agency, social relations, processes, laws, mechanisms, institutions, tendencies, powers, capacities and so on (Fleetwood, 1999, p. 5). A high degree of intersecting commonality is evident here, given how causal-realism also focus on these entities, and other mental entities such as subjective valuations, choices, action, and the underlying logical structure of the human mind enabling these. There are lesser differences though, for example the degree to which each of these non-material entities are transient and transfactual, but those differences may as well be complementary viewpoints, given that both considers social reality as an open non-deterministic system.

The absence of cross-paradigmatic integrative work between post-Keynesian and Austrian ontology, should be classified as a case of non-assembly, and not non-resolution (see appendix 1.4 & 1.5). With respects to the ideas examined comparatively herein, no major ontological disputes were identified, and so the arrangement into these two different systems of realist philosophy in economic science, seems an outcome of a lacking integration by assembly. The process of integration by assembly[43] between critical-realist and causal-realist ontology is therefore deemed fruitful, to widen and strengthen the argumentative scope for realist philosophy acknowledging the ontological foundations in economic science of open-system theorizing, of seeing social processes as non-deterministic, and of including non-material entities into economic science, like social/mental entities. While termed differently, *social* and *mental* entities by and large refer to the same phenomena arising from the mind, but critical-realism, in addition to mental entities like human agency, does put higher emphasis on social structures and their interrelatedness. In contrast, while acknowledging social relations, causal-realism puts emphasis on individual mental entities like value, choice, exchange etc., as critical sources of economic explanation. In comparison, radical-Marxist economics emphasize class relations (Dow, 1999, p. 26)

4.2 Comparing Critical-Realist and Causal-Realist Epistemology

There are identifiable intersections between the critical-realist and causal-realist epistemological ideas examined as well. Each system points to the requirement for an alternative epistemology for economic science, a dualism (or pluralism), between natural science epistemology and social science epistemology. While not sharing the same starting points for explaining this point – critical-realism starts from a fundamental uncertainty in all knowledge, and causal-realism points to human action (in which uncertainty is a category of all action) as an ultimate given and that the logical structure of the mind frames all action – they do argue in a complementary fashion, and not a contradictory one, on the necessity for an epistemological dualism. The critical-realist argument was explained from the innate condition of a fundamental uncertainty in all knowledge and human agency, especially in the expectations economic actors have about the future. This was explained by how "*we each have the capacity to have a different understanding of the nature of that reality*" (Dow, 1999, p. 25-26). With new knowledge and ideas, and with changing circumstances, the economic knowledge will to some degree change as well (Olesen, 2013b, p. 1-2). And the implication of uncertainty is also that no single analytical approach can be conclusively shown as the superior one (Dow. 2004b, p. 283). The study of economics must adopt different analytical modes to gain new knowledge (e.g. individuals or classes, production or exchange, market stability or instability etc.), essentially to increase the scope and the robustness of the underlying evidence of an argument. Sheila Dow describes it as

[43] Integration by assembly is a process of combining insights from different and hitherto compartmentalized or specialized subjects, fields, or realms, wherein the contributions thus far lacks sufficient integration to be considered in synthesis. Presupposed when doing integration by assembly is that insights and ideas must all be based in shared presuppositions and foundations concerning the social objects and the social realm. Insights previously fragmented can then be integrated to "*acquire a bigger n-dimensional, and also a deeper, picture, so gaining in completeness through assembly, akin to a jig saw puzzle*" (Bigo & Negru, 2008, p. 145).

"studying the various causal forces at work in the system, and their evolution, in order to build up knowledge that is as reliable as possible … critical realism does not claim to identify "true" causal processes. While that is the aim, it is emphasized that knowledge actually produced is both fallible and transformable; there can be no assurance of having identified the truth" (Dow, 1999, p. 22-23).

Causal-realism starts from the a different approach. It argues for a dualism starting with the ultimate given between natural science and social science, explained as the unbridged gap between how the movements of inorganic unconscious matter brings about certain ideas and volitions in the minds of men. Ludwig von Mises was earlier referred to, that

"as long as we do not know how external facts—physical and physiological—produce in a human mind definite thoughts and volitions resulting in concrete acts, we have to face an insurmountable dualism. Reason and experience show us two separate realms: the external world of physical, chemical, and physiological phenomena and the internal world of thought, feeling, valuation, and purposeful action. No bridge connects—as far as we can see today—these two spheres." (Mises, [1949] 1998, p. 25)

This condition, that people use reasoning, that they value some things over others, and that they act based on these valuations, which cannot be explained by natural science epistemology, presents a requirement for an epistemological dualism between the natural and social sciences. Logical-positivism are entirely uncapable of dealing with the internal world of human feelings, valuations, and purposes. A dualism that adopts the methodology of praxeological deduction is championed by Austrians for that reason. Post-Keynesians adopts the abductive methodology instead, meaning that at the methodological level, critical-realism and causal-realism are less in agreement. But epistemologically, the two systems intersect in their opposition to neo-classical monism, and they embark, though from different starting points, into lines reasonings that, as complementary arguments, explain the need for a dualism (or pluralism). The current state of fragmentation between critical-realist and causal-realist epistemology is therefore another case of non-assembly, as they argue along similar lines from intersecting ontological starting points. No explicit issues of fragmentation due to non-resolution was uncovered.

4.3 Comparing Critical-Realist and Causal-Realist Methodology

It is in their methodologies that the biggest divergences are found between critical-realist and causal-realist philosophy. These differences should to some extent however also be regarded as complementary ideas. One reason is that a significant shared intersection is in how both studies economics from the starting point of human agency/action. It is then, in extension to this starting point, that their respective methodologies diverge, respectively between the system of critical-realist abduction and causal-realist praxeological deduction.

Post-Keynesian critical-realism, as explained in section 2.4.3, emphasize human agency as the starting point for economic analysis, as the ultimate given in causal-realist vocabulary, very similar to the Austrian focus on human action. In this sense, both critique the neo-classical homo-economicus agent to great extent, in addition to assumptions of perfect rationality and full information. Post-Keynesians point to a different human logic, Austrians use a different understanding of human logic and rationality as well, similar to how Sheila Dow and Tony

Lawson describes it. Human agency/action changes with peoples shifting volitions, feelings, thoughts, preferences, motivations, ideas and so on. A realism-based economic actor is therefore more akin to *homo agens,* the acting animal (causal-realism terminology), or in post-Keynesian Finn Olesen's term *Homo sapiens economicus,* in contrast to *homo economicus* (neo-classical terminology) (Olesen, 2013c, p. 4). The fragmentation, as the lack of integrative synthesis, between the critical-realist and the causal-realist conceptions of agent modelling, should be classified as a fragmentation due to non-assembly, given the many shared understandings.

The divergence begins in their choice of methods, between critical-realist abduction and causal-realist praxeological deduction. Abduction (or retroduction) was explained as the interplay between induction and deduction, where abductive reasoning can be done in a variety of ways, as in accordance with a Babylonian mode of thought that seek to establish as much robust evidence for a given phenomenon as possible. Praxeological deduction instead rely more specifically on logical-deductive reasonings in the study of human action (not to be confused with neo-classical mathematical and empirical-realist deductivism). Regarding the critical-realist skepticism of true and exact laws or and relations between entities established by neo-classical deductive reasoning, the abductive method is incompatible with praxeologically deduced a priori exact, and true laws, if it was the same approach as the mainstream. But as shown, the deductive approaches are philosophically very different, and in fact post-Keynesians and Austrians search for similar descriptive explanations about similar types of unobservable economic entities, those in the critical-realist non-actual domain of structured reality. For both realist systems, these unobservable non-actual entities are fundamentally derived from the categories of human agency/action. Both methodologies study the causal connections, relations, mechanisms, tendencies etc., that can explain how economic processes are governed (e.g. production, growth, banking, price mechanisms). While adopting different methods, a high degree of intersection is evident in the underlying critical-realist and causal-realist goals for adopting these. So classifying the methodological fragmentation, is to an extent a case of fragmentation due to non-assembly, in that the same goals are shared, but there are also elements of fragmentation due non-resolution, in the different viewpoints about whether true and exact laws can be established regarding economic processes. Resolving this issue, with a study of praxeological deduction in mind, in contrast to mainstream deductivism, should be deemed a critical focus point, as this would establish whether praxeology can be regarded as sound methodology in the critical-realist sense. By its conception of an epistemologically structured pluralism (restricted to a realistic worldview of social reality), critical-realist Babylonian thought is open to a range of methods, if they adhere to open-system theorizing, again to gain a wider body of evidence to increase the reliability of knowledge. With this considerations in mind, and that causal-realist praxeology takes an open-system approach, post-Keynesian economics should, at least to the extent of the evidence presented herein, be both compatible and complementary with the praxeological deductive methodology. Using economic theory built from praxeological reasoning on e.g. the categories of human action, and applying those for the contextual regimes studied of a heterogenous economic event or process, should philosophically be compatible with critical-realism. As Sheila Dow states, "*post-Keynesian economics is open to ideas from different schools of thought, and indeed*

different disciplines, in order to add weight to the truth realism of theories" (Dow, 1990. p. 353). Praxeology can, in addition to abductive analyses, be used in explaining what is generally referred to as economic entities, events, and/or processes, phenomena that are often path-dependent, historical, dynamic and complex ones.

It should be evident at this point that many opportunities exists for engaging in integrative work for a realism-based economic science, where most of the work is of the integration due to non-assembly type, and not the more problematic non-resolution type. In order to show how this type of integrative work can be made operational at the theoretical level, in how post-Keynesian and Austrian theory and thus policy recommendations differ, in the next and final part five, it is demonstrated how the contrast between post-Keynesian and Austrian analyses of the 2008 financial crisis is ultimately rooted in differences of how human agency and human action is understood with regards to economic actors dealing with uncertainty. The concepts used to demonstrate this are the post-Keynesian idea of *animal spirits*, and the Austrian idea of *entrepreneurial discovery*.

5. The 2008 Financial Crisis – A Philosophical Case-Review

The philosophical intersections and commonalities between post-Keynesian and Austrian thought, does not extent into several areas of substantive theory. This is especially true about their business cycle theories, as was already alluded to in section 1.3 on Keynes' and Hayeks famous debates of the 19th century. A clear case is between their to some extent contrasting understandings and explanations for what caused the 2008 financial crisis, and what the most appropriate remedies for it were. To identify the *philosophical* origins for these disputes and contrasts, two ideas are discussed in that relation. They are the post-Keynesian concept of *animal spirits*, one adopted from Keynes himself, and then the Austrian idea of *entrepreneurial discovery*[44], one comprehensively systematized by the Austrian economist Israel Kirzner (Kirzner, 1997). As pointed out by Bigo and Negru (2008), issues of a fragmentation in theory, as the one here described, is most expediently resolved at the philosophical levels beneath the theory, as theoretical disputes inevitably trace back to their differences in philosophical foundations that frames them. In doing so, tracing them back to their philosophical origins, a resolution of these disputes may be achieved, as philosophical disputes are resolved, ideally as resolutions that allow for an increased integration, or at least an increased explicitness of cause of dispute. I attempt to do so this remaining part of the thesis.

5.1 Critical-Realism and the 2008 Financial Crisis

Sheila Dow explains animal spirits by its relation between short-run and long-run market outcome expectations. She writes how long-term expectations, are *"dominated by 'entrepreneurs'"*, and short-run expectations *"by 'speculators'"* (Dow, 1983, p. 39). Entrepreneurs are those making decisions about long-term investment projects, decisions which are based in individual expectations about the future values of the various variables involved in the life-cycle of each such potential investment projects. However, explains Dow, "*Given the degree of ignorance about the future, there are no rational grounds on which a decision to invest can be reached. The decision must thus rest on 'animal spirits'* (Dow, 1983, p. 39). Animal spirits are the causal explanation for long-term entrepreneurial agency, where those decision-makings are determined in part by 1) the available information regarding the respective market(s); 2) by the individual entrepreneur's preference for risk-taking; and 3) by the use of individual *imagination* regarding economic outcomes, a process "*what Shackle calls an originative process"* (Dow, 1983, p. 39). An entrepreneur use current market information (e.g. price signals), which he either acts upon, or not, depending on his preference for risk-taking, and on his imagination about future possibilities. In combination, these allow for the formation of 'reasonable' expectations about the future (unlike the neo-classical 'rational' expectation formation). The critical point here though is that animal spirits, modelled in this as 'reasonable', can ultimately "*propel markets along unstable courses*" (Dow, 1983, p. 41). With such unstable courses animal spirits can result in systemic tendencies toward market instability (animal-spirits are an unobservable, non-actual, transient, and transfactual entity). This tendency towards market instability was also captured by Hyman Minsky in his Financial

[44] Entrepreneurial discovery is also referred to as *entrepreneurial alertness*, or just *entrepreneurship* in a broader sense.

Instability Hypothesis (see Minsky, 1992), which explains how "*Financial markets are inherently unstable; they have their own self-expanding dynamics that makes crisis a function of essence rather than one of error*" (Troncoso, 2019, p. 470). The function of essence is from how time and uncertainty (thus only 'reasonable' expectations) are incorporated into asset prices. This uncertainty gauged in information causes positive-feedback loops leading to increasing asset prices, to safety margins being lowered, and to incentives for progressively greater leverage (i.e. increased exposure) and speculation. And so according to Minsky, explains Joshua N. Troncoso, finance is self-expanding, leading to instability, as "*periods of tranquility lower monetary safety margins and stimulate progressively more speculation. Minsky's credit cycle culminates in Ponzi finance, which is when bank bets have gone wrong; they're insolvent and reliant on short-term lending*" (Troncoso, 2019, p. 470-471). The all-encompassing systemic insolvency caused by financial market instability is one that fits the circumstances of the global economy in 2008.

Due to knowledge problems, post-Keynesians conclude that markets cannot solely be relied upon to effect stable market processes (in part also due to divergences between individual and collective interests). Therefore "*public sector intervention has a central role to play*" (Dow, 1983, p. 35), like stabilizing monetary policies and fiscal programs (e.g. social investments). With animal spirits as a central feature in future long-term oriented human agency, leading to inherent instabilities, then, in explaining the causes for the financial crisis, post-Keynesian economist Paul Davidson declares, similar to Christina Peicuti (2013), that the primary reasons were the deregulation of financial markets which, by changing the ground-rules for long-term investment planning[45] "*permitted financial institutions to bundle together many illiquid mortgage debts to create mortgage backed derivatives … to then sell at a profit to savers, the seeds of financial catastrophe were being sowed*" (Davidson, 2015, p. 3).

