

ECONOMIC THOUGHT

History, philosophy, and methodology

Volume 12, Issue 1, 2024

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ISSN 2049-3509

Published by the World Economics Association

Sister WEA open-access journals: *World Social and Economic Review* and *Real-World Economics Review*

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The Dynamic Temporal Sequence and Reflexive Adjustment Behavior: Foundations for a Behavioral Alternative to Optimization Theory

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Abstract

This article discusses the difference between mainstream and heterodox economics in terms of philosophy's distinction between two types of temporal sequences governing events: the static, truth-tenseless before-after sequence and the dynamic, truth-tensed past-present-future sequence. Mainstream theory and optimization analysis employs the first. However, Aristotle showed long ago this implies fatalism. Heterodox explanations employ the second, which I argue implies people reflexively adjust their choices over time in a combined backward-looking and forward-looking way that rules out optimization. Central to this explanation of behavior is how uncertainty about the future is connected to uncertainty about the past. I show this can be explained in terms of how people engage in counterfactual thinking whereby their uncertainty about the future is investigated through how they re-examine their uncertainty about the past. This behavioral explanation affects how we interpret two different sets of temporal phenomena heterodoxy emphasizes: (i) irreversibility and path-dependence and (ii) emergence and cumulative causation. I argue this demonstrates the need for the open economic thinking heterodoxy employs, not the closed economic thinking the mainstream employs.

Keywords: temporal sequences, fatalism, reflexive adjustment, future-past uncertainty, open economic thinking

JEL codes: B41, B50, D01, D80

Mainstream economics makes assumptions about the nature of time that determine how it explains the economy. Heterodox economists have been critical of those assumptions and have produced different explanations of the economy. One way this difference has been understood is in terms of a distinction between logical time and historical time (Robinson, 1980; Shackle, 1958; Georgescu-Roegen, 1994). This paper discusses the difference between mainstream and heterodox economics from the perspective of a related distinction in thinking about time, one debated by philosophers since Aristotle but largely overlooked by economists. This is the distinction between two types of temporal sequences governing events: the before-after sequence, regarded as a static conception, and the past-present-future sequence, regarded as a dynamic conception. In addition to the advantage focusing on this distinction has for connecting existing thinking in economics about time with a long history of thinking about it in philosophy, an important advantage of this focus is that it directly raises the issue of how people act and behave according to which sequence one employs – a matter central to economics.

Mainstream economics, then, employs the static, before-after sequence, and this is foundational to its explanation of behavior as optimization. Most heterodox economists employ the dynamic, past-present-future sequence, but they are not united and generally not clear about just how this produces a theory of behavior alternative to optimization theory. They refer to such phenomena as (i) irreversibility and path-dependence and (ii) emergence and cumulative causation, which presuppose the past-present-future sequence, and defend a number of important ideas about behavior based on it, but on my reading do not advance an alternative theory of behavior comparable in generality and applicability to optimization theory. Until such a theory comes forward, I believe, mainstream theory and optimization analysis will continue to dominate economics. What is missing, I argue, is an explanation of how people reflexively adjust their choices over time in a combined backward-looking and forward-looking way that rules out optimization and relies on seeing the world in past-present-future terms, not before-after terms.¹

¹ This paper draws on arguments previously made in Davis (2017, 2021, 2023, 2024).

This paper's first section explains the difference between the static, before-after sequence and dynamic, past-present-future temporal sequences as the difference between tenseless and tensed truth statements, and shows how the mainstream's reliance on the before-after sequence underlies its explanations of behavior as optimization and change as sequences of equilibrium states.

The second section reviews Aristotle's famous 'sea battle' problem to show a long-held result in philosophy that using the before-after temporal sequence to explain human behavior entails fatalism, and then argues that why the mainstream has taken this path lies in it providing a rationale for its mythologizing about the automaticity of the market system.

The third section uses the distinction from philosophy of science between state descriptions and process descriptions to further differentiate between static and dynamic conceptions of the world, and argues that process descriptions are needed in economics to account for how economic agents continuously and reflexively adjust their behavior under conditions of uncertainty.

The fourth section outlines a simple dynamic model of reflexive adjustment behavior in which agents are uncertain about not only the future but also the past, and rely on a combination of backward-looking and forward-looking thinking in making choices – a behavioral adjustment decision-making approach employed complexity theory agent-based modelling.

To explain this type of decision-making, the fifth section shows how this combination of backward-looking and forward-looking reflexive adjustment behavior employs counterfactual 'what if' thinking, as investigated and understood in psychology, whereby individuals address their uncertainty about the future by re-examining their uncertainty about the past.

The sixth section comments on how this understanding of reflexive adjustment behavior accommodates but also requires modifying how heterodoxy interprets (i) irreversibility and path-dependence and (ii) emergence and cumulative causation, and how this implies a need for an open economic thinking rather than closed economic thinking.

1. Two Conceptions of Temporal Sequence and Mainstream Optimization Analysis

The distinction between the two conceptions of temporal sequences can be explained in terms of how they differ regarding making true statements (Emery, Markosian, and Sullivan, 2020; Morgan, 2023b). Thus, the past-present-future sequence and the before-after sequence –sometimes termed the A-series and B-series (McTaggart, 1908; cf. Dummet, 1960; Gale, 1967)– differ according to whether the truth of truth statements depends on when they are made or is independent of when they are made. Both types exist in human thinking. The issue is when which is appropriate according to the kinds of explanations we are making. Roughly, the difference is between historical explanations and logical explanations.

When, then, we frame time in terms of the past-present-future sequence, what is true at one point in time may not be at a later point in time. For example, one can say it is true that 'unemployment in country *a* is *x*' at that point in time when it is, but can no longer say it is at a later point in time when it no longer is. Truth statements in this case are 'tensed' statements, where their truth depends on their position in time. This is also known as a dynamic temporal idea. In contrast, when we frame time in terms of the before-after sequence, what is true is always true. For example, if it is true that 'unemployment in country *a* is *x* on June 1, 1970' that statement is always true. Truth statements in this case are 'tenseless' statements in that their truth holds irrespective of when they are expressed. This is also known as a static temporal idea.

Note, then, that optimization analysis employs before-after, tenseless, static temporal thinking. If it is true that individuals maximize utility at any point in time, it must be true at a later point in time that they maximized utility at that earlier point in time. Otherwise, one would have to say that when they maximized utility it was not necessarily true that they did. One might reasonably argue instead that people attempt to maximize utility at a point in time but it can turn out later that they did not, particularly because their beliefs and/or expectations about the future were mistaken. But this view is ruled out in mainstream economics via a principle of 'averages' or the claim that people on average are not systematically mistaken in these ways. Indeed, to say that they could be systematically mistaken is to question rationality at its core. If people can be systematically mistaken in various ways, then they cannot be said to be inherently rational.²

Rationality, however, is the Archimedean point on which mainstream equilibrium theory rests, not just as a principle in itself but also because it underlies the mainstream's whole theory of markets as an

² This is of course the challenge that heuristics and biases behavioral economics has made to mainstream theory in challenging whether behavior is rational.

equilibrium process. That theory assumes that economies always tend to settle to new equilibria when disturbed by 'external' shocks that create temporary 'out of equilibrium' or disequilibrium conditions. Economic agents were in individual equilibria before such shocks but are then in disequilibria after they occur. They thus make new choices that both restore them to individual equilibria and drive economies to new equilibria. Comparative statics is the method of analysis for this type of explanation (see Morgan, 2023a).

It needs to be emphasized, then, that on this view when they make new choices this does not imply their old choices were mistaken. Since by definition 'external shocks' are unpredictable, they do not imply those earlier choices were in error. Agents old choices thus truly maximized utility when they were made and this remains true at later points in time. Or, their old choices were rational before these 'shocks' and remain so after. That is, statements that they rationally maximized utility at any given time are tenselessly true.

Many critics of mainstream economics see mainstream rationality as improbable and heroic. This is certainly reasonable, but the larger picture is that rationality is also instrumental to the mainstream view that the market process is a relatively benign set of activities involving many agents that always tends to equilibrium, and when disturbed, usually in modest ways, is certain to tend back again to an equilibrium state of affairs. Arguments exist regarding whether shocks are supply or demand-driven, but those arguments still share the view that their impending result will again be an equilibrium state of affairs.

Since the mainstream rationality-equilibrium view assumes that when agents optimize their old choices can never be mistaken (otherwise they would not have optimized), it employs the before-after temporal sequence view of truth statements. For brief comparison, consider what assuming the past-present-future sequence implies. When truth statements are seen as tensed, what is true at one time might not be true at a later time. Individuals could then 'optimize' at one point in time but later find that they did not, say, because they were systematically mistaken in various ways, or not rational. In this case, there is no obvious reason to suppose an economy seeming to be in equilibrium, then disturbed in some way, will move to a new equilibrium-like state of affairs, or that the economy is a succession of equilibria, punctuated by shocks. Indeed, the whole idea of 'external shocks' becomes questionable once one says agents may not ever 'optimize' and thus that when the economy undergoes change, and even a relative settling at times, this produces a succession of equilibrium states. Rather the economy would be better described as some sort of process undergoing trends without automatic means of correction. Then, when people then say intervention in the market process is called for, equilibrium-like states of affairs might emerge if policies are well-chosen, but nothing is guaranteed. In section three, I lay out ideas for what non-standard explanations of economic behavior employing the past-present-future sequence involve, but in the next section first discuss the problems using the before-after sequence creates for explanations of economic behavior.

2. Implications of the Mainstream's Commitment to the Before-After Temporal Sequence

Aristotle points to the greatest problem associated with using the before-after temporal sequence to explain human behavior in his famous 'sea battle tomorrow' thought experiment – also known as the problem of future contingents (Aristotle, 1984).³ Imagine, he said, that at some date a sea battle that seemed imminent could be avoided. If we think in terms of the tenseless, before-after temporal sequence, then if it is true today that battle can be avoided, it would also be true in the future that it could be avoided, since for tenseless before-after sequences what is true at one time is always true. Yet it is possible that, though it is true today something such as a future sea battle could be avoided, it might not be true in the future that it could be avoided. To assume that was true yesterday is true tomorrow, is to say that the future is predetermined, implying fatalism in human affairs and that what people do in the present does not affect how the future plays out. That it is true today that the sea battle could be avoided does not guarantee it can be avoided tomorrow. Though it is possible it could be avoided, people could fail to do what makes this happen, which might particularly happen should they believe that because it could be avoided it must be avoided.

³ Future contingents are statements about future states of affairs contingent upon what later happens that cannot be determined to be true or false in the present. The philosophical literature on Aristotle's 'sea battle' argument is extensive and mostly concerned with his doubts about the law of the excluded middle in the case of future events and his understanding of the concept of necessity. It would be a distraction from the argument here to review that literature. My focus is on the implication the difference between tensed and tenseless statements makes for economics.

To us it seems that reasoning about things in this way in tenseless before-after terms makes little sense. We ascribe freedom to human beings, and recognize that true statements often depend on when they are expressed. However, many Greeks in Aristotle's time were under the spell of the view that the course of human events was divinely determined, as many of the famous plays of Sophocles and others depicted. What was true could not be changed – thus their sense of tragedy.⁴

Aristotle criticized this thinking by distinguishing two types of temporal sequence, and by arguing that the dynamic past-present-future sequence describes the historically evolving human world, and the static, before-after sequence does not. When it came to momentous events such as possible sea battles, it was crucial that people believed that what they did influenced what happened, and not think that an expected future based on past truths, however likely, had to come about.

From this vantage point, mainstream economics' adoption of the before-after temporal sequence produces a low-grade fatalism, not one that tells us what specific events will occur but one that assures us that whatever people do economies will move back to equilibrium states of affairs. The rationality principle that people are not on average systematically mistaken thus offers the same assurance as the idea that if a sea battle can be avoided today, it will be avoided tomorrow.

This kind of fatalism leads us to a second problem associated with the mainstream relying on the before-after temporal sequence. As those who have taught microeconomics well know, down-sloping demand curves, which market equilibria depend upon, are derived from a number of essentially logical assumptions about the concept of preference. We can accordingly distinguish between two motives for why those assumptions have been adopted. One is their instrumentality for showing markets tend toward equilibria. Without down-sloping demand curves the whole supply-and-demand equilibrium analysis breaks down.

A second, deeper motive is a mythologizing mainstream economists arguably engage in about markets (going back to their happy interpretations of Adam Smith's invisible hand). The myth is that fortuitously, as if divinely, human beings live in a world that generally benefits people – despite the evidence that markets under capitalism often produce suffering and exploitation. The form this myth takes involves saying that no matter what people do markets continually work to achieve settled states of affairs 'scientifically' characterized as equilibria. A mythology, like in religious systems, is an imagined world order that must be believed but cannot be explained – an eternal mystery that ultimately determines what counts as fact. In contrast, a genuinely scientific approach to the market process builds its view of how markets work and affect people from a continual evaluation of theoretical hypotheses about markets in light of what they do and do not tell us given the evidence bearing on them. Thus, a second problem associated with the mainstream commitment to the before-after temporal sequence is that it closes off economic thinking to an open investigation of its subject matter.

3. Explanations of Economic Behavior Employing the Past-Present-Future Sequence

Corresponding to the distinction between the two types of temporal sequence there also exists a distinction between two types of descriptions of the world used in science: state descriptions and process descriptions. State descriptions explain the world in terms of sequences of distinct states of affairs occurring at successive points in time. They correspond to the before-after temporal sequence, because the before-after idea simply refers to an ordering of states. Process descriptions explain the world in terms the passage of time. They correspond to the past-present-future, dynamic temporal sequence, because past, present, and future refer implicitly to one another as a connected relationship.

Herbert Simon held that both types of explanations have roles in science, but argued that modern science had increasingly come to interpret state descriptions as embedded in process descriptions. In effect, a given state came after another, not just because of the before-after idea, but also because the earlier state led to the later one. Process, that is, explains succession. This was apparent in his view of living things where agency, the ability to bring things about, is involved. Thus, he argued:

'substituting a process description for a state description of nature has played a central role in the development of modern science [...] [and] the correlation between [them] is basic to the functioning of any adaptive organism, to its capacity for acting purposefully upon its environment' (Simon, 1962, 481).

⁴ Modern tragedy is based on an array of causes, personal flaws, social relationships, historical surprises, etc. but the gods have dropped out of the picture or at most been demoted to 'fate.' See Carabelli (2021) where tragedy arises from the need to take decisions in spite of uncertainty about the consequences.

However, post-1950 mainstream economics largely gave up process explanations. The rise of general equilibrium theory with its vision of markets always tending to a perfect balance went hand-in-hand with increased use of mathematics, producing a new emphasis on what historian of economics Mark Blaug termed 'end-state' solutions (Blaug, 1997). State descriptions in mathematical terms are compiled out of sequences of 'end-state' solutions. How one moved from one to another, the adjustment process, was stripped of explanations of how agents behaved with the assumption that their rationality delivered them to new optimal states. What was consequently pushed out the field was an earlier emphasis going back to Adam Smith and after on competition as a process and more complex explanations of how agents adjust to change. This earlier literature emphasized process descriptions and explained competition as a continuous adjustment process in which agents 'rationally' assessed their past positions in determining their future positions.

Simon, as an early behavioral economist, was critical of neoclassical rationality thinking, and advanced an alternative 'satisficing' conception of agent behavior that substituted process descriptions for state descriptions (Simon, 1955). In contrast to the 'end-state' general equilibrium theory conception of equilibrium, 'equilibria' were at best relatively settled, transient states of affairs that left open what agents might choose to do later. Thus, 'satisficing' agents were not be optimizers who ignored possible future choices. In terms of the past-present-future dynamic temporal sequence, 'satisficing' agents' reflected on their past actions and aimed toward future ones, always leaving possibilities open for how they might act at later dates.

The difference between using state descriptions and process descriptions lies in whether one thinks of the world agents occupy in closed or open systems terms. If one is a Bayesian, the world is probabilistically closed. Mainstream rationality, in keeping with its myth of an ever beneficent market system, makes optimizing agents Bayesians and closes off the future. However, if one is a Keynesian/Knightian, markets are continually changing and agents are continually adjusting, because the world always presents an open, uncertain future. How, then, might we explain their behavior?

4. A Simple Dynamic Model of Reflexive Adjustment Behavior

Heterodox theories of agent behavior incorporating Keynesian/Knightian uncertainty emphasize future uncertainty, not only is the future is uncertain, but so is the past, though in different ways. It is true that future uncertainty reflects a future that has yet to occur whereas the past has occurred. This difference may incline many to think uncertainty does not apply to the past. However, as debates among historians continually show, there is much that is uncertain about the past as well. At the same time, while the future has yet to occur, much about it will follow the past and is predictable and thus not particularly uncertain, so the difference between past uncertainty and future uncertainty is less pronounced than many believe. A more reasonable view, I suggest, is that both the future and past are uncertain and our understanding of how each is differs in important ways.

One might then suppose that the way to proceed is to first compare these two forms of uncertainty in order to weigh their respective roles in explaining adjustment behavior. A complication in doing this is that how people address the future depends on what they believe about the past, so future uncertainty and past uncertainty interact. Below I will discuss one way this interaction works in how uncertainty about the future stimulates people to investigate their uncertainty about the past through recourse to counterfactual reasoning or 'what if' thinking. Counterfactual thinking probes past uncertainty by examining what might have been misunderstood about the past. Uncertainty about what to do in the future is then connected to asking such things as 'what if in the past I had done such-and-such instead of what I did,' followed by, 'how then should I act now, adjusting for what I did but could have done differently earlier.'