As mortgage backed securities[46] (i.e. derivatives) were bundled together, and then resold through financial intermediaries in the rapidly expanding markets for both securitized assets, credit default swaps (CDS), and credit default obligations (CDO), financial products that were continuously rated by rating agencies as AAA investment portfolios despite the obvious concerns voiced, resulted in the culminating collapse of those securitized markets beginning in 2007, as "*many holders of these derivative securities became bearish and suddenly wanted to sell to make a fast exist from the market while no one apparently wanted to buy these derivatives offered for sale*" (Davidson, 2015, p. 3).

[45] In the Financial Crisis Inquiry Commission (FCIC) report, the 2008 financial crisis was explained by poor regulatory governance and a lax enforcement, and due to lacking transparency. The growth of "shadow" banking and of commercial deregulation legalized, and then led to increased speculative risk-taking across financial markets (FCIC, 2011).

[46] Christina Peicuti describes on securitization that "*Originally, securitization was meant to improve the efficiency of capital markets by reducing risks through risk tiering and geographic diversification. It has also been considered to have contributed to a reduction in transaction costs and greater flexibility in financial operations. As it turns out, it seems to have played a major role in fueling the dynamics of the subprime mortgage crisis"* (Peicuti, 2013, p. 443). And the extent of asset-securitization cab be wide-ranging, as "*In modern finance, any asset that can yield future cash flows can be securitized. Among these assets can be, for example, mortgage credits, corporate credits, credit card outstandings, revolving credits, insurance risks, credit risks, rights on future incomes on assets, such as planes, companies, or copyrights, structured products on former securitizations, and so on*" (Peicuti, 2013, p. 444).

The outcome was the catastrophic liquidity crisis that slowly spread to the entire world economy, as the previously AAA-rated financial assets became "*recognized as 'toxic assets', they lost all market value in the absence of sufficient buyers*" (Davidson, 2015, p. 4. And so, explains Davidson,

"*since these toxic assets were held not only by individuals but also across the global financial community by bankers, pension funds and other institutional funds, the asset side of the balance sheets of these institutions collapsed, thereby damaging or destroying the accounting value the net worth of the holders of these assets. The resulting financial crisis did not spare any important national economy*" (Davidson, 2015, p. 4-5).

To not letting long-term animal-spirit driven entrepreneurship grow into similar market instability outcomes in the future, like those seen leading up to the economic crash starting in 2007 that then continued for almost two years, post-Keynesian theory suggests remedies to "*dull the bad edge of liquid financial swords via (1) legislating proper regulatory rules on financial markets and (2) having central banks ready to alleviate a financial liquidity crisis if it still occurs*" (Davidson, 2015, p. 4). Christina Peicuti explains on the regulatory side of this approach that

"*What subprime mortgage crises as well as other generalized financial crises have proved is that micro-prudential regulation based on minimal adequate capital and applicable only to individual banks, while leaving aside many financial entities and activities, does not prevent systemic crises from spreading.* ***Macro-prudential regulation policies are necessary to absorb these cyclical convulsions of the financial system****, to hold those responsible for generating the crises and to protect the taxpayers*" (emphasis added) (Peicuti, 2013, p. 454).

If loan conditions for subprime customers were more prudently regulated, and if the regulators had limited the loan categories qualified for securitization (e.g. only fixed-rate loans), then the risks involved in financial assets leading up to the 2008 financial crisis, including the severity of it that extended to the entire world economy, could have been reduced (Peicuti, 2013, p. 452). As lenders of last resort, central banks must then act to alleviate any remaining liquidity issues.

From the philosophical idea of recognizing human agency as the starting point in economic analyses, with the category of animal spirits affecting such agency in long-term investment projects where uncertainty and outright ignorance are factors leading to unstable market outcomes, the post-Keynesian theoretical cures are to regulate financial markets in order to stem the tide of such instability, and to then have central banks be ready to act by increasing the available liquidity through its monetary mechanisms like expanding money supplies and lowering interests rates on loans for bearish investors. The critical-realist backdrop to explaining the 2008 financial crisis is thus ultimately grounded in its epistemology and methodology, in the study of human agency influenced by a fundamental uncertainty, where outright ignorance is involved. The uncertainty and outright ignorance extents especially into long-term market expectations and therefore into the entrepreneurial imaginations and the investment choices, both which, without public sector policies, for example regulatory ground rules for financial markets, or by central bank intervention, can cause highly unstable financial markets, this despite any currently available amount of information regarding the future of

those markets (housing, manufacturing, car rentals, etc.). Post-Keynesian critical-realist public policy interventions grounded in critical-realism, aimed at alleviating outcomes like the financial crisis, and any other future crisis, considers the intrinsic epistemological implications of the nature of human agency, with its innate category of animal spirits, when it models business cycle theory. With economic activity having its starting point in human agency, the post-Keynesian theory and policy frameworks are structured around the relevant features that governs human agency itself, including animal spirits.

5.2 Causal-Realism and the 2008 Financial Crisis

The Austrian concept of *entrepreneurial discovery* (sometimes just *entrepreneurship*) has been developed based on elements from the works of Ludwig von Mises and from F.A. Hayek, who both developed the groundwork, where "*from Mises the modern Austrians learned to see the market as an entrepreneurially driven process. From Hayek they learned to appreciate the role of knowledge and its enhancement through market interaction, for the equilibrative process*" (Kirzner, 1997, p. 67). The Austrian concept of *entrepreneurial discovery* is one different from the normal-day connotations of entrepreneurship, as that of a person starting a new business. The Austrian concept of entrepreneurship is much broader, it is a conceptual understanding of human activity itself as being entrepreneurial. Entrepreneurial discovery (or just entrepreneurship) is thus a concept that is fundamental and primordial part of human action itself[47] (on human action see section 3.4.1). In its broadest sense, the term entrepreneurship is understood as "*alertness to previously unknown profit opportunities*" (Boettke et. al., 2016, p. 34). Entrepreneurial profit is here referring to 'psychic-profit' in the broadest sense (not limited to market settings), meaning the achievement of any state of affairs that is more satisfactory than what would otherwise have been the case if entrepreneurial activity had not taken place. Now in terms of entrepreneurship within a market setting, the relevant aspect to study here is its place in the Austrian analysis of the causes and the cures regarding the 2008 financial crisis. Entrepreneurship in a market setting is understood as the capacity of recognizing (i.e. discovering) profit opportunities, in order to then "*correct disequilibrium prices through arbitrage, thereby facilitating convergence to general equilibrium*" (Boettke et. al., 2016, p. 33-34). Noteworthy here is that a 'convergence towards a general market equilibrium' neither assumes or uses equilibrium as the analytical starting point, in fact the state of general equilibrium is never (and can never) be achieved. The focus is instead on the *process* of convergence towards equilibrium, not the state, which is continuously ongoing, as individual entrepreneurs attempts to adjust their activities to be in line with the changes the economic data from other people's activities and their creativity, individual volitions, valuations, and learning, as well as the changes taking place within the political arena and the natural environment, and in the technological sphere of market innovation. What Israel Kirzner (1997) explains with respect to entrepreneurial discovery and the convergence towards equilibrium that it brings about, but never fully achieves, is that

[47] To Ludwig von Mises, the term "entrepreneurship" refers to "*acting man in regard to the changes occurring in the data of the market*" (Mises, [1949] 1998, p. 255). Entrepreneurship is therefore understood as human action "*seen from the aspect of the uncertainty inherent in every action"* (Mises, [1949] 1998, p. 254). The concept of human action thus implies the very notion of entrepreneurship, where "*In any real and living economy every actor is always an entrepreneur*" (Mises [1998] 1949, p. 253).

"*incorrect speculative forecasts lead to disequilibrium prices. Transactions at these disequilibrium prices lead to a revision of plans and encourage learning among market participants that direct prices towards equilibrium. This analysis concentrates on the equilibrating process, rather than the equilibrium end-state, an important point considering the Austrian emphasis on real-world disequilibrium pricing*" (Boettke et. al., 2016, p. 27-28).

In contrast to the post-Keynesian concept of human agency therefore, where animal spirits guides long-term investment projects clouded in uncertainty, which leads to *unstable* economic outcomes, the Austrian conception of entrepreneurial discovery, of humans acting in their entrepreneurial capacities through alertness, imagination, boldness, and judgements, and more, to hitherto unknown[48] profit opportunities, is that of the human entrepreneurial phenomenon as one securing a continuous convergences towards *stable* economic outcomes[49]. Dynamic competitive processes involving entrepreneurial discovery (of previously unthought-of knowledge), where entrepreneurs discover profit opportunities, are processes of foresight and judgement, as well as imagination and boldness, are processes "*seen as tending systematically toward, rather than away from, the path to equilibrium*"[50] (Kirzner, 1997, p. 62).

If entrepreneurial discovery and entrepreneurial action is, as just described above, seen as entities "*tending systematically toward, rather than away from, the path to equilibrium"*, the question that the Austrian analysis must answer is then how the 2008 financial crisis could come about, where the world economy through entrepreneurial activities were evidently 'steered' away from its sound and stable foundations (i.e. greater disequilibrium). To Austrians, the explanation for the financial crisis is instead found in the skewing of market information and signals that each entrepreneur bases his decision-making upon. This skewing were promulgated in an increasing capacity in the years leading up to the steep recession in the 2007 to 2009 period. To Austrians, as explained in the Austrian business cycle theory (ABCT), the

[48] In the Austrian perspective, "imperfect information" is an element that cannot be fitted into the neoclassical approach. Imperfect information involves "sheer" (i.e., unknown) ignorance. Sheer ignorance is different from the neo-classical imperfect information, as discoveries that reduce such "sheer ignorance" is necessarily accompanied by elements of surprise, in the sense that "*one had not hitherto realized one's ignorance*", and therefore, "*Entrepreneurial discovery is seen as gradually, but systematically, pushing back the boundaries of sheer ignorance, in this way increasing mutual awareness among market participants and thus, in turn, driving prices, output and input quantities and qualities, toward the values consistent with equilibrium (seen as the complete absence of sheer ignorance)*" (Kirzner, 1997, p. 62).

[49] Israel Kirzner himself describes that "*These positive elements focus on the role of knowledge and discovery in the process of market equilibration. In particular this approach (a) sees equilibration as a systematic process in which market participants acquire more and more accurate and complete mutual knowledge of potential demand and supply attitudes, and (b) sees the driving force behind this systematic process … as entrepreneurial discovery*" (Kirzner, 1997, p. 62).

[50] Individual entrepreneurial decision-making may prove entirely wrong in relation to current and future supply and demand conditions, these decisions may even be more wrong that the judgements and decisions they are replacing. And such errors may produce even more errors. But, explains Israel Kirzner, when "*the Austrian theory claims that entrepreneurial discovery can account for a tendency toward equilibrium, that vague-sounding term "tendency toward" is used deliberately, advisedly, and quite precisely. Such a tendency does exist at each and every moment, in the sense that earlier entrepreneurial errors have created profit opportunities which provide the incentives for entrepreneurial corrective decisions to be made … What our understanding of the entrepreneurial discovery process provides, is not conviction that an unerringly equilibrative process is at all times in progress, but rather appreciation for the economic forces which continually encourage such equilibrative movement … For, although entrepreneurs can, as noted above, make errors, there is no tendency for entrepreneurial errors to be made. The tendency which the market generates toward greater mutual awareness, is not offset by any equal but opposite tendency in the direction of diminishing awareness*" (Kirzner, 1997, p. 82).

most important reason for these distortions of otherwise sound entrepreneurial decision-makings were the skewing of prices through a massive expansion of money supplies in the early- and the mid-2000s before the crisis took place, including the lowering of interest rates through central bank policies like that of the U.S. Federal Reserve Bank. In an economy that is dynamic, with highly complex capital and production structures, the only available method and recourse for entrepreneurs in order for them to estimate reliable outcomes of their investment decision-makings, is that of monetary calculation. In his *Prices and Production*, F.A. Hayek makes this point explicit, writing that

"*It is important... to remember that the entrepreneur necessarily and inevitably thinks of capital in terms of money, and that, under changing conditions, he has no other way of thinking of its quantity then in value terms, which practically means in terms of money*" (Hayek, [1931] 2008, p. 321).

This Austrian assessment of the crisis being caused by massive credit expansions and artificially lowered interest rates (compared to the "natural" rate) hinges on two conceptual ideas already touched upon, the first being the idea of money as a non-neutral entity, and then the idea of entrepreneurial decision-makings in markets being reliant on monetary calculation based on prices (including interest rates), where prices are the informational market signals to entrepreneurs about the current and future supply and demand conditions for economic goods and available savings. From the first idea, the concept of money being non-neutral, Austrian economists argue that following an increase (or a decrease) in the money supply and by the lowering (or increase) of interest rates through fiat by central banks, problematic distributional consequences follows in markets. In the case of the financial crisis, the business cycle caused by the effects of loose monetary policies skewed prices and thus their signaling reliability, leading to entrepreneurs being led astray from the 'true' supply and demand conditions (absent monetary intervention), where widespread economic slumps, rising unemployment and countless bankruptcies were the result (especially in the U.S. retail sector[51]) (Salerno, 2012, p, 7-9). How centralized central bank monetary policy affects markets and prices, from an increase (or decrease) in the money supply through an unbacked credit expansion affects the relative prices throughout the entire economy over time, Uskali Mäki describes that

"*Austrians think that, as a matter of fact, an increase in the amount of money first reaches the hands of a limited number of agents. The increased real cash balances exceed the amount demanded by these agents with the result that they are able and willing to offer more money for those goods that they decide to purchase, this decision being based on their subjective valuations concerning economic goods and additional units of money. Others who receive this money in exchange will, again on the basis of their subjective valuations, demand more intensively those goods that they wish to buy, thus also causing their prices to rise. And so on.*

[51] The sharp plunge in retail sales during the recession is described by Salerno, in that "*For example, in all previous recessions beginning with the 1960–1961 recession, monthly real retail sales compared to a year ago decreased by 8 percent or more for only three months, all in the mini-recession of 1980. By contrast, during the 2007–2009 downturn real retail sales on a year-over-year basis contracted by 8 percent or more for nine consecutive months, ending in May 2009 (Federal Reserve Bank of St. Louis [2010b]). Overall, year-over year retail sales growth was negative for 23 consecutive months ending November 1, 2009. As of April, 2010, real retail and food service sales, seasonally adjusted, stood at $166.886 billion, above its recessionary trough of 158.109 for February 2009, but still well below its local pre-recession peak of $180.290 billion of October 2007*" (Salerno, p. 7).