To begin to lay out connections such as this between past and future uncertainty, I offer a simple model of how agents behave when they think in terms of the past-present-future temporal sequence. One way to think about this, if metaphorically, is to say that how people adjust to the future involves their looking backward in order to look forward. That is, they see themselves operating in the entire past-present-future sequence, not just in the present they occupy. In effect, the present is both backward-looking and forward-looking. More concretely, what thinking in this way involves is a process of evaluation and assessment whereby from the vantage point of the present judgments are made about the past in light of judgments to be made about the future. That is, we specifically need a dynamic model of adjustment behavior in which the means by which individuals make decisions is by comparing and connecting their present beliefs about past and future.

Looking backward in order to look forward is a reflexive activity. The meaning of the concept of reflexivity is of something referring to or acting upon itself – metaphorically, a backward-referring idea.

The reflexivity concept has been used in philosophy, logic, mathematics, political science, psychology, and economics to explain reflexivity as a property of certain types of conceptual systems made up of multiple propositions (e.g., the Cretan liar paradox, Gödel's incompleteness theorems, fixed point theorems, the Grunberg-Modigliani prediction problem, various impossibility theorems, etc.). What distinguishes these systems is that they include at least one proposition that refers to itself, often generating interpretation paradoxes for the system those propositions represent.⁵

However, a systems application does not provide an analysis of reflexive individual behavior such as presented here. No system of propositions with a self-referring proposition is involved when individuals compare and connect their present beliefs about past and future. Nor is there anything paradoxical about individuals behaviorally looking backward in order to look forward. Revising past beliefs may produce unexpected, even surprising changes in how a person understands the past, and past beliefs may seem inconsistent in an informal, non-logical sense with choices being made about the future. But there is nothing inherently paradoxical about saying individuals behave in a reflexive manner and behave as reflexive agents.

In economics, there are many examples of reflexive behavior that illustrate this. Bank runs (Merton, 1949) and 'Minsky moments' (Minsky, 1982) are two well-known cases. What occurs in each is that agents find in light of a future developing in unanticipated and often problematical ways that their past decisions and their understanding of their basis were somehow mistaken. This causes what I previously termed 'belief reversals' in which agents reflexively recalculate in a combined backward-looking and forward-looking way how they think the past and future are connected as concerns their need to make choices in the present (Davis, 2020). Thus, their expectations of the future draw upon their reappraisal of the past, and given that both are uncertain they know this sort of circumstance will occur again in the future. This creates a continuous dynamical process of adjustment in which optimization never occurs, or if one wants to insist agents see themselves as 'optimizing' in some loose sense, it is conditional upon them regarding their priors as at best provisional. This is not how mainstream economics understands how people form priors with its naïve view of facts as simply facts. Better then, as Simon emphasized, say that agents 'satisfice' or do the 'best they can' under the circumstances they regularly encounter.

The reason I call this a 'simple' model of reflexive adjustment behavior is that it describes how individual agents behave in a past-present-future world while abstracting from their interaction with other agents. Of course in the bank run and 'Minsky moments' cases how individual agents behave depends very much on how other agents behave. For example, in a bank run individual depositors think in terms of what they believe other depositors are likely to do.⁶ Yet in both cases how agents influence one another presupposes an understanding of how they individually address their situations. Importantly, their individual situations are different from one another, if sometimes similar, but different because they necessarily occupy different positions in the world. Thus, to explain their interaction we first need to know what kind of behavior they exhibit, and then explain how it is influenced by the behavior of other agents. Ultimately the rationale for this two-step strategy derives from the problem of explaining agency in the world. To say people initiate courses of action requires we first say where that initiation occurs – I claim it is individual agents– and then proceed to explain how initiated actions are affected by social interaction.⁷

One illustration of this is complexity theory agent-based modelling (ABM) which explains agent interaction in complex systems given assumptions made about individual agent behavioral rules. By comparison with mainstream optimizing agents, agents in ABM are quite simple. They do not optimize in any global fashion but simply apply sets of simple decision rules to address their immediate choice situations. Those rules can indeed be very elementary – 'do x when P happens' but 'do y when Q happens.' In the bank run case for the depositor agent, x could be withdraw your deposits and P could be an auditor issued a report saying the bank is insolvent. Alternatively, for the depositor agent, y could be leave your deposits in the bank and Q could be the central bank has guaranteed deposits.

More complicated sets of decision rules can then be hierarchically ordered, giving sets of conditions that activate additional rules. Explaining these kinds of cases was once beyond economists' technical-mathematical skills, but ABM has made them straightforward by employing computational methods developed with advances in computing technologies. This development now pervades science

⁵ For a discussion of how reflexivity operates in economic methodology, see Davis and Klaes (2003).

⁶ In another famous example, Keynes's 'beauty contest,' individual investors make decisions based on what they believed are other investors' decisions (Keynes, 1936).

⁷ This strategy of course deserves more than a single sentence statement. I have tried to provide that in my books on individuals and identity, e.g., Davis (2024).

in multiple fields.⁸ At its heart is the assumption that simple rules agents employ, whether singly or in structured manifolds of rules, make it possible to give explanations of complex interactions between many agents.

There are now many applications of ABM in not only economics but also in biology, business theory, technology diffusion, social science etc. In economics, early influential examples are the El Farol bar problem (Arthur, 1994) –how people decide to go to a popular bar– and the Santa Fe artificial stock market analysis – how a set of individuals each employing simple decision rules continually adjust their stock market portfolios as a result of their interaction with one another (Arthur, Holland, LeBaron, Palmer, and Tayler, 1997; Brock and Hommes, 1997, 1998; see Tesfatsion, 2004). What is often emphasized as distinctive about ABM in these and other examples is how they incorporate heterogeneous agents and reject the mainstream representative agent idea. Indeed, this allows ABM to exhibit learning, adaptation, and emergent system properties, which standard mainstream general equilibrium/representative agent thinking does not recognize.

Yet at its core, ABM just employs a simple model of reflexive agents with their sets of decision rules framed in terms of the need for continual adjustment. When circumstances change for agents, they adjust by working back through their sets of decision rules to make new choices, thus reassessing what they relied upon in the past in order to evaluate their future prospects. Much of the development of ABM has been motivated by the challenge created by how small changes in sets of decision rules ascribed to agents can produce significantly different multi-agent outcomes. To do this, ABM has employed a computational-experimental sort of method to investigate what sets of decision rules applied to agents generate what kinds of multi-agent outcomes. This outcome-based, pairing method of investigation is very useful because it can generate significant new knowledge about the world.

ABM also addresses one of the challenges that has long faced models of decision-making alternative to the mainstream optimization model: providing an analysis that is not only realistic but also possesses comparable generality and versatility. However, as computational modelling skills increase among young economists, it is reasonable to suppose that ABM adjustment models will find more and more applications – thus addressing the generality issue. Indeed, there was also a learning curve for optimization analysis (post-1950) that delayed its adoption in economics for a time. Regarding the versatility issue, here matters are even more promising since optimization models are tied down by a number of restrictive, equilibrium requirement assumptions (especially about preferences axioms) determining when optimization models can be used. ABM is not tied down by those equilibrium requirement restrictions. Moreover, that ABM borrows from the panoply of simple decision rules now being investigated in behavioral economics (BE) means it possesses considerable potential for generating explanations of behavior not available with the optimization approach.

This paper shares these ABM goals but is different in focusing on what we can say behaviorally about the nature of agents' simple decision rules when we emphasize their temporal character. The argument above is that when examine how the past-present-future sequence operates in decision-making we see that important to it is the relationship between future uncertainty and past uncertainty. Past uncertainty has been less investigated, so questions naturally arise regarding what sorts of phenomena it involves.

The next section discusses how people's counterfactual thinking underlies their reflexive adjustment behavior. The main advantage of this focus is that counterfactual thinking works through how it connects past and future uncertainty. A further advantage is that it allows us to begin to determine what types of simple decision rules agents exhibit according to research in psychology on different patterns of counterfactual thinking. I will distinguish two such patterns and comment briefly on how they might differentiate two ways in which people address surprise and unexpected events.

5. How Counterfactual Thinking Links Future Uncertainty and Past Uncertainty

Since 1982 when Daniel Kahneman and Amos Tversky argued that counterfactual thinking is functional to human behavior rather than an indication of irrational behavior (Kahneman and Tversky, 1982), the literature on counterfactual thinking in psychology explaining individual decision-making has grown significantly. In the simplest sense, counterfactual thinking involves what is often called 'what if' thinking. This 'what if' thinking specifically refers to how, on further reflection, individuals might find the world different than they had been supposed, and then use this to determine the choices they make. In this regard, the basis for counterfactual 'what if' thinking lies in how people evaluate what they take to be

⁸ For example, in psychology it operates in the 'fast and frugal heuristics' approach developed by Gerd Gigerenzer and others (e.g., Gigerenzer and Todd, 1999).

facts about the world, recognizing that they might actually be different, even contrary to what they had believed them to be (Roese and Olson, 1995; Byrne, 2002, 2016).⁹

A different understanding of counterfactual ‘what if’ thinking exists in mainstream economics in connection with policy choices. It is not uncommon for policy-makers to ask what the ‘counterfactual’ is should a certain policy adopted. The ‘counterfactual’ is the alternative state of affairs that a policy would bring about. This is not the sense of counterfactual ‘what if’ thinking above. When a new policy regime is enacted, individuals do not engage in reconsideration of what the facts about the world are, but simply, as before, choose rationally without imagining that what were taken to be facts might not be facts. That is, they only find themselves confronted with a new sets of existing facts appropriate to the changed state of affairs.

Mainstream economic agents are Bayesians, meaning their choices begin with sets of prior probabilities based on given statistical facts. They update those probabilities as new statistical facts emerge, but they do not ask what, contrary to existing fact, might form the basis for an entirely different possible sets of prior probabilities, where the meaning of ‘prior’ is adjusted to accommodate previously unrecognized possible facts. That is, for mainstream economics counterfactual ‘what if’ thinking only applies to different possible states of affairs, given whatever are taken to be the facts about the world, not to individual behavior.

However, when one reflects upon how people ordinarily engage in counterfactual thinking – something which the universal use of the subjunctive mood in natural language shows us is part of how people think– one sees that that people often ask whether beliefs about the past rests on what are conjectured to be facts, that is, what at the time are generally taken to be ‘facts’ but which people are well aware can cease to be facts. Recognizing this, agents regularly speculate about how facts could be different than believed, and on that basis examine how they could have acted differently in the past and perhaps should act differently in the future.

In mainstream economics facts are always facts, and as such can never change their status. This doctrine parallels the mainstream’s temporal sequence conception whereby statements about time never change their truth value. Together, it is fair to say, this produces what philosophers and methodologists of economics would regard as at best epistemologically primitive view of economics and economic agents. More practically speaking, its consequence is that neither the future nor the past are can be fundamentally uncertain, so that rationality in the mainstream sense always applies.

Counterfactual thinking’s ‘what if’ type thinking as applied to individual decision-making, then, combines backward-looking and forward-looking thinking and thus concerns how the former supports the latter. In a popular example used in the literature, a person might say, ‘I studied enough for the exam’ –a presumed fact– but then later say that since their score was poor, perhaps it was not a fact that they studied enough. Then their inference might be, ‘I didn’t study enough but could have’ –an alternative fact– then ask ‘what if’ I had, what would my score have been?¹⁰

Bayesian economists could of course say that this is all quite speculative and consequently has no place in a scientific approach to economic behavior. However, there are several reasons to dismiss this response. First, as noted above, linguists and psychologists have shown that people commonly engage in counterfactual thinking, as does the nearly universal use of the subjunctive mood in human language. Second, the Bayesian view that what counts as fact in human thinking is clear is surely both philosophically indefensible and in virtue of its reliance on statistical foundation in normal distributions also unrealistic. Third, the idea that counterfactual thinking is highly speculative by nature is inconsistent with the evidence that most often when people employ it they think in terms of what are called ‘close counterfactuals’ or ones that, because they depart from presumed facts only moderately, address real choice possibilities.

The literature on ‘close counterfactuals’ (Kahneman and Varey, 1990; Doan, Denison, and Friedman, 2023) also provides a means of distinguishing different individual behavioral patterns in counterfactual thinking. Since ‘close counterfactuals’ concern circumstances in which agents investigate relatively small departures from presumed facts (e.g., ‘I studied enough for the exam but maybe I didn’t’), they apply to a large number of cases in everyday life when people make choices about activities that are regularly repeated over time. Thus, they generally get their facts mostly right, or right enough most of the time, and their counterfactual thinking only explores relatively small margins of error around what they regard as fact.

⁹ For how in a behavioral economics framework counterfactual thinking influences attribution substitution in choices people make, see Davis and Koutsobinas (2021a, 2021b). For a general review of counterfactual thinking, including in relation to abduction, see Davis (2024, ch. 4).

¹⁰ Another popular, everyday example is being late to an appointment having thought it was a fact the traffic would not be bad.

Contrast this with non- 'close counterfactuals' where people get things drastically wrong, and are surprised, such as occurs in cases such as bank runs and Minsky moments, and find they need to rethink what they are doing in a more fundamental way. In this less common sort of case, whole structures of facts and beliefs may be jeopardized, people engage in re-examination what conceptually counts as fact, whole theories upon which facts rest can come into question, and new theories built upon apparent new facts emerge.

Another way to further distinguish these 'close' and 'non-close' cases is in regard to the role social interaction plays in each. For 'close counterfactuals' agents usually proceed in a relatively autonomous manner, but for non-'close counterfactuals' their usual adjustment strategies that exploit margins of factual error fail, and whole structures of facts and beliefs come into question. Then they begin to look to others to see how they are addressing the surprising breakdown of conventional views, demonstrating the role conventions play in agents' epistemic grasp of the world.¹¹

Here I put these more significant adjustment cases aside to distinguish two broad patterns of counterfactual thinking psychologists have investigated: *downward* and *upward* counterfactual thinking (Epstude and Roese, 2008; Roese and Morrison, 2009). Downward counterfactual thinking is associated with how things could have been worse for a person had they acted differently, and thus focuses on errors or mistakes that were actually avoided. In the unexpected exam result example, an individual might say recognizing the fact they had not studied enough: 'I would have gotten a lower grade if I hadn't studied as much as I did.' Functionally, downward counterfactual thinking is treated as an affective, 'coping' mechanism, whereby people regard themselves as fortunate that their actions turned out as well they did, and concentrate on maintaining their existing situation.

In contrast, upward counterfactual thinking is associated with how things could have been better had a person acted differently, and is focused on opportunities missed. For the unexpected exam result example, an individual might say, recognizing the fact they had not studied enough: 'I would have gotten a higher grade if I had studied more.' Thus, upward counterfactual thinking is characterized as an affective, 'preparative' mechanism which people employ to put themselves in a better position to achieve their goals in the future, where their focus is instead on developing their situation.

When we introduce interaction between individuals in connection with non-'close counterfactuals,' it is not clear whether agents respond more often in a downward or in an upward way. It may be that some individuals respond in one way and other individuals respond in the other way. Supposing there is an identifiable distribution of responses across these two orientations, then the dynamics of crises could play out in terms of how the two groups interacted, with 'coping'-oriented people essentially adjusting in a more conservative, cautious manner, and 'preparative'-oriented people effectively adjusting in a more exploratory, experimental manner. This could provide foundations for a theory of social dynamics of crises, but here I put this off for later investigation in order to briefly take stock of what has been argued above.

Thus, when we adopt a more realistic view of how individuals negotiate time than the one the mainstream employs, we can replace the rationality optimization behavioral adjustment paradigm with a simple dynamic model of reflexive adjustment behavior that has several main components. It employs the past-present-future sequence in which statements about events can change truth value over time. It assumes uncertainty applies to both the past and the future, though in different ways. It represents decision-making as a continuous reflexive adjustment process in which, when agents' choices do not produce what was expected, they look backward at how they used the past to make them, and then ask how the past should be re-explained in making subsequent choices. This opens up economics' analysis of adjustment behavior to extensive literatures in psychology on the nature of counterfactual thinking. In the closing section, I briefly link these ideas to what heterodox economists said about such phenomena as (i) irreversibility and path-dependence, and (ii) emergence, and cumulative causation, and then argue this implies a need for an open rather than closed economic thinking.

6. Heterodox Economics and Historical Time

Heterodox economists generally reason in terms of historical rather than logical time (Setterfield, 1995; Morgan, 2023a, 2023b). Consequently they have emphasized such phenomena as (i) irreversibility and path-dependence and (ii) emergence and cumulative causation, which indeed provide important conceptual foundations for an economics alternative to mainstream economics. I argue, however, that when we explain behavior as a reflexive adjustment process, and focus on how individuals address

¹¹ Again, Keynes (1936) was insightful in this regard, noting that investors adhered to conventions about investments until those conventions broke down, then particularly looking to what others were doing.

their uncertainty about the future by re-examining their uncertainty about the past, we need to modify how those phenomena are often interpreted.

The two sets of phenomena do different things. Irreversibility and path-dependence concern how we understand sequences of events, and emergence and cumulative causation concern how we interpret the overall effects in time of those sequences. At the same time, irreversibility and path-dependence, though both are about sequences of events, have slightly different meanings, and emergence and cumulative causation, though both are about the overall effects of those sequences of events, have somewhat different meanings as well.

Irreversibility looks backward, and generally means a succession of events cannot go backward and a return to the past in the future cannot occur. Path-dependence looks forward, and generally means what happens in the future depends in some way on what happened in the past. Both ideas are based on a lock-in type idea, though in different ways. Irreversibility tells us that past-future sequence is a locked order: the past leads to the future but the future never leads to the past. Path-dependence tells us that the events of the future have been locked-in by events in the past, so the future always recalls the past.¹²

However, when we think not just in terms of the nature of historical time *per se* but in terms of how agents reflexively adjust their behavior in time, we see we should modify the lock-in character of these ideas. Agents reflexively adjust over time by reworking their understanding of the past and its uncertainties in making choices that address future uncertainties. By engaging in counterfactual thinking, they unlock aspects of the past that seemed fixed, and in effect reactivate aspects of the past. Thus, when future behavior depends on reinterpreting the past, irreversibility is modified. It is still true that successions of events themselves cannot go backward and a return to the past in the future cannot occur. Yet behaviorally speaking individuals can change how the future succeeds the past, so that the future in a way also leads to the past. Accordingly, for path-dependence, while the future depends on the past, the past also depends on the future.