The price level will rise. The exchange value of money will fall. However, there is no reason why all prices would rise equiproportionally to the increase in money supply. In the process, there will have occurred changes in relative prices and relative incomes. Changes in the quantity of money are not neutral in this respect … It cannot be ignored that there is no uniform increase in 'the price level'; the exchange value of money does not change in the same proportion with respect to all goods." (Mäki, 1990, p. 328).

What Mäki explains here is also known as the Cantillon effect, named from the French-Irish physiocratic economist Richard Cantillon that initially developed this theory of the relative effects that follows from fiat changes in the money supply. When newly created money enters the economy as the money supply increases, like central banks did massively in the years prior to the financial crisis, the results are that 'artificial' skewed changes take place in the relative prices for goods, whereby the direction of the available economic resources are steered to other purposes than what they would otherwise have been used for. This is so given that as prices change, including interest rates (which when lowered signals entrepreneurs that an increase in *real* savings has occurred), so does the economic calculations by entrepreneurs of their potential profit and loss outcomes from each individual investment project. This leads to what Austrian business cycle theory considers as entrepreneurial *malinvestments* (investments that do not reflect the *real* economic supply and demand conditions absent central bank monetary intervention). As interest rates are lowered through monetary policy, the propensity for consumers to save their wealth will also further diminish, leading to overconsumption, and do a disparity between the supply and demand of loanable funds. Joseph Salerno applies this theory in an article on the 2008 financial crisis that explains the Austrian perspective[52], writing that

"*I explicitly extend the analysis of the effects of the central bank's manipulation of interest rates from entrepreneurial choice among the length of production processes to household choice among intertemporal consumption patterns. Most accounts of ABCT focus almost solely on the "malinvestments," that is, the intertemporal misallocations of resources, which are induced by the permanent gap between the loan rate and the natural rate of interest created by expansionary monetary policy. By formally integrating the "wealth effect" into ABCT, I am able to show how the illusory profits and inflated factor incomes and asset prices caused by money and bank credit expansion promote the falsification of households' assessment of their net worth and the distortion of their consumption/saving choices. Thus, the overconsumption that is typically observed during the boom is established as a coordinate effect with entrepreneurial malinvestments in the production structure attributable to the same cause: the distortion of the interest rate by monetary expansion*" (Salerno, 2012, p. 5).

[52] In explaining the various causes for the 2008 financial crisis, from the Austrian perspective, and in outlining the remedies for it, Joseph T. Salerno wrote the article *A Reformulation of Austrian Business Cycle Theory in Light of the Financial Crisis* (Salerno, 2012). His explanation is framed around the Austrian business cycle theory, which is itself a theoretical framework that explains the causes and cures for business cycles in general, a framework initially originated within the works of Austrian economists including Ludwig von Mises (see e.g. Mises, [1912] 1953, and Mises, [1949] 1998), Friedrich A. Hayek, and Murray N. Rothbard (see e.g. Rothbard, [1962] 2009) (Salerno, 2012, p. 3). The building blocks of the Austrian business cycle theory (ABCT) includes the Austrian concepts of entrepreneurship, economic calculation, capital theory, and monetary theory including the argument of money being a non-neutral entity.

As overconsumption and malinvestment occur from the central banks manipulation of money supplies and interest rates, the process can only take place and be maintained through a consumption of the existing capital structure (i.e. capital consumption), which Salerno points out was what exactly happened during the early 2000s leading up to the financial crisis[53]. Economic bubbles (occurring due to overconsumption and malinvestments) emerged with respects to the financial crisis in for example the real estate sector and in construction, where real estate prices continued to appreciate as additional new credit were injected into the system expanding the money supply and keeping interest rates artificially low (notably from 2001 to 2006). The financialization of favorable mortgages loans (including sub-prime loans) at very low interest, and the expansion of problematic securitization schemes that relied on credit default swap schemes, derivatives, and other financial instruments, were ultimately made possible through the expansion of cheap money/credit. Ultimately

"*the boom phase of the cycle is initiated by bank credit expansion in the form of "fiduciary media" or unbacked demand deposits. This results in an increase in the supply of loanable funds beyond the level of voluntary saving. The artificially swollen supply of credit depresses the risk-adjusted interest rate on credit markets below the level of the "natural rate," which is the rate of return on investment in the structure of production that is consistent with intertemporal consumption preferences*" (Salerno, 2012, p. 9).

During the boom phase of the business cycle, meaning in the case of the 2008 financial crisis the years of the early- and mid-2000s, the inflationary boom of the money supply leads to profits exceeding even the most optimistic expectations. Especially in the real estate sector this was evident, were houses would be "flipped" by buyers as they waited a period of time before reselling houses at often drastically appreciated prices with little or no changes to those houses. And, explains Salerno,

"*These "paper profits," as Hayek calls them, become almost universal, creating a general climate of over-optimism and "irrational exuberance" that undermines shrewd entrepreneurial judgment. Reinforced by inflationary expectations, this results in a growing overestimation of prospective profit streams which, when discounted by the artificially low interest rate, generates fictitious capital gains throughout the structure of production that are completely unhinged from the fundamental realities*" (Salerno, 2012, p. 20).

As the expansionary boom phase of a cycle ultimately comes to an end, "*when the central bank reacts to accelerating consumer price inflation or some other event by significantly restricting its expansion of bank reserves*", credit markets begin to tighten, as the interbank market for

[53] Joseph T. Salerno explains on the overconsumption and malinvestment as the consequences of loose monetary policy how "*Mises, Rothbard and, somewhat less emphatically, Hayek argued explicitly that "overconsumption" and "malinvestment" were the essential features of the inflationary boom. In their view, the divergence between the loan and natural rates of interest caused by bank credit expansion systematically falsifies the monetary calculations of entrepreneurs choosing among investment projects of different durations and in different stages varying in temporal remoteness from consumers. But it also distorts the income and wealth calculations and therefore the consumption/saving choices of the recipients of wages, rents, profits, and capital gains. In other words, while the artificially reduced loan rate encourages business firms to overestimate the present and future availability of investible resources and to malinvest in lengthening the structure of production, at the same time it misleads households into a falsely optimistic appraisal of their real income and net worth that stimulates consumption and depresses saving*" (Salerno, 2012, p. 15)

example did after September 15th 2008 when the overleveraged and heavily subprime positioned Lehman Brothers bank declared bankruptcy, to this date is still the largest bankruptcy in U.S. history. As investments begins to decline, "*Firms producing capital goods, especially specialized machines, tools and other equipment relatively specific to processes temporally remote from consumers, encounter an unanticipated drop in spending on their output and, consequently, declining prices and profits*" (Salerno, 2012, p. 10), leading ultimately to layoffs and a rising unemployment rate as businesses are faced with rising costs of both labor and credit. Projects and other costs are slashed, and plants, factories, and other capital equipment are idled, and some firms retrench or restructures, or altogether shut themselves down leading to rising unemployment and a reduction in output – recession sets in[54]. In its totality, the expansionary boom set in motion by central bank monetary policies such as those preceding the 2008 crisis, "*squanders through malinvestment scarce factors of production and reduces the stock available through overconsumption; its alleged blessings are paid for by impoverishment*" (Mises, [1949] 1998, p. 573). Austrian economists advocates for central banks to discontinue such market-skewing interventions as it distorts sound entrepreneurial discovery, foresight, and decision-makings. When the recession that follows from a credit-expansion boom-phase is instead allowed to run its full course, then "*this relative price adjustment inevitably re-establishes a natural interest rate sufficiently high to stimulate capitalists and entrepreneurs to dishoard cash and actively seek out investment opportunities*" (Salerno, 2012, p. 6). But, if this adjustment-process is again later obstructed through new monetary easing, like lowered interest rates, bailouts, or fiscal stimulus programs driven by deficit spending and financed by central banks bond buying, then "*the entrepreneurial malaise becomes chronic, and economic stagnation ensues*" (Salerno, 2012, p. 6). So where post-Keynesians recognize central bank intervention as a necessary mechanism to reduce the impact of long-term animal spirit driven investment projects, Austrians see this mechanism of intervention as the ultimate cause of economic crises like that of the 2008 financial crisis.

5.3 Final Words and Future Research

In this final part it has been shown how, by tracing theoretical disputes back to the underlying philosophical differences that frame them, here first with the critical-realist idea of animal spirits as an integral part of human agency, and second with the causal-realist idea of entrepreneurial discovery as an integral part of human action, that it is in the philosophical origins of post-Keynesian and the Austrian theories that the causes of dispute were uncovered on their analyses of the 2008 financial crisis, but also on business cycle theory in general.

Where critical-realism argue that long-term entrepreneurial activities are inherently prone to produce unstable and disequilibrated outcomes, causal-realism explain human entrepreneurial discovery as is prone to produce, absent government monetary and fiscal

[54] Salerno explains how from the economic point of view, the malinvestments and the capital consumption disintegrate the structure of production into pieces, pieces that "cannot be fitted back together again without a protracted recession-adjustment process. During this process both investment *and* consumption will decline causing unemployment to rise in both sectors. The recession will be further prolonged by the fact that entrepreneurs, after experiencing massive losses and capital write-downs, will temporarily lose confidence both in their ability to forecast future market conditions and in the reliability of monetary calculation" (Salerno, 2012, p. 22)

interventions, long-term outcomes of economic stability in the form of tendencies towards equilibrium convergence (even if equilibrium is never fully realized). Due to these differences, post-Keynesian theory argues for government regulation and intervention in certain market processes to mitigate their inherent instabilities, whereas Austrian theory argues that it is precisely due to government interventions in the first place that distortions of market signals occurs leading to unstable market outcomes[55]. This contrast originating in the ideas of animal spirits and of entrepreneurial discovery is therefore a present case of a problematic fragmentation in the realist understanding of the economic world and the processes and entities in it. It is however a case of fragmentation due to non-assembly, and not due to non-resolution, given how their deeper ontological, epistemological, and methodological ideas share significant intersections and some complementarities. This thesis has only started the process of outlining the various philosophical intersections, complementarities, and differences between critical-realism and causal-realism, and explaining the reasons for why they produce such contrasting theoretical explanations for business cycles like the 2008 crisis. Much work still needs to be done on this topic, and it is likely that comparative analyses should be extended to the understandings of money, and to what the perceived role of money is in an open, dynamic, and complex economic system.

[55] Sheila Dow touches upon this contrast in the post-Keynesian and the Austrian views of market outcomes. She explains that "*In the neo-Austrian model, 'reasonable' expectations promote individual action which ensures the beneficent working of markets. In the Post Keynesian sense, 'reasonable' expectations propel markets along unstable courses. In the case of both models, the starting point is the formation of expectations*", where post-Keynesians find that, "*Unlike the neo Austrians … markets cannot be relied upon because of information problems (together with divergence between individual and collective interests) so that public sector intervention has a central role to play*" (see Dow, 1983, p. 35, 41)

6. Conclusion

The goal of this thesis was an identification of the comparative philosophical nature between the systems of post-Keynesian critical-realism and Austrian causal-realism. The aim was to identify intersections, complementarities, and differences between them, specifically with respects to their ontologies, epistemologies, and methodologies. Several intersections, in addition to a few complementarities and differences, were identified. In all these identified cases, the current fragmentations as lack of explicitness and shared understandings, was identified as the fragmentation due non-assembly type, given similar critical-realist and causal-realist ontological presuppositions. Both these realist philosophies intersect in their subscription to ontological world-realism and to epistemological process truth realism. Ontologically, they adopt open-system theorizing, where social reality is seen as highly non-deterministic and unpredictable in its processes. Neo-classical logical-positivist thought is criticized for its focus on empirical observation and on relations between quantitative economic data. Critical-realism and causal-realism instead focus on the unobservable social/mental entities in order to develop qualitative explanations of non-actual, transient, and transfactual economic entities and the connections, relations, laws, mechanisms, powers, tendencies and more between them. Economic events originating in human agency/action are studies in both critical-realism and causal-realism as phenomena with a distinctly different epistemological nature requiring an epistemological dualism in contrast to the mainstream monism and mathematical deductivism. In critical-realist and causal-realist methodology was identified differences between post-Keynesian abduction and Austrian praxeological deduction, but with likely complementarities. With a commitment to a structured pluralism, critical-realism allows several open-system analytical methods, and with praxeology being so, avenues of introducing praxeological thought into post-Keynesian economic thought are worthwhile to analyze further.

Despite their identified intersections, post-Keynesian and Austrian analyses of the 2008 financial crisis business cycle were shown in the case review to be in a contrasting disagreement on the causes and the cures, with the post-Keynesian analysis emphasizing deregulation and long-term entrepreneurial investments guided by animal spirits as producing unstable market outcomes leading to the 2008 crisis. With a recourse to the philosophical foundation of human agency/action analysis, Austrian entrepreneurial discovery was identified as a contrast to post-Keynesian animal spirits, with entrepreneurial discovery understood as being an entity that produce convergence towards equilibration outcomes. The cause for the 2008 crisis was instead argued to be central bank manipulation of money markets and bank interest rates, leading to distortions of market price signaling whereby entrepreneurial projects become malinvestments resulting in unstable market outcomes. Post-Keynesians advocates for financial regulation and central banks as lender of last resort to circumvent future crises, where Austrians in contrast advocates for a halting of central bank money market interventionistic manipulation and for a severing of the link between financial markets and governmental protection programs like bailouts and buying of toxic financial assets. This current fragmentation between understanding long-term economic activity through animal spirits or through entrepreneurial discovery is a specific area of theoretical dispute that should be analyzed further to reach some synthesis through integrative assembly, to increase the shared realism-based understanding of whether long-term activity is in a cause of instability or of stability. In conclusion it is recourses to the philosophical differences between economic paradigms and their systems of thought that was shown as fruitful and highly relevant avenues for future economic science research when the aim is an advancement of integration and greater synthesis between economic ideas, including economic idea based in realist foundations.

Appendix 1: Economic Philosophy – Terminological Reviews

In the introduction were used a range of terms regarding philosophy and science, including economic philosophy and science. These terms were used then without more precise specifications of their broader terminological definitions and meanings. In this first appendix to the thesis is presented closer looks at a selection of these terms, in order to cover their meanings and to clarify how they are understood within this work. For the reader without prior explicit knowledge about these terms and their use in economic philosophy, they are relevant to examine and explain, so as to ensure a sufficient coherence between use of these terms and the various philosophical arguments in part 2 and 3, and how these are comparatively examined in the ensuing discussion in part 4 and what can be concluded from those. The selection of terminologies examined within the sections of this appendix 1 are *science* and *economics*; *philosophy* and *economic theory*; *philosophical foundations*, including *ontology*, *epistemology*, and *methodology*; *scientific paradigms*; *pluralism* in economic science; and lastly the concepts of *fragmentation* and *integration* in social science. On the concept of scientific fragmentation and the problematic nature it imposes on the current state of economic science, the use of an *ontologically* (or more broadly, *philosophically*) *reflexive pluralism* as a method for integrating social science is also examined, including the relevance it bears for economic science.