Emergence and cumulative causation concern how we interpret the overall effects and character of sequences of events. Emergence refers to the appearance of something new and novel arising out of a sequence of events. Cumulative causation refers to the additive or compounding character of the continual emergence of novelty. That is, novelty is not only emergent because the past is succeeded by the future but the cumulative deepening of novelty derives from that ordering as well.

Yet when we see individuals reflexively adjusting in time by employing counterfactual thinking, we can see that novelty is also emergent upon their re-examining the past, not just because the future succeeds the past. When people reason counterfactually, their interpretation of the past derives from the reasoning about the future. Thus, the cumulative deepening of novelty also depends on movement in both directions, the future succeeding the past and the past succeeding the future.

I suggest, then, that there are two undesirable consequences of seeing i) irreversibility and path-dependence and (ii) emergence and cumulative causation in the conventional ways that emphasize lock-in and the additive or compounding character of emergent novelty. First, recalling Aristotle, this promotes fatalism in thinking about time and sequences of events. Lock-in tells us the past determines the future largely irrespective of what we do. Some things must inevitably come about because of the past. Yet we surely have some discretion over how we make the future play out, even if the past narrows and restricts the degree to which we can exercise that discretion. That is, when we unlock aspects of the past that had been taken as fixed, we weaken lock-in, and in recognizing how it had affected sequences of events we see occurring, we make it possible to alter those sequences. Then, what produces novelty is not just its continual, relentless accumulation, but also our own determination of what we believe counts as emergent and novel.

Second, the conventional understanding of these time phenomena promotes closed rather than open economic thinking (Davis, 2024, ch. 1). Closed economic thinking involves abstractly identifying sets of theoretical assumptions and principles, and then in a top-down way logically inferring a set of conclusions from them regarding how economies must always function. Scientific progress is then restricted to refining these assumptions and principles through their empirical investigation, though this risks confirmation bias and science bubbles (*Ibid.*). In contrast, open economic thinking involves advancing hypothetical sets of theoretical assumptions and principles, and then in a combined top-down and bottom-up way allowing their empirical investigation to revise and overturn them when called for, allowing altogether new sets of theoretical assumptions and principles to be proposed.

¹² Path-dependence is often associated with as hysteresis, a concept originally developed in physics. I prefer path-dependence because it is specifically associated with social-historical systems whereas hysteresis risks confusing physical properties with social ones. For discussion of both concepts see Dutt (2023).

Heterodox thinkers have emphasized the importance of open economic thinking, for example, Tony Lawson (2003) and Sheila Dow (2004). Their arguments for it emphasize epistemological issues, as does the previous paragraph. However, this paper also makes open economic thinking depend on two specific ontological ideas: how we understand time in connection with concept of temporal sequence, and how we understand agency when we explain agents as beings that reflexively adjust their choices in the face of interrelated past and future uncertainty. To the extent that ideas of this kind are employed in open economic thinking approaches, economics holds promise of escaping the confining, closed thinking that characterizes much of current mainstream economics. To the extent that this paper contributes to this, it does so by expanding how we think about time in connection with uncertainty, reflexivity, and counterfactuality.

Acknowledgements

I am grateful to Sheila Dow and Jamie Morgan for comments on a previous version of this paper.

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SUGGESTED CITATION:

DAVIS, John B. (2024) 'The Dynamic Temporal Sequence and Reflexive Adjustment Behavior: Foundations for a Behavioral Alternative to Optimization Theory.' *Economic Thought*, 12.1, pp. 3-15.

<http://etdiscussion.worldeconomicsassociation.org/papers/the-dynamic-temporal-sequence-and-reflexive-adjustment-behavior-foundations-for-a-behavioral-alternative-to-optimization-theory/>

The Making of Humanistic Economics

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Abstract

The essay traces the evolution of my academic career through three stages: as a Habsburg economic historian, an anthropometric historian, and as a humanistic economist exposing the Achilles hills of mainstream economics and tracing the roots of the rise of the current right-wing populist movement through the economic history of the U.S. since Reaganomics. The essay also explores how one stage led to the next, all the time preserving my predilection for data-driven deductive analysis.

Keywords: Humanistic Economics, Capitalism with a Human Face, Biological Standard of Living

1. Introduction

Realizing the limitations of my undergraduate education which centered around the natural sciences, and under the influence of the upheavals of 1968, which diverted my interest from the physical to social sciences, I decided to broaden my horizons by pursuing a Ph.D. in history at the University of Chicago. Seven years later I emerged with a dissertation on the economic development of the Habsburg Monarchy from the end of the 18th century through the turn of the 20th (Komlos, 1983). Cliometrics enabled me to combine my earlier training in data analysis, computer programing, model building, and hypothesis testing, and apply it to historical data. These characteristics and dispositions persisted with me for the rest of my career.

2. History Ph.D.

While in many ways my research was fairly conventional in the neoclassical tradition, one major finding of universal significance that emerged from it was that the Habsburg economy experienced a significant upswing in economic activity simultaneously with England's Industrial Revolution. This was controversial because Central Europe was not considered to have been among the more advanced economies of the continent. They supposedly followed in the English footsteps. Instead, I found that they were apparently well integrated into the European business cycle by the late 18th century. So, I argued that the Industrial Revolution was essentially a pan-European upswing of the business cycle, although its manifestations in the various countries took on different forms, depending on the region's level of technological development.

In retrospect it seems to me that I did demonstrate some daring in reformulating the conventional conceptualization of the Industrial Revolution. Moreover, I was convinced that the upswing was closely intertwined with demographic developments, insofar as the acceleration in population growth led to a greater demand for industrial products and to an increase in food prices, that also meant that people had an incentive to produce more industrial goods in order to earn enough income to sustain themselves and their families. With that conceptualization, I was able to formalize, together with Mark Artzrouni, a path-breaking economic-demographic mathematical model of economic development, in which business cycles are generated endogenously through demographic cycles from the early Middle Ages through the Industrial Revolution (Komlos, and Artzrouni, 1985). Independently from my work, and simultaneously, endogenous growth models became a major subfield in economics, generating a Nobel Prize in 2018 (Romer, 1986). Such unconventional explorations off the beaten path would characterize much of the rest of my career.

3. Economics Ph.D.

But I must backtrack, because it was important in my intellectual development that I was unable to find a tenure-track job in 1978 upon completion of my history PhD, since the Habsburg Empire was not on the radar screen of most departments who at the time were not looking for people with my outward characteristics anyway. Since cliometrics had a substantial economic component, I decided that I should obtain a Ph.D. in economics also from the University of Chicago. Two years after I had completed the degree in 1990, I became a professor with an endowed chair at the University of Munich. Fate sometimes takes a circuitous route.

4. Anthropometric History

Back in 1982 as part of the economics Ph.D. coursework, I took a course in American economic history offered by Robert Fogel, who introduced me to the idea that human height could be used as an indicator of nutritional status, which at the population level is obviously related to economic as well as demographic processes. The topic has a humongous biological and anthropological literature but had been neglected by economists as well as by social and economic historians. Using physical stature as a marker of nutritional status appealed enormously to me because it was data driven and offered the possibility of revealing some fundamental truths about the past. So, here was a new field, I subsequently christened anthropometric history, where one just might be able to make some significant fundamental contributions to our knowledge about how the economy worked and how it affected the human beings living in it.

It was obviously risky for an economics dissertation, because it would continue to define me as an eccentric within the profession and actually only one other of Fogel's students (Rick Steckel) made a career out of studying the history of human height. However, the topic suited my high-risk, high-reward mentality, so, just a few months after hearing the lecture in November, I was already in the *Kriegsarchiv* in Vienna looking for, and finding, zillions of data on the height of soldiers dating back to the 18th century. That discovery was incredibly exciting and I spent the next thirty years researching the topic by collecting data sets from all over Europe and the United States. It still fascinates me. The first breakthrough came practically immediately since I found that physical stature declined in the Habsburg Monarchy during the late eighteenth century (Komlos, 1985, 1989). Subsequently, I found that that it was a European-wide phenomenon, including in England during the Industrial Revolution but not in North America (Komlos, 1993a, 1993b; 2001).

That was a major discovery because it meant that the nutritional status of a large segment of the population was declining at a time of rapid industrialization and urbanization. The finding supported the pessimistic side of the long-standing controversy about the standard of living during the Industrial Revolution (Ashton, 1948 and Hobsbawm, 1968). I dubbed the finding the 'early industrial growth puzzle' because it might be puzzling at first sight that people would shrink as output accelerated but the pattern turned out to be a widespread phenomenon tied to the fact that agricultural productivity did not keep pace with the growth of the urban population and the expansion of the industrial labor force (Komlos and Küchenhoff, 2012).

This pattern led me to infer that a Malthusian crisis was threatening the European populations at the end of the 18th century and to argue that the Industrial Revolution actually enabled Europe to overcome that threat in the late 18th century (Komlos, 1998).¹ In other words, the Industrial Revolution enabled the Europeans to break out of the Malthusian demographic regime that had been constraining its economic growth periodically since time immemorial even if the pauperization was still widespread at the end of the 18th century (Komlos, 1989, 2000). My interpretation of the historical record was a more nuanced way of conceiving of living standards, in that it had a counterfactual component: living standards declined, but they would have declined by more without industrialization. Moreover, the thesis took into account the impact of industrialization on children and youth, insofar as physical growth ceases in adults; so, final height is a historical record of nutritional status until one reaches adulthood. Hence, the data I was examining recorded the nutritional experience of the people during the first two decades of life.

Subsequently, I found a very similar pattern in the United States, although a half-century later, at the onset of its modern economic growth in the antebellum period; dubbed the 'Antebellum Puzzle', it

¹ As of 2024 (Komlos, 1998) is the 15th most frequently cited article of the nearly 3,000 published since the journal's inception and the study of the height and weight West-Point Cadets is the 26th most cited. No one else is in the top 26 twice. <https://www.cambridge.org/core/journals/journal-of-economic-history/most-cited>.

generated a lot of pushback, because it was challenging for specialists to entertain the idea that food consumption actually declined in the sparsely settled immense continent with a seemingly unlimited supply of foodstuffs that included plentiful wildlife (Komlos, 1987, 1996, 2012a). But in the end, the finding was accepted because the antebellum decline in physical stature was documented in multiple samples and, moreover, real food prices did increase substantially as a consequence of the extremely rapid population growth, urbanization, industrialization, and market expansion, similar to the European experience of the late 18th century (Komlos and A'Hearn, 2019; Komlos, 2019a; Komlos and Coclanis, 1997).

My research on these topics during three decades, collecting many hundreds of thousands of observations, received numerous accolades (Bilger, 2004; Stewart, 2007).² Studies by students and collaborators as well as the founding of the journal *Economics and Human Biology* in 2003 enhanced the research program substantially (A'Hearn, 1998, 2003; Baten, 2000; Baten and Murray, 2000; Carson, 2009, 2011, 2016; Cinnirella, 2008a, 2008b; Coppola, 2009, 2013; Craig, 2016; Cuff, 1993, 2005; Lang and Sunder, 2003; Lantzsich and Schuster, 2009; Sunder, 2011, 2013; Woitek, 2003; Zehetmayer, 2011).

I also found that the U.S. population was the tallest in the world until the Second World War but fell behind the welfare states of Western and Northern Europe (as it did in life expectancy, and other indicators well-being such as happiness), because of the expensive and inefficient health-care system, and the unhealthy food habits of the population, despite the stupendous increase in income during the second half of the 20th century (Komlos and Baur, 2004; Komlos and Lauderdale, 2007; Komlos and Kelly, 2016). This finding received widespread coverage in many major newspapers around the globe (Krugman, 2007).

5. The Biological Standard of Living

My thinking was now approaching the conviction that economic theory itself needed a makeover because it appeared to have overlooked an important element in welfare: how real-life human beings actually fared in the economy. I began to gravitate toward humanistic economics, a concept that had been proposed earlier (Brockway, 1991; Lutz and Lux, 1988). After all, the overarching pattern that emerged from three decades of the anthropometric research program led to the clear inference that the conventional indicators of living standards were frequently incomplete and misleading. Conventional conceptualizations of human welfare clearly diverged from biological indicators such as physical stature and life expectancy, not always and everywhere to be sure, but practically universally during crucial phases of economic development especially when industrialization accelerated before technical progress in the agricultural sector sufficed to maintain the nutritional status of the population. Evidently, GDP, income per capita, and other aggregate monetary measures of living standards omit the effects of negative environmental externalities, of fluctuations of the business cycle, of the distribution of income, and a myriad of other factors (e.g., the efficiency of the medical system, monopoly prices for pharmaceuticals), that have a distinct and measurable impact on the human organism (Komlos and Baten, 2004). Thus, anthropometric history enabled me to discover hitherto hidden human costs of industrialization and of economic growth.

This breakthrough realization led me to formulate the concept of the biological standard of living as distinct from its conventional counterpart. It is an omnibus measure of how well the human organism itself thrives in its socio-economic environment. In turn, this distinction led me to consider in depth how economic processes affect flesh-and-blood human beings and became a natural segue into humanistic economics.

6. The Eureka Moment

The devastating financial crisis of 2008 triggered my eureka moment since it made me realize that my anthropometric research program until then was squarely human centered, i.e., it concentrated on analyzing the multitude of ways in which economic processes affected human beings even at the cellular level. My work on the obesity epidemic led to the very same conclusion: capitalism needed a significant reform in order to enable people to thrive and reach their natural potential (Komlos et al.,

² In any event, there are not many scholars who had publications in flagship journals of three disciplines (Komlos, 1985; Komlos, 2003; Komlos and Breitfelder, 2008). I also published in interdisciplinary, social science, demographic, and statistical journals (Komlos and Artzrouni, 1990; Schneeweiss and Komlos, 2009).

2004, 2009; Komlos and Brabec, 2010). In stark contrast, mainstream economists were irredeemably focused on abstract concepts such as GDP and output, or on inanimate objects like money and consumer goods, but never ever actually considering how sentient beings with emotions actually felt living in a complex economy beginning with childhood and continuing throughout the life course. The policies based on the advice of neoliberal economists were unable to create an inclusive economy in which most people felt good about their life most of the time (Phelps 2003). The Meltdown of 2008 revealed for the whole world to see plainly that, in effect, the 'emperor had no clothes', despite the immense amount of hubris that was characteristic of the discipline as allegedly the queen of the social sciences (Appelbaum, 2019; Chang, 2010; Fourcade et al., 2015; Keen, 2001, 2016; Krugman, 2009; Staveren, 2015).

I was not alone in this realization. Others also increasingly recognized that the real-existing economy had 'fallen short of any conception of a 'good economy' – an economy offering a good life' (Phelps, 2015; Bowles and Carlin, 2020; Jo et al., 2018; Kwak, 2017; Lawson, 1997; Nelson, 2018; VanderWeele, 2017). However, in the contemporary context, I alone advocated for a paradigm shift to humanistic economics. In my moral judgement, healthy life was a basic need, so a thriving body was also part of a good life; it was the prerequisite for a flourishing population. Thus, through my three-decade work on the relationship between human biology and the economy, I arrived at the conclusion that the economic profession desperately needed a Kuhnian paradigm shift and instead of maximizing income we should be thinking hard about maximizing the quality of life and minimizing pain, stress, and insecurity (Komlos, 2012b). That was the reason I began analyzing the mistakes of mainstream economic theory and at the same time began formulating an alternative vision for the economy, Capitalism with a Human Face (Komlos, 2014).

7. Humanistic Economics: The Overdue Paradigm Shift

As my anthropometric researches, the new paradigm, humanistic economics, is human centered. It became obvious to me that conventional economics was making a grave mistake in putting *Homo oeconomicus*, a mythical being, at the center of its canon, and neglecting *Homo sapiens* as they actually live and work in the real existing world. By emphasizing that consumption ought not be the goal of a meaningful life, humanistic economics diverges fundamentally from the mainstream canon. Its emphasis on income often conflicts with human values. The goal of Capitalism with a Human Face is to enable everyone, or nearly everyone, to live fulfilled lives with dignity. John Maynard Keynes intimated as much:

'I think that capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative system yet in sight, but that in itself it is in many ways extremely objectionable. Our problem is to work out a social organization which shall be as efficient as possible without offending our notions of a satisfactory way of life' (Keynes, 1926).

As far as humanistic economics is concerned, Keynes' satisfactory way of life can be achieved by maximizing the quality of life instead of income. Pope Francis recently also reminded us that we need an economy 'that is inclusive and not exclusive, humane and not dehumanizing' (Francis, 2019). However, by insisting on its rational-agent, utility-maximizing model, conventional economics has become anachronistic – inadequate to meet the challenges of the crisis-ridden world of the 21st century.

Another important issue for the 21st century is that *de jure* equal opportunity is insufficient for a just economy without *de facto* equal opportunity (Rawls, 1971). Family wealth is a privilege for those babies lucky enough to enjoy the opportunities it provides. However, babies born into poor families are at a disadvantage: they have less chance of living a fulfilled life than those born into wealthy ones. Hence, their future development diverges, depending on their initial endowment. Such random allocation at the start of life cannot possibly be the basis of a good society. So, the standard conceptualization of a meritocracy disregards the inconvenient truth that so much of it is based on the luck of birth (Frank, 2016; Sandel, 2020). Our goal ought to be to create a just society in which children have *de facto* equal opportunities, not merely in theory, but also *de facto* in actual outcomes.