Appendix 1.1: Science and Economics

The term *science* may be understood as a systematic procedure of acquiring and establishing both sound and reliable knowledge about our world[56]. Science in the widest sense, is mankind's collection of all the knowledge that currently has been established through processes of scientific valid reasoning One way to distinguish between types of science is by the branches of formal science, natural science, and social science. Formal science includes the studies of logic and mathematics. Natural science studies the natural phenomena which constitutes the external physical reality of human existence includes amongst others the studies of physics, chemistry, geology, and oceanography, and the life sciences as well for example botany, biology, and zoology. The process of scientific critique and assessment has for example secured for the formal and the natural sciences strict rigor and methodological unity. Logic and mathematics have successfully unified and carried their sciences forward to great achievements through processes deduction. The same holds true for the natural sciences, such as physics and chemistry, with their championing of positivistic methods of inductions and inferential inquiry based on sensuous observations of empirical phenomena in man's external natural environment. Lastly, and the most relevant branch for this work, is the branch of social science. Social science is concerned with the study of those various types of phenomena that constitutes human societies, and it is the study of for example the fields of anthropology, criminology, and psychology, as well as political science, law, sociology, and of *economics.*

As a social science field, economics is the study of a long range of important subjects regarding the economic nature of human society, including for example the nature of production, wealth, distribution and consumption, and other subjects such as human action and

[56] On 'science' Sheila Dow writes that "*By science I mean a systematic procedure for establishing reliable knowledge, involving evidence-based enquiry and critical thinking*" (Dow, 2018, p. 13).

choice, scarcity, economic relations, the division of labor, business and markets, money and finance, investment and interest rates. While it is a distinct social science discipline itself, economics also investigates aspects studied in other social science disciplines, such as the economic nature and implications of different political and judicial systems, or the history of past social events and of past human civilizations. Ultimately economics is a social science field that is both specialized and also compartmentalized into different subjects of inquiry.

The bedrock of scientific work is the use and application of critical thinking and of evidence-based inquiry applied to the subjects studied (Dow, 2018, p. 13). Economics inevitably relies on these same features in order to discover and establish sound and reliable knowledge about our socioeconomic world. But what it exactly does a 'systemic procedure of critical thinking and evidence-based enquiry' involve, what modes of thought and methods must be used in order to establish both sound and reliable economic knowledge about the social world? This is not by any means a straightforward question to answer. In fact, it is a very fundamental question to the science of economics that still remains problematically unsettled within the economic science community. It is a question which has split economists between their different views and ideas. As is explained more in-depth below, it has split economists into different *paradigms*, and it has resulted in a *fragmentation* of economic knowledge and ideas. It is however a question that has experienced something of a revival in the recent decades, where some economists have acknowledged the issue and have begun debating again what 'systemic procedure of critical thinking and evidence-based enquiry' exactly entails. The debate is essentially one that pertains to what constitutes a sound social theory. Social theory means a system of scientific analysis for studying social systems and events to obtain scientific explanation about them of both their causes and their effects. The ongoing disagreements in the debate of sound social theory and pertaining to how social scientists appropriately can study and access new knowledge about that explains the nature of economic phenomena, ideas and categories, such as for example time and uncertainty, taxation, distribution, monetary systems, economic cycles, wealth and value, rationality, economic development and inequality and so forth. Social theory in this way pertains to the modes of thought and the methods for analysis and explanation, while ensuring that those are both legitimate and valid in in their relation to social and economic phenomena (Fleetwood, 1999). Debates about scientific legitimacy, validity, reliability, soundness and so forth in economics are discussions that concern the *philosophical foundations* of the science, as these foundation forms the structure and groundwork for developing economic theories and empirical analyses.

Appendix 1.2: Philosophy and Economic Theory

Philosophy, meaning *love of wisdom,* is the oldest and the origin of all science. Science is to man a refined form of knowledge cleansed from inconsistencies. Since its inception, many areas that were prior sub-branches to philosophy became, as knowledge of the subject increased, independent sciences. This is also the case with economics in the 18th century[57] (Mises, 1998, p. 1) (SEP, 2018a). Economics is but one of many sciences investigating our existential reality and the objects within it. In economic science, ideas, substantive theories,

[57] In ancient Greece, Aristotle addressed the economics of household management. The Mercantilists addressed the balance of trade. The scholastics addressed ethical considerations of economic phenomena (SEP, 2018a).

and modes of empirical analysis are ultimately, in fact inevitably, always grounded in an underlying system of philosophical foundations. Foundations is a term that signifies a demarcation between levels of thought, where the philosophical foundations can be said to refer to ontological, epistemological, and methodological presuppositions and ideas, where theory for example signifies another level of economic thought (Dow, 1999, p. 16). Foundations in economics fundamentally frames the questions and the contents, as well as the implications, and the scopes of analytical application of substantive theories and how they are used in empirical research including the analytical methods of how those are derived. As foundations they are the structural system of combined presuppositions, perceptions, and ideas *"on the nature of economy, society, people, and their interrelations, and on how to understand them"* (Lawson, 1994, p. 525, as social scientists seeks to establish a coherent connection between scientific knowledge and the real world. A system of philosophical foundations is the prerequisite necessity in attempts to ensure that economic knowledge brought to bear have a sufficient relation to reality such that the knowledge gained from theory and analysis is both valid, sound, and reliable knowledge (Fleetwood, 1999). This includes for example the attempts to establish a coherent and reliable connection between monetary theories and the nature and functions of money in the real world, or theories of the causes and the effects of different economic systems and institutions, or of trade policies, business investments, and market forecasting, including what the nature and the timeframe is of the next coming economic recession, or of economic booms and bubbles. Economic philosophy therefore ultimately informs economists about the nature, the scope, and the methods for doing legitimate, valid, and reliable economic science (Dow, 1990). Absent any valid philosophical system and methods of proof that can weather any received criticisms, and which can adopt to changing real world circumstances, then the knowledge and the substantive theories proposed cannot be deemed as scientifically legitimate and reliable. Economists must be prepared to respond rigorously, to elaborate and clarify, without any reservation, about his ideas on any criticisms they receive, including the connections between their philosophical foundations, their methods of proof, their theories and the conditions under which they apply in the real world and why (Mises 1998, p. 6). It is this connection between the philosophical foundations and of economic theory and empirical research that are of a fundamental and imperative nature in order to ensure the health of economic science.

The unique case concerning the economic science field and the debates and the arguments about the most appropriate system of philosophy (i.e. ontology, epistemology and methodology) for the development of reliable substantive theories, of valid empirical research, and of sound policy advocacy, is that economists are split widely split between a whole range of different systems and conceptions about those issues. The split referred to between economists includes for example, amongst others, post-Keynesian economists who are committed to the philosophical system of critical-realism, it includes the Austrian economists who for over a century have been committed to the philosophical system of causal-realism, and as a last example it includes the mainstream neo-classical economists who are committed to logical-positivism as their system of ideas.

An important feature in the connection between economic philosophy and economic theories is that, if a resolution to any issue about the validity or reliability between two or more

economic theories cannot be found at the level of theory itself, for example if two theoretical conclusions are in direct contrast to one another, then a resolution to the issue should instead be sought after at the 'lower' levels beneath the theories, meaning their foundations and argumentations at the philosophical levels. This implies tracing the theoretical issues backwards towards the underlying levels usually distinguished between as ontology, epistemology, and methodology. The theoretical issues (e.g. disagreements and contrasts) might relate to disputes and inconsistencies at either one or more of these levels. An economic theory might then be found to be unsound and inconsistent at one or more of the philosophical levels in its line of reasoning and in the proposed underlying correspondence between the theory and the reality of the subject matter studied. The reality is that these range of issues and ideas considered within the subjects of economic philosophy are indispensable to economists and the economic science community as a whole, especially when economists due to disputes are at an impasse. This is the case whether economists engage with the fact or whether they disregard it and leaves out any careful consideration about the underlying philosophy nature of their theoretical arguments and propositions and empirical works (Lawson 1997, p. 11). Therefore, by being informed and familiarized with the different levels of economic philosophy and theory, including the different systems and the lines of reasonings that economists with different views commit themselves to, one is in a position of being more adept at navigating these systems, theories, and reasonings, in order to better understand them, compare them, and to ultimately reflect upon them. It is through identification and reflection that attempts at resolution should be sought for the range of unresolved and prevailing philosophical and theoretical issues in economics brought about by the split between economic scientists and their commitments to ideas within different philosophical systems (Bigo & Negru, 2008).

With the above case demonstrated of the importance that philosophical understanding and explicitness has in economics about the presuppositions and the ideas taken to be true at the different levels of the systems that economist adopt in their works, there follows now brief accounts of the interpretations of those levels, of namely ontology, epistemology and methodology[58].

Appendix 1.1.1: Ontology and Economics

Stanford Encyclopedia of Philosophy describes ontology as the field of philosophy that pertains to man and the nature of his existence and to questions concerning such topics as 1) *what objects of being that exists*? 2) *what is our reality formed by and made of*? and 3) *what is it that constitutes the most general features and relations of those objects and beings that exists*? (SEP, 2017a, 2017b). By adapting these ontological questions to the science of economics, questions pertaining to economic ontology should attempt to answer 1) *what* ***economic*** *objects of being that exists?* 2) *what is our* ***economic*** *reality formed by and made of?* and 3) *what is it that constitutes the most general features and relations of those* ***economic*** *objects and beings that exists?* As such, ontological questions and inquiries are often about the nature of reality about the a subject being studied, for example here the mind and matter,

[58] In this work, the field of methodology is considered as a part of economic philosophy, in the same way as ontology and epistemology. Whether methodology belongs to the 'philosophical' level, or if it on a level of its own, is not straightforward. Sheila Dow for example takes the latter position, that *"philosophy, methodology, and theory … should be understood as applying to different levels of thought"* (Dow, 1999, p. 16).

causality, determinism and free will, the nature of the economic world and economic entities, objects, or other types of phenomena. Now these ontological questions are by any means not an exhaustive list of all the lines of questioning that ontology takes, but for the purpose of later identifying, understanding, and comparing the philosophical nature and arguments within critical-realist and causal-realist ontology, the ontological questions given here present a generalized, well-suited, and open framework.

Appendix 1.1.2: Epistemology and Economics

Epistemology is another field in philosophy. Stanford Encyclopedia of Philosophy (SEP, 2020) describes it as the field that studies *the nature and theory of knowledge itself*. Epistemological questions centers around the nature of human knowledge, and it attempts to elucidate 1) *what the sources are of our knowledge?* 2) *how do we obtain knowledge*? and 3) *what is the structure, the scope, and the limits of our knowledge?* As with the framework for ontological questions above, the same modifications can here be made to the questions to specify them for economic philosophy inquiry. Economic epistemology should attempt to answer 1) *what are the sources of our **economic** knowledge? 2) how do we obtain **economic** knowledge*? and 3) *what is the structure, the scope, and the limits of our **economic** knowledge?* These questions are critical in order to ascertain what should be deemed scientifically reliable truth and what should not and how to separate true economic ideas from false ideas. Again, epistemology is also wide and very disputed field, and these questions should be seen as representation of the nature of epistemological inquiry.

Appendix 1.1.3: Methodology and Economics

There are two types of debate commonly referred to by the term methodology as a field of philosophy (Robbins, 1938, p. 351-352). According to one type of the debates, methodology concerns the nature of the subject being studied, including its logical status, and the significance that should be attached to the achieved results from its study. Understood in this way, methodology can be understood to pertain to both the types of ontological and epistemological questions as those given above, as well as questions related to method and proof. Economic methodology and economic philosophy are then terminologies with overlapping meanings. The other type of the debates that concerns methodology is one that is more limited in scope as it pertains to questions of 1) *how scientific research should be conducted? 2) what methods are scientifically valid?* and 3) *For what reasons are those methods considered as valid?* By again narrowing down the questions to concern economic science methodology, then economic methodology questions 1) h*ow **economic science** research should be conducted? 2) what **economic** methods are scientifically valid?* and 3) *for what reasons are those **economic** methods considered as valid*. The methods are the means by which the products of knowledge, theories and predictions are obtained. On methods, Stanford Encyclopedia of Philosophy states that it

"*might range over: specific laboratory techniques; mathematical formalisms or other specialized languages used in descriptions and reasoning; technological or other material means; ways of communicating and sharing results*" (SEP, 2015)

Methods are in this way the more practical aspects of how to engage in a scientific field. It is in accordance with this latter interpretation of the debate of methodology that the term is used

and understood in this work. It is the interpretation that holds methodology as a narrower field of study, separated from the ontological and the epistemological types of inquiry (SEP, 2015).

Appendix 1.2: Scientific Paradigms in Economics

The terms covered so far have included descriptions of *science*, with a closer look at the field of *economics*. In relation to economic science, the connection between *philosophical foundations* and *economic theory* was explained, and how they together form into a system of social theory. The nature of the philosophical foundations in economics was then described as consisting of a framework of ideas and lines of reasonings within *ontology*, *epistemology*, and *methodology*. By being familiarized with these terminologies allows for the introduction of two philosophical concepts that are profoundly relevant and useful for this work. The two concepts which were developed by the philosopher of science Thomas Kuhn, are that of a *scientific paradigm*, as well as the concepts he defined in the distinction between *normal science* and *extraordinary science*. Thomas Kuhn's conceptual terms greatly assists in the depiction of what the current state and structure is like in economic science, a depiction that is helps to indicate where critical work is required within economic science and especially economic philosophy.

In his book *The Structure of Scientific Revolutions* Thomas Kuhn (1970) presents a framework which makes the identification and the depiction of the progress and the current structure of economic science more intelligible. In his framework Kuhn selected, amongst others, the term *scientific paradigm*, a concept which he used to distinguish one 'body of thought' from other 'bodies of thought' present, or ones which used to be present, within a given scientific field (SEP, 2018b)[59]. In Kuhn's terminological definition, a scientific paradigm represents a social network of scientists who all share in some specific world view (i.e. ontology and epistemology) and that are in agreement about what they consider as the appropriate and valid range of methods for their scientific work (i.e. the methodology). As the renowned post-Keynesian professor of economics Sheila Dow explains it in her account of Thomas Kuhn's concept of a scientific paradigm, it involves

"*… a shared philosophy and methodology; terms have shared meanings, and there are shared criteria for deciding on how to understand evidence and on what constitutes theoretical development.*" (Dow, 1999, p. 19).