Furthermore, the common wisdom erroneously equates economic growth with rising living standards. However, survey after survey categorically contradicts this assumption: happiness and life satisfaction in the U.S., for instance, has stagnated and even declined relative to the welfare states of Western Europe, but especially compared to Scandinavia and Switzerland (Easterlin, 2004; Helliwell et al., 2024). The growth-at-any-price perspective disregards the decisive problems associated with

stress, pain, and the distribution of income: economic growth has not benefited the less skilled, those without a college education, or without some skills that are valued in the new knowledge economy (Komlos, 2019b).

Despite 250 years of extraordinary economic growth (and previously unimaginable scientific and technical achievements) since the Industrial Revolution, discontent is now more widespread in the U.S. than ever before with the exception of the years prior to the outbreak of the Civil War. It is amazing how much dissatisfaction a \$29 trillion (dual) economy can evidently produce. In 2023 merely 52% of U.S. adults considered themselves 'thriving' while the rest were 'struggling' (43%) or 'suffering (4.7%)' (Gallup, 2022). In other words, the U.S. version of capitalism is amazingly inefficient at producing contentment for some 150 million of its citizens.

In contrast, humanistic economics implies that a kinder and more just capitalism is possible, embedded in a truly democratic society that enables people to live their daily lives with less anxiety, conflict, inequality, insecurity, manipulation, pain, poverty, stress, uncertainty, unemployment, and less fear that their lives could spiral out of control during the next recession. This variant of capitalism would also maximize educational attainment, mental and physical health, intellectual satisfaction, leisure time, dignity, respect, healthy social relationships, and a moral life. Consequently, by disregarding the distribution of income and the stress generated by the economic system, free-market aficionados have led us astray (Komlos, 2022).

8. The Achilles Heel of Neoliberal Economic Policy

Conventional economists were mistaken in other important ways as well even as they sang praises to the immense achievements of the market system (Feldstein, 2016), closing their eyes to inconvenient evidence contradicting their claims like the skyrocketing 'deaths of despair' by the underprivileged,³ the millions in jail who were rejected by the legal labor market, or the inequality-fueled rise of populism against the entrenched elites who control the political and economic system. Ignoring these dystopian deaths of despair, reflects mainstream economists' myopia and is evidence of the failure of neoliberal policies, since people would not kill themselves or others in troves in an economy in which they are flourishing. Through my research on humanistic economics I reached the conclusion that the economic history of the U.S. since Reaganomics is characterized by at least five blunders that converged in a in the second decade of the 21st century, fostering the rise of populism, a 'response to a political failure of historic proportions' (Sandel, 2018, 354).

These policy failures, enthusiastically supported by conservative economists, included: supporting Reagan's supply-side economic policies that were supposed to initiate a new era of prosperity (Jones, 2012). Instead, they magnified inequality not seen since the Robber Barons at the turn of the 20th century, and fostered the formation of an oligarchy (Bartels, 2016; Freeland, 2012; Johnston, 2003; Komlos, 2019c, 2020; Levitsky and Ziblatt, 2018; MacLean, 2017; Mann and Ornstein, 2012; Posner, 2011).

Neoliberal economists ignored the crucial role of power in the economy and the political system (Leonard, 2019; Piketty, 2014). The immense wealth of the 1% combined with the lack of countervailing power for the rest of society meant that laws and institutions were shaped so as to magnify the privileges of the wealthy (Boushey, 2019; Rajan, 2019). They also neglected that the benefits would accrue mainly to the top 1% of the income distribution and lead to the 'hollowing out' of the middle class (Komlos, 2018; Lazonick, 2015; Temin, 2017). Trickle-down economics was a sham: practically nothing reached the masses (Stiglitz, 2011). No wonder they turned against the elites and supported a strongman who promised to 'drain the swamp' in Washington, D.C.

The mainstream also completely misjudged the effect of globalization on the economy, society, and the political system. Supposedly it was going to be good for Americans. Mainstream economists 'parrot[ed] the wonders of comparative advantage and free trade and [...] consistently minimized distributional concerns [...]' (Rodrik, 2016, 2018). In reality, globalization was far from Pareto optimal. It had winners and losers with devastating social, political, and demographic consequences: it contributed substantially to the formation of the Rust Belt, left scores of millions hopelessly destitute, encouraged the disparagement of the political elite, and the fraying of the social contract that left many with nothing to grasp onto except a bottle, the trigger, or a hypodermic needle in addition to fomenting the right-wing populist movement (Autor et al., 2020; Chang, 2008; Koh et al., 2019; Komlos, 1988; Levitsky and Ziblatt, 2023; Pierce and Schott, 2020; Reich, 2020; Rodrik, 2018; Stiglitz, 2017).

³ Annually 150,000 Americans escape the pain of economic life through suicide, opioid overdose, or alcoholism (Case and Deaton, 2020, 113). The per-capita overdose deaths in the U.S. are 14 times as high as in Switzerland.

In addition to the above missteps, deregulation, crucial for increasing efficiency according to neoliberal dogma, added to the structural problems of the economy. Dismissing Minsky's (1977) warning about the fragility of the financial sector, Bernanke emphasized the virtues of the 'Great Moderation', i.e., that business cycles have become benign and nothing to worry about (Bernanke, 2004). However, in spite of all the sophisticated analysts, deregulation and negligent oversight led to the immense financial crisis that added to the political destabilization (Foroohar, 2019; Minsky, 1982; Kakutani, 2018; Keen, 2017; Komlos, 2014; Krugman, 2009; Schiffrin, 2011; Shiller, 2000, 2008). After all, the eight million families evicted, while the CEOs, the ones who were responsible for the crisis in the first place, remained in the top 1%. Not a single one slipped into the middle class. These lopsided bailouts were not going to be cheered by the electorate.

The structural problems of the economy persisted: immense trade imbalances, the endemic budget deficits in excess of trillion dollars, skill mismatch because of the lack of educational opportunities,⁴ exorbitant health-care costs, monopoly prices for medicine, deteriorating infrastructure, stagnating low-skilled wages, exploding student debt, obscene levels of inequality, and global warming.⁵ These weighed heavily on future growth and living standards. Hence, the economic growth between the Dot-Com bubble and the 2008 Meltdown was a mirage underwritten by easy credit and easy monetary policy.

Yet, the Obama administration focused on overcoming the crisis as quickly as possible and that entailed getting back to business as usual with all the structural imbalances in place. They neglected that only in a crisis can the political inertia be mastered in such a complex economy with innumerable powerful vested interests, and once Wall Street was resuscitated the government would no longer be able to reform the structural problems caused by neoliberal policies since 1981 and rebalance the economy. While the bankers were on their knees, the Obama administration held all the cards, thereafter the balance of power tilted in the other direction. This is how Obama missed the once-in-a-lifetime opportunity to rebuke neoliberalism and allowed the Meltdown to become a wasted crisis (Hundt, 2019; Manjoo, 2019; Mirowski, 2013; McCarty et al., 2013, 251-274; Starr, 2013). His failure left the door open to Trump's brand of right-wing populism (Komlos, 2023, Chapter 15, 2024).

9. Conclusion

My half-century academic career can be conveniently divided into three distinct phases: Habsburg economic history, anthropometric history, and humanistic economics. The obstacles in progressing further in my career in Phase 1 led me directly to Phase 2, which then made me keenly aware of the Achilles heels of mainstream economics, and then the financial crisis gave me the impetus to transition to phase 3. Researching the causes of the crisis made me realize the grave mistakes of economic policy based on mainstream economic theory and on neoliberal ideology. Most establishment economists and policy makers completely misjudged the true effects of the Reagan era tax windfall for millionaires on the distribution of income. They were incomprehensibly blind to the idea that 'liberal democracy requires [...] mild levels of income inequality [...]' (Mukand and Rodrik, 2020, 768). In fact, they were cheerleaders of policies that made the U.S. the most unequal society among peer countries. This obscene level of inequality had tremendous impact on the political power structure that eventually led to democratic backsliding as the country morphed into a plutocracy (Gilens, 2012; Page and Gilens, 2017).

Most economists and policy makers erred also by insisting that globalization would lead to prosperity and misjudged the severe blow it had on the lives of low-skilled workers and the implications of alienating so many millions from the political system. Even arch-conservative Republican Alan Greenspan, an ardent advocate of free markets, realized that the perception that the economy is *just* is an essential prerequisite of sustaining a liberal-democratic Capitalism:

'[y]ou cannot have the benefits of capitalist market growth without the support of [...] virtually all of the people; and if you have an increasing sense that the rewards of capitalism are being distributed unjustly the system will not stand' (Greenspan, 2007).⁶

⁴ Skill mismatch means that the vacancies in the labor market cannot be filled because the available labor does not have the required skills.

⁵ Emma Kerr and Sarah Wood, '10 Years of Average Total Student Loan Debt.' *U.S. News*, September 14, 2021.

⁶ 'Alan Greenspan on Income Inequality.' YouTube video, posted by 'johnklin.' September 28, 2007, @ 2:36. www.youtube.com/watch?v=oqx88MyUSck.