Sheila Dow's account of Kuhn's concept describes how it is the philosophical underpinnings of any given paradigm (i.e. the ontology, epistemology, and methodology) that the essential means by which the existing range of different paradigms can be identified, classified, and differentiated[60]. It is worthy to note here that defining a scientific paradigm in this way, it is a

[59] Thomas Kuhn's framework is only but one a range of different interpretations of the state and the structure of science, as well as its progressions (i.e. is science linear, or is it circular in similarity to the pattern of a corkscrew). The merits of Kuhn's framework have also been famously debated by for example Mark Blaug, who finds "Kuhn's absence of over-riding criteria for good science as unacceptably relativistic (Dow, 2018, p. 14), or by the Hungarian Imre Lakatos or by Alan Musgrave. It is not however the purpose of this work to go over those. Arguments for or against Kuhn are not essential here, instead it is how his framework allows for a demarcation between schools of economic thought and for understanding their co-existence (Dow, 2018, p. 14) with the ensuing possibility of comparison, and *"in so doing, we can conclude which differences between schools of thought are irreconcilable, reflecting differences of paradigms, and those which are not*" (Dow, 1983, p. 31).

[60] Sheila Dow in another article also explains those features that distinguish the paradigms from one another, where she writes that "*scientific communities form around shared ontological beliefs, epistemologies and*

classification of a scientific network of scientists which is very synonymous with two other commonly used conceptual terms in economic science, namely an 'economic tradition', or an 'economic school of thought' (Dow, 2004b, p. 277). These two terms also refer to some of the same general features as those contained in the definition of a scientific paradigm. To a large extent all three are indicative of where the delineations are between the different economic 'traditions', 'schools of thought', or paradigms, with respect to their different philosophical boundaries and presuppositions. Thus, in the economic literate, the post-Keynesian paradigm are for example often also referred to as the post-Keynesian tradition or the post-Keynesian school of thought. Throughout this thesis, each of these terms, a paradigm, a tradition, or a school of thought, can be regarded as interchangeable concepts and terms, however the term 'economic paradigm' will be the one used primarily outside of the included quotations and otherwise.

To explain the nature of scientific progress, including how any given paradigm has emerges, and how any past ones disappeared, Thomas Kuhn adopted the terminological distinction between *normal science* and *extraordinary science*. According to these two terms, normal science is science which is performed by a given paradigm within its own philosophically established boundaries. Extraordinary science on the other hand is scientific work which is performed with a focus in mind on either the continued development or the alteration of any of the already established philosophical foundations and boundaries. Extraordinary science in this sense is performed to bolster the 'core' of the paradigm. Extraordinary science is also science that is focused on for example the philosophical foundations (i.e. the core) of *another* paradigm, typically in an effort to either critique and propose changes to it, to integrate ideas from it, or to succeed it. Extraordinary science can therefore be an effort to develop a new alternative paradigm, most often to succeed the paradigm that at the time are the mainstream and dominant one. These types of paradigmatic successions from one dominant paradigm to another may be sought in order to evolve a science away from its present state, typically if a 'crisis' within the core of the mainstream paradigm is perceived to have emerged (Dow, 1999, p. 19). On the successions of paradigms, Randall Holcombe explains that commonly,

"*One paradigm dominates a field of inquiry, and competing paradigms attempt to displace the dominant paradigm by doing a better job of explaining anomalies in the dominant paradigm*" (Holcombe, 2008, p. 66).

Therefore, extraordinary science is what can lead to Thomas Kuhn's concept of scientific revolutions. As an example, within the economic science field post-Keynesian paradigm is a current and clear case of a competing paradigm to the dominant mainstream neo-classical paradigm, as it seeks to replace and in cases succeed the neo-classical philosophical system and ideas, one which post-Keynesian economists perceives to be in a state of crisis (Lawson, 1994, 1997). But in a mature science, as exemplified often by physics,

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methodologies, out of which emerge distinctive sets of methods and theories, expressed in terms with meanings shared by the community. These paradigms are incommensurate in that there is neither an independent set of principles
by which to judge them, nor a shared set of meanings of language by which to discuss them" (Dow, 2004b, p. 277-278)

extraordinary science is an unusual activity which only comes to the fore at times of crisis. Normal science, where foundations are not questioned, is the norm. By not questioning foundations, those engaged in normal science effectively accept the paradigm's principles as being the best" (Dow, 2004b, p. 285-286).

Thomas Kuhn's philosophical framework of the structure and progress of science is thus a way to break down the historical progress of the various economic science ideas, and for identifying and delineating where, and for what reasons, the 'revolutions' in economic ideas have taken place. But Kuhn's idea of a mature science does not fit well with social science, which is more akin to an immature science, *"a situation where several paradigms persist simultaneously and where extraordinary science is accordingly more prevalent*" (Dow, 2004b, p. 286).

Over the course of more than a century now there has existed several identifiable distinct economic paradigms within the economic science community. As explained, these distinct paradigms have each, to varying degrees, worked from their own systems of economic philosophy foundations and ideas as they have engaged in their economic work. In addition to the orthodox mainstream neo-classical paradigm, the group of existing paradigms also include the heterodox non-mainstream paradigms, such as post-Keynesianism and Austrianism, and others that not examined within this work, including feminist economics, Marxist-radical economics, neo-Ricardian economics (Lee, 2009) (Dow, 2011), behavioral economics, and mainline economics (i.e. new-institutional economics) (Boettke, 2016). If one goes further into each of these individual paradigm, and others not mentioned, it is typically the case each are further distinguished by various sub-groupings, wherein economists from the same paradigm argues along different but less paradigmatically defining points of philosophical and theoretical origin [61].

To give a brief glimpse into how the economics has been structured by paradigms, and how it has progressed, a few examples follows. At present, in this 21st century, the economic science community is structured in a decentralized fashion as it consists of a wide range of several individual and distinct co-existing paradigms. Included amongst the current paradigms are for example the neo-classical economics paradigm, the post-Keynesian economics paradigm, the Austrian economics paradigm, the Marxist and the neo-Marxist economics paradigms, and the new institutional economics paradigm. Some of these enjoy a long scholarly history, for example the Austrian economics paradigm which goes back to its founding in the late 1870's by the works of Carl Menger. Other paradigms have been founded in more recent decades, as for example the new institutional economics paradigm that began to form and gain traction in the 1970's. Economic paradigms that were active in and before the 20th century, but that since have either largely disappeared, have been transformed, or have been 'absorbed' into other

[61] Within the Austrian economics paradigm for example, there are identifiable distinctions between the Hayekian approach, one that is mostly concerned with the contributions and the positions taken by the Nobel laureate economist F.A. Hayek, or the Misesian approach (i.e. neo-Austrian), one that is more committed to the positions taken by Ludwig von Mises, another prominent Austrian economist, who developed the system of praxeology to advance the science of human action, a science that he saw as the very foundation for engaging in economic analysis (see Mises, 1933, 1949, 1962). Both 'groups' to a very high degree share the same features, lines of reasoning and conclusions (see e.g. Boettke, 2018), but as it is with the nature of science, to strive for the achievement of rigor to the highest extent possible, even economists within the same paradigms find causes for disagreement.

paradigms, includes for example the German historical school paradigm, the classical and the mercantilist economics paradigms, the French physiocratic paradigm, and the Spanish scholastics paradigm. Now it is evident that at closer inspection certain economic paradigms are, or were, more philosophically developed and oriented than others, and some paradigms also share overlaps with others in their philosophical foundations[62]. It is however not the purpose here to dive deeper into each of these paradigms and how and for what reasons they have taken on different ideas in their economic science endeavors. That is too great a task and goes beyond the intended scope of research within this work. The case in point here however is that, in taking a 'Kuhnian' approach on delineating the progress of economic science, it is made clear that at any given point in time within the last few centuries, there has existed *a wide range of co-existing distinct and individually functioning economic paradigms* within the economic science community. As individually functioning paradigms, each of them are, or were, engaging in economic thought in their own way, *working within their own systems of economic philosophy with diverse worldviews, modes of though, methods and theoretical conclusions*. This has been the norm within economic science, opposite to a scientific structure and progress from just one concurrently existing paradigm to another. Another important point is also that, as a consequence of the several distinct and co-existing paradigms being in active at any given time, there is no unified view, no consensus, and no clear-cut vision with regards to what the precise and appropriate nature, scope, and methods is, or should be, for economic science, when it comes to the development of both sound and reliable arguments in the fields of economic ontology, epistemology, and methodology, and for that matter also in economic substantive theory and policy. Over the last centuries both normal science and extraordinary economic science, within and across the paradigms, have shaped, evolved, and 'revolutionized' the knowledge in the field. But problematically, that progress has taken place in the absence of any clear-cut consensus and unified view about was counts as true, sound, and reliable economic knowledge and practice. Instead the progress has led to a prevailing structure, one that would well be defined as a scattered pluralism, one that has left the science of economics in a high degree of scientific fragmentation (Bigo & Negru, 2008). This current state of fragmentation, as will further explained below, is the result of the broad range of increasingly disconnected, diverse, and often contrasting ideas between each of the economic paradigms. Sheila Dow explains that at certain economic ideas even seems to be completely incommensurable in the current state of economic science (Dow, 1999, p. 21).

In order to further develop the review done so far on the current structure and state of economic science, the following sections will present more in-depth examinations to elucidate more explicitly the consequences and the necessary implications that has come about due to the problematic nature of the scattered pluralism and the high degree of fragmentation within

[62] For example, philosophical overlaps exist between the neo-classical and the new-Keynesian paradigms. Jesper Jespersen (2009, p. 232) correctly points out that these three paradigms all are committed to the philosophical system of logical-positivism including its methodology of deductivism. This is the case despite their differences in name, which instead relates to differences in their substantive theories and assumptions about rigidities, information, and other concepts within the economic system. To an extent the new-classical paradigms also share philosophical features with the other two, though it also leans toward logical-idealism. Jesper Jespersen categorizes, under the neo-classical methodological umbrella, due to their philosophical alikeness, the following schools of thought; Neo-classical; Old-Keynesian (neoclassical synthesis); Monetarist; New-Classical; New-Keynesian (2009, p. 16). This despite individual their differences in theoretical assumptions and conclusions.

economic science. As proposed in the insightful paper by Vinca Bigo and Ioana Negru (2008), a paper wherein they investigate these issues, an account is then given of their proposed method of an ontologically reflexive pluralism, which is the method they recommend to seek resolutions to the issues of fragmentation and to thereby advance economics towards a higher degree of integration instead within an increasingly structured pluralism as Sheila Dow finds to be a more productive scientific state (Dow, 2004b). Final remarks are in conclusion to this part then given on why confronting the problematic issues of fragmentation in economics are deemed as a highly relevant and critical task for the robustness of the science and its knowledge as a whole.

Appendix 1.3: Pluralism in Economic Science

About the prevailing structure in economic science being consistent of several co-existing and competing paradigms, it was explained already that the classification of *pluralism* necessarily defines the current state of economics. Even if some economists state their disapproval of economics being in this state, and rejects the scientific legitimacy of the claims and the contributions made by other economists arguing from a different systems of ideas and perspectives, it does not invalidate the case that economic science is scattered between a pluralism paradigms and conceptions that sometimes contrasts one another. It is so due to the absence in the first place of any unified consensus between economic scientists about what is legitimate and what is not in their science. Sheila Dow describes for example that

"There is now a grouping of around 40 international organizations in ICAPE, the International Confederation of Associations for Pluralism in Economics. At the theoretical and policy levels too, there has been an explicit expression of pluralism" (Dow, 2004b, p. 275).

Generally however, economists that are critical of the ideas and contributions made within the other paradigms are in recognition of the pluralistic reality and that there is a whole range of different understandings when it comes to economics and different systems of philosophy, methods, theories, empirical conclusions, policy analysis and so forth (Dow, 2004b, p. 75). On this state of an openness and acceptance with regards to pluralism in economic science Vinca Bigo and Ioana Negru (2008) mentions how

"few would disagree that the state of play across the social science consists in a vast plurality of scholarly contributions … a degree of pluralism prevails; that is, there seems to be an openness to the development of varying approaches, opinion, methods, and so on" (Bigo & Negru 2008, p. 131).

The nature of pluralism described here in economics are commonly defined by the concept of *methodological* pluralism. Methodological pluralism (or philosophical pluralism given how the term methodology is understood within this thesis, see appendix 1.1.3), implies a scientific structure wherein there is an embodiment of an *a priori acceptance* of other ideas than one's own (though not agreement with them), an acceptance or sometimes advocacy of plurality. A structure of methodological pluralism is one conducive to *"the co-existence of a plurality of theories, methods, methodologies, approaches, models, explanations, assumptions, and so on"* (Bigo & Negru 2008, p. 131), and so the term very well describes the current structural state in economic science community. Sheila Dow (2007) sees this pluralism in economics as one in

ongoing change, wherein the variety of co-existing perspectives (i.e. paradigms) are present at the levels of both philosophy and theory.

The opposite to methodological pluralism is a structure of methodological monism. Monism is the state in which a scientific community (e.g. economics) share in a settled meta-consensus about the appropriate way to understand, approach, and engage with the subject of investigation. If a scientific community agrees on what constitutes the 'legitimate' nature, scope, and methods for their field of investigation, then methodological (i.e. philosophical) monism would be the proper classification for that science. Whether there is present case of any field of science which have accomplished such achieve such a complete state of monism is unclear to the author, but it is clear that if economic science is compared with the natural science of physics, or the logical science of mathematics, then the state in economics is one of a much higher degree of methodologically scattered pluralism, where physics and mathematics are closer to monism in a spectrum of two extremes[63]. Thus, when it comes to pluralism and monism in economic science, then, from a 'meta-perspective', the science in its current state is indisputably a pluralistic one. Each economic paradigm pursues their own developments for economic knowledge and explanations about the important features of our socioeconomic reality. Maurice Allais (1992, p. 31) illustrates the case of pluralism and of contrasting views in economics clearly when he explains that,

"From the innumerable analyses which have been produced over the past years, only one certainty can be drawn: ***the deep disagreement, indeed the disarray, that prevails amongst experts****, whether it be with regard to the floating exchange rate system; the dollar rise and subsequent fall; the fluctuations of interest rates; the United States trade, payments and budget deficits, and their interdependence; the role of the Euromarket; Third World debt, etc. ...* ***The striking fact is the absence of a consensus, not just on any sort of diagnosis, but on prospects for the near future as well*** (emphasis added)" (Allais, 1992, p. 31).

In both economic philosophy and theory there are an absence of syntheses, and as a consequence, a whole range of different and in some cases contrasting diagnoses and proposed remedies are presented by the economic science community towards contemporary real-world economic issues.

It is worthy to note that methodological pluralism is not necessarily by nature a problematic state for a science. A state of methodological pluralism can reflect a natural progress of scientific discovery, where several explanations prevail within an ongoing debate about a given phenomenon. Pluralism can also open up for a wider scope of analysis and explanation for any given phenomenon as any theory and model must assume some parts of the complex socioeconomic reality away. In that way pluralism therefore allows for a more nuanced and complete understanding of a given phenomenon due to the different points of view, models, and explanations (Holcombe, 2008, p. 64). And Sheila Dow describes on the beneficial nature of a degree of pluralism that

[63] Sheila Dow explains about natural science that the context of for example physics *"is one of disciplines which are viewed as having a shared understanding of the range of possibilities at any point in time and a shared understanding of their subject. Even when there is (Kuhnian) revolutionary change, either a new paradigm replaces the old one, or the old one is absorbed into a new synthetic paradigm"* (parenthesis added) (Dow, 2018, p. 13)

"To restrict economics to one, inevitably limited, monist approach is to restrict the scope for reliable knowledge, reducing the scientific capacity of the discipline. Further, without the obligation which pluralism imposes to explain and defend one's own approach, economic theory from any one approach is weaker and less capable of constructive evolution" (Dow, 2018, p. 25).

The problematic nature in a high degree of pluralism comes about when it is a pluralism that is scattered. A pluralism that is scattered implies that each of the different paradigms and their modes of explanation for example are disconnected to a high degree and contrasting in their explanations for the same phenomena, and it means that the paradigms have increasingly entrenched themselves and have become detached from engaging primarily with the other paradigms and their modes of explanations in the search for resolution. These issues are a problematic state for a science, they are issues of *fragmentation*. As Vinca Bigo and Ioana Negru suggests, there is in economic science such a high degree of scientific fragmentation when the science is considered as a whole in its current state (Bigo & Negru, 2008) (Dow, 2004b)

Appendix 1.4: Fragmentation in Economic Science

As it was briefly outlined above, economics science, in its current form, and due to different reasons, is in a state of *fragmentation* (Bigo & Negru, 2008). The fragmentation chiefly been brought about due to the scattered pluralism between the paradigms wherein a range of differences, disagreements, and contrasting ideas and explanations prevail between the abundance of academic contributions made on different economic topics. In economics fragmentation is evident at all the different levels of thought, including ontology, epistemology, and methodology, as well as theory, empirical work, and policy advocacy. The relevant question is, as Sheila Dow puts it,

"Why exactly is it that there is widespread agreement that we have no conclusive basis for agreeing on one best epistemology, and therefore, must accept that science will be pursued pluralistically? Were it defensible, a monist approach would be more satisfactory" (Dow, 2004b, p. 282),

or for that sake one best ontology or methodology? One reason for the fragmentation in economics is the differences already explained between the distinctions of paradigms, including how each in different ways perceive, organize, and practice the science. A secondary reason is that for over a long period of time the norm in economics has been a lacking investment in, and concern for extraordinary science within the paradigms[64]. It is a lack of

[64] Some advances are however being made towards increasing the conversations and understandings between economic paradigms, for example in the Cambridge Journal of Economics which in a recent call for papers asked its contributors to "*investigate any aspect of the history of economic thought, so long as it can fruitfully be illuminated by a focus on ontological issues. They may for example consider questions of method, examining how heterodox economists have invoked considerations of (philosophical) ontology in criticizing the mainstream and/or making the case for their own preferred approach economic analysis. Another possibility would be to examine how one or several authors or schools have engaged in (scientific) ontological reasoning, using their ontological reflections to inform their efforts to develop and improve their analysis of key features of economic life (money, markets, firms, rules, trust etc.)*" (CJE, 2019). The research goals sought here in this work, which includes ontological reflections, share some of the goals of the journal about comparing the different paradigms

extraordinary science that should have aimed towards enhancing the mutual understandings of the positions ideas that the 'other' paradigms take in the way they argue about their philosophical foundations and presuppositions, their theories, and analyses. Dow explains this when she writes that

"had economists been more methodologically aware in the past, we would have made more progress, not least by avoiding debates that were fruitless precisely because of a lack of awareness of methodological differences … Serious communication issues are involved here too, between philosophy, methodology, and economics; even with a general methodological awareness among economists, attention must be paid to easing the translation of ideas between specialists in the different levels" (Dow, 1999, p. 19-20)[65].

And without that awareness, the communication between the paradigms is not only a problematic process during times of crisis and change, but also in the day to day discourse, where Sheila Dow then further points out that *"the distinctions between normal science and extraordinary science then become blurred"* (Dow, 2004b, p. 286). But if economists are philosophically more aware of the respective differences, then theory can develop more productively across the paradigms, and it is in such instances of productive communication where Sheila Dow finds most breakthroughs to occur. This lack of extraordinary science in analysis and conversations *between* the paradigms to counteract the current high degree of fragmentation is ultimately a significant issue and has added to the absence of any clear consensus and syntheses on a range of economic subjects (Bigo & Negru, 2008, p. 129-131). The fragmentation in economic ideas where any clear-cut consensus and synthesis is lacking includes for example the philosophical and theoretical arguments and the positions taken on economic causation, human rationality, time and uncertainty, determinism, and economic value. The issues also includes, as explained earlier, what modes of thought are deemed valid for economic research, including whether closed-system or open-system theorizing are appropriate, or whether deduction, induction, or abduction best fit the epistemic nature for the process of uncovering economic knowledge.

To Bigo and Negru (2008) there are two primary causes that has led economic science into its state fragmentation. The first cause of fragmentation, one which Maurice Allais also points out (Allais, 1992, p. 36), is the increasingly specialized and the compartmentalized structure of economic science into distinct sub-fields. This type of fragmentation Vinca Bigo and Ioana Negru classifies as *fragmentation due to non-assembly*. As economists have continued to expand the scope as well as the depth of economic inquiry and explanation, it is increasingly more difficult for individual economists to be informed and aware of the whole range of economic subjects, including theories, new definitions, philosophical presuppositions, experimental results, the methods that different economic paradigms adopt in their work and so forth. The tendency towards non-assembly, where compartmentalized and specialized economic contributions are not sufficiently synthesized into a coherent whole has resulted in

in order to achieve more explicit understanding of their comparative natures and from there seek integration of their differences.

[65] In her description, Sheila Dow points out that Kuhn's (1970, p. 202) resolution to communication issues between science communities is that "*what the participants in a communication breakdown can do is recognize each other as members of different language communities and then become translators*".

gaps of fragmentation between 'low' and 'high' levels of empirical, theoretical, and philosophical work (Bigo & Negru, 2008, p. 135).

The second cause for the fragmentation is classified as *fragmentation due to non-resolution.* Non-resolution is leads to, and is equally the result of, a continuation of "*divergent, conflicting views, approaches, methods, and so on"* (Bigo & Negru, 2008, p. 129-130). This latter cause of non-resolution they find to be the more problematic cause of the two. It is more problematic given how fragmentation due to non-resolution is not, like non-assembly is, a result of the extension of a division of labor into economic science sub-fields and a continued increase in the amount of economic science contributions. Non-resolution is instead the result of the current splits between economists into their different economics science paradigms which are committed to different and in cases conflicting philosophical, theoretical, and empirical ideas and methods. As an example, neo-classical economists in their work primarily focus on closed-system mathematical model descriptions, on quantitative predictions, and on the estimation of future equilibrium outcomes. In contrast to this neo-classical mode of thought is how the post-Keynesian, or the Austrian economists, commit themselves to qualitative explanations, to open-system analyses, and to identifying the underlying causal processes within the economic systems. These differences are based on, as it will be shown later, contrasting ideas about the ontological nature of economic reality and the epistemic nature of economic knowledge and how science can obtain it. So while it in the first place is a difficult task for economists to keep a clear track of the range of economic research topics and specializations within, and across each of the different paradigm, that difficulty is enhanced even further from how these paradigms comparatively adopt and make us of a range of different and unique "*divergent, conflicting views, approaches, methods, and so on"* (Bigo & Negru, 2008, p. 129-130). One problematic issue related to non-resolution are the cases in which "*non-modelers cannot publish (for the 'lack' of mathematical formalism and/or econometric analysis) in certain journals"* (Bigo & Negru, 2008, p.37). Exclusion from economic journals, based solely on modes of analytical expression, further adds to the reasons why there are a problematic absence of conversations, exchanges, and attempts at resolutions regarding economic ideas between the paradigms. A second problematic matter that also impedes the inter-paradigmatic debate on ideas is the use of paradigm-specific technical vocabularies and their individual definitions regarding economic terms commonly used in economic discourse. This use of paradigm-specific vocabularies and definitions of terms is an issue that discourages the pursuit of integrative work and a systematization of economic ideas. Instead "*the situation serves only to cause a further (increasingly irreversible) entrenchment of views and specializations (and further contributes to fragmentation)*" (Bigo & Negru, 2008, p. 137). For example, as will be shown later, the neo-classical and the Austrian conceptual definitions of rationality and irrationality presents two very different accounts of what is meant by human 'rational' choice and action, and this skews the conversation between neo-classical and Austrian economists when they refer to rational and irrational human choice. The same applies to discussions about the fruitfulness of deductive logic in economic science since logical deduction within the neo-classical and the Austrian systems of thought are grounded in widely different presuppositional reasonings.

Other issues regarding differences between paradigm-specific definitions and understandings includes for example to different degrees the economic concepts of rationality, uncertainty, money, firms, and markets outcomes, as well as information and knowledge, capital, economic value, interest rates and inflation. The issue is how the differences in their respective conceptions of what the nature, the consequences and the implications are of these and other economic concepts continues to complicate attempts at resolving the fragmentations in economic ideas. It thwarts clear insights and explicit awareness about how each paradigm perceives and reasons about economic theories, mechanisms, events, concepts, and their interpretations and explanations for past, present, and future economic events. The pursuit of obtaining the clearest possible answers through criticisms back and forth between the different modes of explanation may be based on inaccurate understandings of what is actually inferred in the arguments from different viewpoints, making it problematic to navigate the true nature of the rationales brought forth as differences between the conceptions of economic terms may lead to economists not implying the same things by those terms in a dialectic discourse. Usually when there are several, but contrasting, viewpoints and theories, those should under a process of rational scrutiny be compared to each other, in order to correct or combine, or to further develop them where needed, but due to the described entrenchments and disconnects between the paradigms and their economists, this type of process in economics is being obstructed.

In part three will be presented a closer probe into the fragmentations between a selection of paradigms and how their differences can be classified by an analysis of their ontological and epistemological commitments, commitments that are identified within a framework of philosophical *realism*. Before the presentation of these philosophical differences however, an account is first given here below of the concept of *scientific integration*, as well as of an account of the method of an *ontologically reflexive pluralism* for achieving increased scientific integration.

Appendix 1.5: Integration in Economic Science

In dealing with the fact that economic science is in the problematic state of fragmentation, a primary and pressing point of inquiry becomes how to reach any resolutions towards a higher degree of *integration* about issues and concepts like those described above. Because importantly, "*for the understanding of a domain of study to progress few would argue against the need for a degree of integration between the many different contributions" (Bigo & Negru, 2008, p. 128)*, a point that that should apply to economic science as well, even if it is evidently far from that point at present. So, the relevant question is then, what route may economists take in their work towards transitioning economic science towards a higher degree of fragmentation? For as it were argued earlier, important features are lacking within the economic science community, and other existing features are highly problematic, in order to advance the science through an integrative process. Maurice Allais for example points with regards to advancing syntheses in economics, including on both issues of non-assembly and of non-resolution, that

"The domain of analysis of economic science today has been so greatly enlarged that it is tending more and more to become specialized into different fields: the description of institutions, price theory, the theory of risk, monetary theory, the theory of international trade,

*the theory of development, business cycle analysis, are but a few of them. There are many others. This specialization is necessary, for it seems clear that it would be beyond one man's capacity to have thorough knowledge of all these different fields. Nevertheless, it is essential to maintain concern for synthesis. Progress in each individual field is conditioned by a broad overall view, and thus such a view is essential … **It is by the way of a vast global effort of synthesis that immense progress can be realized by the science today*****"*** (emphasis added). (Allais, 1992, p. 36)

Maurice Allais leaves out examples concerning synthesis within economic philosophy, but the argument should remain the same for those levels of thought given the plurality of views and modes of thought and the continued presence of fundamental disagreements and contrasting views. So, by what route can such deep-seated and highly problematic fragmentation issues be dealt with appropriately? To resolve a range of issues from fragmentation and to work towards achieving a higher degree of integration within the economic science community and its ideas instead, Bigo and Negru (2008) introduces the method of analysis which they have termed an *ontologically reflexive pluralism.* Ontologically reflexive pluralism is defined as the process of engage in analytical research on any of the attendant fragmentation issue perceived in economics, and the procedural approach is comprised of engaging in *comparative* examinations of the respective issues by studying the literature as well as other forms of scholarly contributions attributed to them. Such a comparative form of examination will likely be of a cross-paradigmatic nature (meaning comparing two or more paradigms) in order to analytically compare them by reflecting on their differences about the respective fragmented economic ideas, vocabularies, and definitions. Ontologically reflexive pluralism means to examine how they use them, as well as to comparatively follow their respective lines of reasoning that has led to their conclusions and the present problematic differences or even incompatibilities in those conclusions. The approach calls for examinations that when necessary engages in the process of tracing the disputes back to their ontological starting points and reflecting upon them. In some cases, it may also require a focus on the epistemological origins of the differences between the argued conclusions.

The aim of ontological reflexivity is not to adopt an a priori ontological worldview to superimpose on the various systems of philosophy and theories. The purpose is instead to inquire about the specificities of the different ontologies that are presupposed in the systems of economic philosophy, the methods, the theoretical frameworks, and the policy advocacy. For importantly, as Bigo and Negru explains that

"It is not unlikely that such an inquiry will throw up a host of different (philosophical) world views, or indeed divergent conceptions of the specific (scientific) topic under study, whether firms, markets, money, care, and so on. Paradoxically perhaps, it is the fact of rendering visible differences (in presuppositions) that emerge out of such an exercise that will often prove of the greatest relevance" (Bigo & Negru, 2008, p. 141)

Concerning the implied meaning of 'pluralism' in the name of the described method, Bigo and Negru state that they see the 'pluralist project' as an ongoing one, one that engages in reflexive and integrative analysis, as it actively seeks to establish connections between the range of ideas which they put at the center stage (Bigo & Negru, 2008, p. 127). Through research and conversations within the economic science community, the pluralist project seeks to 1)

overcome disagreements and differences and 2) to connect and consolidate the many partial economic ideas and insights where possible (Bigo & Negru, 2008, p. 134). This format of a pluralist project essentially implies Kuhn's conception of doing *extraordinary science* as means for achieving further integration by identifying the very root causes of the attendant issues of fragmentation. Bigo and Negru sees the reflexive and integrative 'pluralist project' (not to be mistaken with methodological pluralism as described earlier) as a necessary project that economic as well as social scientists in general must engage in given the present problematic state of fragmentation including the absence of philosophical and theoretical explicitness within and between the paradigms.

As there were two primary causes of fragmentation, namely of non-assembly and of non-resolution, Vinca Bigo and Ioana Negru distinguishes also between two primary routes toward increasing scientific integration. These two are namely *integration by assembly* and *integration by resolution*. The first, integration by assembly, is a process of reversing the fragmentations due to non-assembly. Integration by assembly is a process of combining the insights from different and hitherto compartmentalized or specialized subjects, fields, and realms, wherein the contributions are lacking sufficient integration to be considered in synthesis. Presupposed in a process of integration by assembly is that the insights and the ideas must each be based on shared presuppositions and foundations (i.e. ontological and epistemological) concerning the objects and the social realm that the objects are located within (Bigo & Negru, 2008, p. 145). If that requirement is found to be fulfilled, then insights previously fragmented may be combined to "*acquire a bigger n-dimensional, and also a deeper, picture, so gaining in completeness through assembly, akin to a jig saw puzzle*", a puzzle which they by analogy compares to how theories of limbs, organs, cells, etc., are merged into a combined theory of the whole human body. An example of integration by assembly would for example be the Austrian business cycle theory which the Austrian economist Ludwig von Mises first introduced and formulated in his *Theory of Money and Credit* in 1912. Ludwig von Mises used three different and hitherto non-assembled economic theories, where, as Austrian economist Richard Ebeling describes that,

"Mises was very much aware of its multinational roots. The notion that the market process can be systematically affected by a divergence between the bank rate of interest and the natural rate came from Swedish economist Knut Wicksell; the understanding that the process so affected would have a self-reversing quality to it came from the British currency school, whose analysis featured international gold flows. The uniquely Austrian element in Mises's formulation is the capital theory introduced by Carl Menger and developed by Eugen von Böhm-Bawerk" (Ebeling, 1996, p. 8-9).

Austrian business cycle theory is thus an example of specialized economic theories that were assembled by Ludwig von Mises from his explicit in-depth understanding of them and the insights they would bring to bear about the causes of business cycles when synthesized.

The second route for integration is integration by resolution. This is primarily *"a process of sublation, or dialectical resolution, of existent divergences, to gain, ultimately, in truth and accuracy"* (Bigo & Negru, 2008, p. 134). From this approach the process aims at locating the conflicting views and presuppositions from their ontological and epistemic origins by tracing them back to those. The effects of assembly by resolution is that the inconsistencies in one or

more of the conflicting views, presuppositions, ideas, etc., can be illuminated, for example when it comes to different ontological conceptions about the socioeconomic realm, or about the nature of determinism or uncertainty, or about the epistemic implications of different types of economic institutions under which people conduct economic actions. Integration by resolution may further uncover if or where there are inconsistencies in the methods adopted for the study of a specific economic subject, inconsistencies that are revealed when the lines of reasoning from several modes of thought are comparatively reflected upon. The result in any case from this mode of integrative work is that a dialectical process of conversation is opened up towards achieving resolutions to the disputes and conflicts between different economic views and commitments. Integrative work however necessitates both a high degree of philosophical as well as theoretical explicitness, necessities which Vinca Bigo and Ioana Negru points are an issue in economic science (Bigo & Negru, 2008, p. 139). In economics they find a remarkable absence of explicit accounts of the philosophical presuppositions and of the theoretical systems which are used in the different scholarly works. That absence includes explicit accounts of essential features like the ontological presuppositions and worldview taken about the nature of the social realm. The issue extents to accounts of epistemological claims and the nature of economic knowledge, and also into an absence of more explicit methodological and theoretical justifications. Those absences are a major obstacle in the way of integrating ideas, as the absence of explicitness within the different paradigms, their modes of economic thought, their ideas and so forth, sustain the lack of explicitness itself between the paradigms causing the fragmentations to prevail in the economic science field (Bigo & Negru, 2008, p. 139-140). Economic scientists may in some cases in fact be discovered to be studying rather different things and ideas as their set of vocabularies and definitions might not be covering identical subjects or entities (Bigo & Negru, 2008, p. 146). Economists for example understand the nature of money, the causes of inflation, and market mechanisms conceptually different, or they focus on different aspects of them. It may also be that opposing views and ideas are defended implicitly in for example methods, theories, or the interpretation of the data used. Being ontologically reflexive helps researchers to identify where and how deep the tensions are rooted in order to begin resolving them to facilitate a process of integration by assembly of the found non-resolution issues (Bigo & Negru, 2008, p. 146).

If one considers a continuum of options for where a science should be positioned between the extremes of complete fragmentation and complete integration, then an appropriate and expedient goal would be to aim for at least a relatively high degree of integration. Complete fragmentation as an aim essentially implies methodological relativism, a state in which *"equal acceptance of all stances is encouraged"* (Bigo & Negru, 2008, p. 132), and wherein no judgements or assessments can be made over the range of perspectives, stances, and ideas due to the a priori absence of rules and structure. For the progress and reliability of economic science, methodological relativism could be argued to be counterproductive aim since no standards and justifications of truth can be claimed regarding disputes, as "*all interpretations become defensible but at the price that none is more justifiable than the rest"* (Bigo & Negru, 2008, p. 133). The opposite extreme to complete fragmentation is complete integration. Complete integration is a scientific state that presumably is unattainable as it would imply a scientific state of omniscience, meaning that everything in a science is agreed upon and are in

synthesis, and it further implies that any expectations about future change would be known to all, or it would mean that the state of flux in our human economies have dissipated. Another feature of social reality that stands in the way of complete integration, explains Sheila Dow, is that whereas

"*natural science may be expected to 'progress' in that they deal with subject matter which has not changed fundamentally during the history of modern science, the social sciences deal with behavior, preferences and institutions which inevitably do change, changing the framework within which choice is framed and expressed. As a result, the social sciences may be expected to change both their emphasis and their mode of analysis to suit their times … As such, it is likely that there will be, at any one time, strong differences of opinion as to which approach does best 'suit the times'*" (Dow, 1983, p. 30),

It is likely therefore that, at any point in time, several co-existing paradigms will be active within the economic science field.

With the various features which have already been used to describe the state of economic science, it seems evident that a classification of economics to describe its current overall state is one that, at the very least, would be close to the extreme end of relativism on the spectrum, and a relativism of significant fragmentation. It would imply that a lot of integrative work in economics is called for, even if by the features of social reality would prevent any complete integration of the science in line with the extent of integration and synthesis within natural science (e.g. physics, chemistry).

To summarize the first part of the thesis, the argument was presented of the relevance in conducting ontologically reflexive studies within the science of economics about the current scattered pluralism as well as issue that has led to the fragmentation in the science, including problematic issues that maintains the fragmentation. By adopting the method of an ontologically reflexive pluralism, it is possible to advance the degree of mutual understandings through a dialectic discourse, in order to reach resolution to current disputes and incompatibilities between the different active economic paradigms. Through ontological reflection, reasons that has led to and which sustains the disputes, contrasts, and incompatibilities in world views and presuppositions about the socioeconomic realm can be uncovered, including the justifications for those ideas, views, methods and so forth,

"*one can examine if methods are appropriate to, or consistent with, the nature of the realm in which the subject matter is located. Whilst a certain conception 'X' of the nature of the social realm can often accommodate an array of methods, it is also clear that certain methods can a posteriori be seen to be inconsistent with the particular conception 'X'*" (Bigo & Negru, 2008, p. 142).

Where methods or theoretical ideas conflict, it may be due to divergent presuppositions in philosophical systems and conceptions about the nature of reality and the object studied, or both. The relevant point is that the conversation towards resolution can be located at the right place. As Bigo and Negru concludes,

"*It is completeness by way of resolution with a view to achieving a greater degree of (methodological) consistency, and so integration, that is in this instance facilitated by the suggested ontological turn. This is a first way then in which ontological reflexivity can be seen*

to pave the way towards resolving tensions and differences towards greater integration" (Bigo & Negru, 2008, p. 142)

An ontological turn, and even an epistemological turn for certain cases, can better situate syntheses and increase the reliability of knowledge from economic science and thereby reverse the at present continuing state of affairs of the highly fragmented nature of economics with its growing body of contributions. Ontological reflexivity serves to facilitate constructive exchanges by way of finding resolutions to differences, thereby piecing together the issues of non-assembly, non-resolution, and problematic differences in vocabularies and definitions.

Appendix 1.6: Reflections on the State of Philosophical Realism in Economics

Coalescing together the concepts and ideas reviewed to this point, and their terminological meanings, is helpful in developing a foundational framework that is able to analytically engage with an examination and identification of one, or more, of the current matters and issues of fragmentation in economic science. From the above accounts of the status of economics in appendix 1.3, 1.4, and 1.5, and with the delineations of ontology, epistemology, and methodology, before that, and how theory in economics is inherently connected to those, it is possible to engage in a process of examination and identification of fragmentation in the ideas on realism in economic science, including a process of identifying the level of economic thought at which an issue is ultimately left unresolved, and whether that issue is due to it either having not been integrated through a process of assembly yet, or whether the issue is due to a matter of non-resolution regarding the mutual views and understandings on realism. In moving ahead, the attendant issue concerns what explicitly is meant by philosophical *realism*, as it pertains to both its nature, the ideas is grounded in, and their implications for economic science. This specific issue is a fragmented one when it comes to both the nature of an ontologically realist worldview, the epistemological status of realist economic knowledge, and the methodological implications of realism with respect to the nature, the attributes, and the scopes of practical methods for economic knowledge. In Appendix 2 is presented a framework on philosophical realism, which outlines the various types of realism and non-realism and applies to various philosophies in economic science, with a schematic overview of where some of the economic paradigms are positioned on accounts of their ontological and epistemological views and commitments.

Appendix 2: Scientific Realism in Economic Science – A Framework

To examine the various types of realism in economic science, a framework on *realism* in science in general is useful to enable a classification of what the overall aims, the ideas, and the commitments are, within the various philosophical systems in economics, and how these may be compared. For the purpose of presenting such a framework on scientific realism, the realism-framework developed by Sheila Dow (1990) is reviewed. Dow's framework demarcates the various distinctions between varieties of philosophical *realism* as well as *non-realism*, including the levels, the types, and the variations of these as they pertain to economic science. With this realism-framework it is possible to perform examinations of how e.g. critical-realism and causal-realism categorically compares in their understandings of what realism is in economic science. In her framework Sheila Dow specifically emphasize various types of ontological and epistemological realism and non-realism, with explanations of how different economic methodologies have arisen from those. However, before presenting Dow's realism-framework, a few preliminary descriptions on realism by Uskali Mäki (1990) and from the Stanford Encyclopedia of Philosophy (SEP, 2017) will first be given, as these descriptions positively augment the descriptions by Sheila Dow that then follows. This appendix 2 applies several of the terminologies reviewed in Appendix 1, and so for the reader unfamiliar with those, Appendix 1 should be visited beforehand.

In economic philosophy there are paradigms which are committed to what they consider as ideas that represent scientific *realism*. At closer inspection however, there are identifiable differences between those paradigms and their philosophical foundations, even if each claim to take realist positions (Mäki, 1990, p. 314). But a general set of ideas are typically shared by each of these variations of scientific *realism*, which is that realism is a system of philosophy, or a commitment to a set of ideas, that takes the position that external reality does exist, and that it exists independently from what people might think about it or understand that existence to be. In contrast to this idea of realism stands *idealism*, or *non*realism (sometimes *anti*realism), a position that holds that only through the human mind and through the socially constructed meanings of things can 'reality' be understood (PES, 2017) (Dow, 1990).

It can be said that scientific realism is understood as an epistemic attitude towards the development of sound and 'realistic' scientific theories in the sense that they explain something about reality. The term epistemic here implies the gathering, classification, and validation of human knowledge, where realism implies the belief in, and the pursuit of, realistic knowledge through realistic descriptions about aspects of our world and the entities in it, both observables as well as unobservables ones. Observables and unobservables entities includes for example objects, properties, processes, events, laws, or relations, all which are types of entities studied in economic science also. In a commitment to philosophical realism there is thus implied the subscription to the idea that *scientific entities do exist* – in contrast to the idealistic view that entities only exist in the mind – when they are postulated or hypothesized about in theories and models (Mäki, 1990, p. 314). A broader description of scientific realism might be described as

"the commitment to the idea that our best theories have a certain epistemic status: they yield knowledge of aspects of the world, including unobservable aspects … the scientific realist holds that science aims to produce true descriptions of things in the world" (SEP, 2017).

While this description of realism captures the essential and general features of a realist position and its claims, the more definitive and detailed specifications about what scientific realism is differs widely between those who have contributed to the debates on it. Thus, moving further beyond the description above from Stanford Encyclopedia of Philosophy it becomes more problematic if one seeks to explain what philosophical ideas all realist scientists shares. In order to better understand and demarcate the differences between the current varieties of scientific realism, and for the purpose in this work of comparing the ideas and the commitments on realism within critical-realist and causal-realist thought, it is fruitful to examine those differences by first decomposing realism into those three philosophical dimensions. These are the *ontological* (i.e. the metaphysical), the *epistemological*, as well as the *methodological (*i.e. the semantic*)* dimensions of philosophical realism, with descriptions given as well of the counterpart ideas rooted in nonrealism (PES, 2017).

The dimension of ontological realism, as already hinted to in the beginning of this section, involves the idea and the claim of reality being a mind-independent existence. This claim involves that the world exists independently of the sciences and the scientists that investigates it. In contrast to ontological realism is the conception of ontological idealism (i.e. non-realism or anti-realism), and also "*some forms of phenomenology, according to which there is no world external to, and thus independent of, the mind"* (PES, 2017). So, in contrast to the ideas in ontological realism, the ontological idealist position denies the existence of a mind-independent world.

Within the epistemological dimension, realism is conceptualized as the idea that scientific and theoretical hypotheses and propositions constitutes knowledge that explains aspects of the real world. Therefore, scientific claims are interpreted as being approximate or literal descriptions of the real world (PES, 2017). In contrast to epistemological realism, Stanford Encyclopedia of Philosophy describes that epistemological skepticism is a position that doubts the epistemological sufficiency of human knowledge to be powerful enough to yield any real knowledge about reality, especially regarding unobservables entities including objects, properties, processes, events, and relations. The positions of epistemological skepticism might however still hold a commitment to ontological realism, the issue for the skeptic position is that there is no accessible knowledge obtainable to explain that reality as knowledge is fundamentally deemed subjective and changing.

The last dimension is semantic (i.e. methodological) realism, the philosophical position which, according to Stanford Encyclopedia of Philosophy, is the commitment to "*a literal interpretation of scientific claims about the world. In common parlance, realists take theoretical statements at "face value""* (PES, 2017). Claims and theories about observable and unobservable scientific entities (i.e. objects, events, processes, properties, and relations) should be interpreted in the literal sense as being postulations of real and true knowledge statements. The semantic realist position contrasts with the position of semantic instrumentalism. Semantic instrumentalism interprets theoretical descriptions, especially those postulating about unobservables, "*simply as instruments for the prediction of observable phenomena, or for systematizing observation reports"* (PES, 2017). This third dimension holds a relevance in economic philosophy given how monetarist economists presents their claims through

instrumentalist-inspired modes of thought in the way that Milton Friedman argued for a positive economics science (see for example Friedman, 1956).

By coalescing the above three dimension above together to explain the idea of realism, Stanford Encyclopedia of Philosophy describes is as the view that *"our best scientific theories give true or approximately true descriptions of observable and unobservable aspects of a mind-independent world"* (PES, 2017). Building upon these three described dimensions for a framework of philosophical realism, the framework will further be augmented by descriptions of realism in the work of Sheila Dow (1990). While some of elements in Dow's framework share similarities with those presented from the Stanford Encyclopedia of Philosophy, her work provides complementary elements that are relevant to a philosophical comparison of economic paradigms, including in this work the comparison of critical-realist and the causal-realist ideas and commitments to realism and how those ideas explains economic science.

According to Dow's framework (1990), commitments to *realism* can be narrowed down to two positions within both the ontological dimension as well as the epistemological dimension. Respectively, these positions are ontological *world realism,* and epistemological *truth realism*. Here Sheila Dow adopts a similar interpretation of realism, with the terms of world realism and truth realism. Regarding ontological world realism in economic philosophy, Dow cites Maki who describes that "*world realism refers to the 'object of theorizing'; it is the idea that economic theories are (or are believed, intended, etc. to be) about objectively existing economic reality"*. Ontological world realism in economics is therefore the similar claim, or position, that the real world *exists*, that it can be referred to as being real independently of the observer. This description mirrors the general statement on ontological realism by the Stanford Encyclopedia of Philosophy. Complementary to the Stanford Encyclopedia of Philosophy on realism however, Sheila Dow further distinguishes between how ontological world realism may be held either objectively or subjectively. Objective world realism implies the claim that objective facts exists independently of the observer and can be claimed to be true, whereas subjective world realism implies that observations about the world are innately subjective and potentially uncertain as well as different from observations made by others. Subjective world realism still holds that the real world exists independently from the observer but allows for different interpretations of the real world. The opposite to the position of world realism is world *non*realism, a position of skepticism (or idealism as described above). World nonrealism is an ontological position which *"regards all economic knowledge as fictional and it does not aim to theorize about an objective reality, either because its existence is in doubt, or because it cannot be referred to"* (Dow, 1990, p. 347). As will be shown later, some economic theoreticians implicitly adopt certain features of world nonrealism in their work.

On epistemological realism in economics, Sheila Dow describes in her framework that *truth realism* is the epistemological position that concerns the truth value of the foundations for the criteria of theory appraisal. Again, she refers to Mäki, who describes that truth realism implies *". . . that our theories or attempted representations are either true or false partly in virtue of the way the world is, independently of our representations of it*" (Mäki, 1988, p. 95). It is the claim that an observer of reality is in a position to ascertain real knowledge about the real world, given the correspondence between the observer and the real world, even if at times the theoretical knowledge presented are false. Holding the ontological and epistemological

positions together, epistemological truth realism necessitates the ontological position of world realism. On the other side however, an ontological world realist may not be an epistemological truth realist, if he judges that no link or any correspondence can be ascertained between reality and theory. If that is the case, then it implies the position of truth *non*realism, the contrast to truth realism. In holding epistemological truth nonrealism, the ontological world realist appraises his theory instead by the internal criteria of the theories themselves, not by its correspondence with the real world. Truth nonrealism

"*involves the judgement that theories are not true or false as accounts of, or predictions of, an independent reality. Thus, a world realist may see no possibility of appraising theories by reference to reality"* (Dow, 1990, 348-349).

A truth nonrealist must therefore, as the world nonrealist, appraise economic theory from internal criteria of the theoretical structure. An example is by conforming theories instead to classical rules of logic applied to a specified set of idealistic axioms, a mode of thought adopted within neo-classical pure general equilibrium theorizing (Dow, 1990, p. 348). Given the wide representations of realism in economics, an additional layer exists with regards to truth realism, as there are different modes of thought related to what is deemed as acceptable or sufficient methods for claiming a correspondence between reality and theory. These are either by a correspondence through events, in the form of *event truth realism*, a position concerned primarily with prediction, or a correspondence through causal processes, in the form of *process truth realism*, a position primarily concerned with understanding and explanation instead of prediction. A famous debate from Milton Friedman's article (1953) on instrumentalism took place on this level of truth realism between events and causal processes. The debate concerned the status and importance of assumptions in economic theory with respects to reality. Dow notes here that *"If it is possible to discuss the truth or falsity of assumptions, then truth realism extends to assumptions. But it does not if the assumptions refer to fictions and no attempt is made to discuss the correspondence between the fictions and reality" (Dow, 1990, p. 348)*. Here the discussed semantic dimension of realism is applicable, given how Milton Friedman's position on instrumentalism was that it essentially did not matter whether a correspondence existed between theoretical assumptions and reality, as it did not matter what the assumptions were and that descriptions should not be taken literally, the primary criteria for theory appraisal was instead event predictions, not understanding and explanation. For the process truth realist on the other hand, ascertaining what is fiction in assumptions, and what is not, and how a theoretical explanation corresponds to reality, is the more relevant methodological issue.

Table 1: Varieties of Philosophical Realism		
Basis of Theory Appraisal ↓ (Epistemological Position)	Worldview and Aims of Theory (Ontological Position)	
	World Realism	**World Nonrealism**
Process Truth Realism (Explanation/Understanding) (Semantic Realism)	Theories corresponds to objective reality in the sense of its causal relations	Inconsistent Position
Event Truth Realism (Prediction) (Instrumentalism)	Theories correspond to objective reality in the sense of events: 1) theories themselves refer to events; 2) theories themselves fiction	Inconsistent Position
Truth Nonrealism	Theories are fictional with no correspondance to objective reality; appraised by internal criteria	All knowledge is fictional, theories are appraised by internal criteria

Table 1: Varieties of realism and nonrealism as philosophical positions in science. Inspiration from Sheila Dow (Dow, 1990) and Stanford Encyclopedia of Philosophy (PES, 2017).

Based on the combination of the frameworks on scientific realism above, with explanations taken from Stanford Encyclopedia of Philosophy and from Sheila Dow, an account was given of the natures of the different varieties of philosophical realism as well as nonrealism. These combined findings are illustrated in Table 1 above, which categorizes the explained varieties and the philosophical implications of ontological world realism and world nonrealism, as well as epistemological event and causal truth realism and truth nonrealism.

Appendix 2.1: Varieties of World Nonrealism / Truth Nonrealism in Economics

With regards to ontology and world realism, most economist are world realists, and identify themselves as such (Dow, 1990, p. 349). But exceptions do exist, and according to Dow *"Some economists pursue their inquiries with a view to achieving intellectual or aesthetic satisfaction, rather than to increasing knowledge about objective reality"* (Dow, 1990, p. 349). This view includes the pure general equilibrium theorists that work within the intellectual tradition of Léon Walras. The Walrasian approach is one opposed, at least implicitly, to the idea that there exists any correspondence between general equilibrium theory and observed economic reality. It is so given how reality never actually reaches a state of general equilibrium (i.e. a steady state) and perfect market coordination. The aim for general equilibrium theorizing is therefore not about theorizing about observed reality, but an ideal state, and Dow therefore positions them as world nonrealists and as idealist. Randall G. Holcombe explains on axiomatic general equilibrium theorizing, that it is first of all an accepted part of the neo-classical mainstream, and the theory offers

"a different approach to economic methodology … In this axiomatic approach, models start with particular assumptions which, contrary to the positivist approach, are not subject to test. Conclusions are then logically deduced from the theoretical models which are, following this methodology, irrefutable … It is not uncommon for contemporary general equilibrium models to contain a substantial empirical component, as the parameters of the models are calibrated

using real-world data. However, this empirical work is fundamentally different in its underlying philosophy from the positivist approach to economics. The model is not being tested by the data; rather, in order for the calibrated model to be descriptive of the real world, the underlying structure of the model must by assumption be accepted as an accurate model of the structure of the real world" (Holcombe, 2008, p. 57-58).

In essence, the only connection between general equilibrium theorizing and the real world, is model-calibration by use of real empirical data, in order to make the idealistic model operational, even it if is built on unrealistic and unrealizable axioms and assumptions.

In terms of epistemology, truth nonrealists can, as mentioned, be ontological world realists, a position that also includes some economic theoreticians within the neo-classical paradigm. Their goal is to work with real world problems, even if their adopted theoretical system involves a lacking correspondence with that reality. Here Dow's explanation on the approach is that the position of world realism and truth nonrealism in economics implies that a

"correspondence with reality is not a basis for theory appraisal; rather accordance with the principles of classical logic, consistency with given axioms, generality of application, etc. are criteria by which theories are judged. For world realists, truth nonrealist theory will be applied in the sense of addressing 'real-world' problems but will still be appraised by criteria independent of the nature of that world."

She goes on to delineate that many orthodox neo-classical economists work from this approach, in the sense that their theories and models are appraised by internal consistency, often through mathematical formalism, ascertained from a set of unrealistic and unrealizable assumptions. However, within mainstream neo-classical economics there is not only one, but a wide range of modes of thought and positions on economic philosophy, and so this classification is not meant to be all-encompassing of the philosophical nature of the paradigm.

Appendix 2.2: Varieties of World Realism / Process Truth Realism in Economics

Having accounted for the applications of ontological world nonrealism and epistemological truth nonrealism, as well as event truth realism, left remaining is a discussion of the varieties of positions taken on commitments to ontological world realism combined with a commitment to epistemological process truth realism. In the position of ontological world realism and epistemological process truth realism belongs primarily paradigms focused on political economy, ones that Sheila Dow identifies to be the paradigms of post-Keynesianism, Austrianism, radical-Marxism, behavioral economics, and institutional economics, but also a subset of mainstream economics (Dow, 1990, p. 352).

To give a preliminary understanding of the commitments to positions of epistemological process truth realism taken within the post-Keynesian and Austrian philosophies regarding the economic system and the necessity to approach and understand the aspects of it, in a search for explanation of causes and processes instead of quantitative prediction, Sheila Dow gives the account that

"If the economic process (particularly when viewed as an integral part of a broader sociopolitical process) involves irreversible structural change and uncertainty about the future (i.e., unquantifiable risk), then the scope for predicting events is extremely limited. The best

chance we have for making predictions of any sort is to understand the processes underlying structural change (and structural stability). Further, if it is particular aspects of the economic process which policy is designed to address, understanding process takes primacy in any case over prediction of events" (Dow, 1990, p. 352).

Dow then goes further on to explain that this epistemic attitude of searching for process explanations has its roots in the Scottish Enlightenment, and is one that underpins a variety of different approaches that are coincident with process truth realism, even if these paradigmatic approaches each adopt different methods of inquiry for discovering and understanding the causal relations that are in place within the economic system. Both post-Keynesian critical-realism and Austrian causal-realism, in their modes of thought, are concerned with uncovering knowledge about the underlying processes and causal relations that form our economic reality. Critical-realism and causal-realism are primarily each concerned with expanding the scopes of economic explanation about economic phenomena and events, in contrast with the position of event truth realism which is one primarily concerned with prediction.

Based on their shared broad aim of understanding economic processes, critical-realism and causal-realism are in Table 2 on the next page below both categorized within the same then classification of world realism and process truth realism, granting a first initial identification of a shared philosophical intersection, one that is also shared with radical-Marxist economics, behavioral economics etc. As also shown, the positions of world *non*realism, combined with either event truth realisms or process truth realism, are positions that are scientifically inconsistent, as epistemological truth realism must necessarily presuppose an ontological commitment to world realism. Ontological world *non*realism and epistemological *truth* nonrealism is the position, at least implicitly, that philosophically represents the mainstream branch of pure general equilibrium theorizing. Further, it was briefly mentioned that Milton Friedman's instrumentalist position is one of ontological world realism and epistemological event truth realism, given that he claims theories should be appraised from their predictive capabilities of actual and real observed events, and not from their understanding and explanatory powers of causal processes. The group of neo-classical orthodox economists that argue for strict formalism and internal model consistency in their theorizing, with assumptions that are not in correspondence with the real world, can be argued to belong also within the positions of ontological world realism and epistemological event truth realism.

Table 2: Varieties of Realism and Nonrealism in Economic Philosophy		
Basis of Theory Appraisal ↓ (Epistemological Position)	Worldview and Aims of Theory (Ontological Position)	
	World Realism	**World Nonrealism**
Process Truth Realism (Explanation/Understanding) (Semantic Realism)	Political Economy: Post-Keynesian, Austrian, radical-Marxism, behavioral, subset of mainstream	-
Event Truth Realism (Prediction) (Instrumentalism)	Friedman instrumentalism, subset of mainstream: new-Keynesian, new-classical: 1) true/false assumptions; 2) fictional assumptions	-
Truth Nonrealism	Noninstumentalist applied neoclassical theory	Nonapplied Pure General Equilibrium theory (aestethic, intellectual)

Table 2: Varieties of realism and nonrealism as philosophical positions in economic science. Inspiration from Sheila Dow (Dow, 1990) and Stanford Encyclopedia of Philosophy (PES, 2017).

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