Well, the system was not standing very firmly on January 6th, 2021 and it is still not on very solid terrain.

Then the 2008 crisis diminished the neoliberal ideology's credibility further and with it brought populism to the tipping point. The crisis demonstrated the fragility of free markets without adequate government oversight and it became obvious that markets were far from being self-regulating and instead needed trillions of dollars of support from the much-derided nanny state, in order keep them from imploding. That was a too big a blow to the legitimacy of the traditional elites.

These errors add up to an extraordinary set of policy blunders. Hence, a paradigm shift is long overdue. Without these blatant blunders I would not have devoted so much effort in promoting humanistic economics. The accumulation of anomalies in the normal science of economics is sufficient for a paradigm shift toward Capitalism with a Human Face. The goal is not to squash markets but to tame them so that we, the people, control them and not the other way around. This new economy would enable people to live their daily lives with less uncertainty, less manipulation, less stress, less deception, less conflict, and less fear that their lives could spiral out of control at the next cyclical downturn of the economy or the next bout with medical emergency. Such an economy is not utopian. It has been achieved to a considerable degree in Switzerland, in the Nordic countries, and is similar to the social-market economic model of Germany and Austria. In humanistic economics flesh-and-blood people count, as they experience their quality-of-life in the real existing economy.

So, I end my career with very different perspectives than I began nearly half century ago. In spite of the substantial differences in the subject matter of the three phases, the transition between them was seamless and, moreover, all three phases were characterized by the same methodology of analytic narrative based on data collection and analysis, pattern recognition, and inferences from the perceived patterns using deductive logic. So did humanistic economics emerge out of my researches on the biological standard of living.

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SUGGESTED CITATION:

KOMLOS, John (2024) 'The Making of Humanistic Economics.' *Economic Thought*, 12.1, pp. 16-27.
<https://et.worldeconomicsassociation.org/papers/the-making-of-humanistic-economics/>

Is Heraclitean Spirit Present in Contemporary Evolutionary Socioeconomic Theory?

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Abstract

This article posits that Heraclitus' work constitutes a somewhat underappreciated foundation in the study of socioeconomic thought. It then differentiates his perspective from earlier economic thought in ancient societies and critically examines the surviving fragments of his work. The dialectical approach to phenomena, established by the Heraclitean spirit, has inspired contributions to socioeconomic thought that increasingly shape contemporary economic thinking. This historical trajectory is examined elliptically, emphasising its importance in understanding today's complex realities.

Keywords: Heraclitus; economic thought; dialectics; Heraclitean spirit

1. Introduction

The god: day and night, winter and summer, war and peace, satiety and hunger. It alters, as when mingled with perfumes it gets named according to the pleasure (hedone) of each one. (Ὁ Θεός ἡμέρη εὐφρόνη, χειμῶν θέρος, πόλεμος εἰρήνη, κόρος λιμός. Ἀλλοιοῦται δὲ ὀκωσπερ [πῦρ], ὁπότεν συμμιγῇ θυώμασιν, ὀνομάζεται καθ' ἡδονήν ἐκάστου.)¹

Where did it all begin, in the world of economic thought? Where and when did what could be described as the 'big bang' in social-economic thought and intellect occur? Which thinker and writer could we place as the first in a long line of scholars who fertilised with their intellect man's attempt to understand the world, society, and, by extension, its economy? Who is worthy of being called the most valuable pioneer in this long and continuously expanding genealogy?

This study aims to establish the point at which the first, most critical ideas, concepts, and statements for a broader theoretical understanding of our world emerged through the Heraclitean spirit (Eburne, 2016; Goetzmann, 2017; Kurz, 2016). This question has not been thoroughly analysed within the context of modern economic theories that focus on pre-Socratic thought. A brief comparison of Democritus with Heraclitus could be particularly illuminating, as discussed by Michaelides et al. (2011).

This contribution attempts to show where the first formulations in socioeconomic thought began, without which the rivers of philosophical, social, political, and economic reflection could not have gushed forth dazzlingly for the first time. It also examines what Heraclitus' basic cosmological and political views were and how his thought influences and fertilises the analysis of socioeconomic sciences to this day.

We follow an approach of synthesis and historical investigation of essential milestones in economic thought, taking a critical stance toward the phenomena under consideration (Katselidis, 2019). This article is structured as follows. Section 2 compares early civilisations to conclude that economic recording and thinking remained rudimentary in ancient Mesopotamia, Egypt, China, and India. Section 3 argues that the intellectual revolution in pre-classical Greek antiquity triggered the first profound, holistic and radical extension of the conceptual horizon of socioeconomic reflection through the Heraclitean perspective. Thus, I uncover the elements that conceal the seeds of economic and political thought in his surviving work. Section 4 highlights the constant clash of opposites in the Heraclitean approach as a critical contribution to all socioeconomic sciences throughout the centuries.

¹ Kahn (1979: 84), Fragment CXXIII (D. 67). See also Yeroulanos (2016).

Section 5 is concerned with examining relevant socioeconomic concepts within Heraclitus' fragments. Finally, Section 6 situates the Heraclitean dialectics in economic thought up to the present day.

2. The First Forms of Civilisations, Economic Structures, and Early Economic Thought and Intellect

It is generally accepted that the early Mesopotamian communities were the cradle of social and economic civilisation (Postgate, 2017). The Mesopotamian civilisation between the Tigris and Euphrates was the first to develop many aspects of our daily life as we know them today. There we saw –seemingly for the first time– outstanding human achievements such as writing, the wheel's invention, the codification of laws, the establishment of a conventional calendar, the irrigation of crops, the recording of wealth– production, and the fermentation of beer (Speiser, 1942).

In these early forms of societies, the phenomenon of wealth emerged for the first time and distinctly. The Assyrian and Babylonian theocracy constituted, to a considerable extent, the first political and social basis for economic symbiosis (Grayson, 2000). Here we observe large armies and clear administrative hierarchies, an elaborate legal system –the code of Hammurabi, written around 2,000 BC, is an important milestone (Barmash, 2020)– and early institutions of money, credit, and banking. From that point onward, we observe the building of cities and the gradual stabilisation and repetitiveness of production, which led to the systematic creation of economic surplus, established the mechanism of taxation, and, by extension, provided the necessary material basis for the existence of political and religious power (Hunt and Lautzenheiser, 2011).

However, can we say with certainty that it is in ancient Mesopotamia where social and political intellect emerged, especially the scholar intellectual as an agent of independent thought? Apparently the answer is no.

Did the next great civilisation of ancient Egypt give birth for the first time to free socioeconomic reflection by leaving written monuments? Apart from the colossal and stunning pyramids, which required technological discovery, economic calculation, measurement, and efficient management of the needed resources –a fact that is not in doubt– we cannot find any written monuments of broader socioeconomic reflection (Brewer, 2014; Dykstra, 1994). Nevertheless, certain scholars cultivated writing even more intensively in ancient Egypt. These intellectuals, called the 'scribes,' possessed the most advanced technology back then. The kings and other rulers held them in high esteem as they were considered the chosen of God Thoth, who inspired, guided, and protected their high and irreplaceable art. Wilkinson (2013), an Egyptologist, notes that the power of written words to make permanent a desired state of affairs was at the heart of Egyptian belief and practice, which was, of course, a primary concern of the kings to maintain and reproduce their power. Therefore, the daily responsibility of these scholars was to record the essential facts –of all kinds– of society so that they would become clear, official, and 'indelible' in time as instruments of political and economic power, primarily in the service of Egyptian kings.

The entire intellectual elite in ancient Egypt, including the priests, were scribes; however, the opposite was not always the case. Healers were also –in principle– writers (scribes) because they had to be literate and write their medical texts – so they always began their training by learning to write. As there was no clear separation between the religious and lay life of the elite in ancient Egypt, these doctors were usually priests – a fact that seems to have been preserved over time in the history of Egypt, even as the profession gradually became secularised. In addition, the senior administration officials were also trained scribes, as they had to accurately record and guarantee the efficient use of the always-limited financial resources in their administration (White, 2013).

However, we do not find any scribe, physician, official, or priest in ancient Egypt who remained truly immortal through his eponymous intellectual work. Historically, we mention the Pharaohs exclusively and usually only when referring to the magnificent pyramids. Hence, even in ancient Egypt, we cannot distinguish the individual and named intellectual who, through their eloquent written or spoken word, begins to activate the cradle of global socioeconomic thought, which has been constantly active ever since.

Similarly, no other evidence is found in any other part of the world in those early ages of human civilisation – e.g., China and India. As is well known, the first Chinese cities were established by different settlers along the Yellow River and Yangtze valleys – the former is considered the cradle of further developments. A significant intellectual, religious leader, and philosopher in this region was Confucius, who was born in 551 BC. Confucius' teachings and philosophy undoubtedly profoundly influenced everyday life and thought in East Asia. His teachings, as preserved in the *Analects*, laid the foundation for many later Chinese views on the education and conduct of the right person and how individuals

should live their lives and interact with others in society (Ames and Rosemont Jr, 2010) – in this sense, his social focus is clear. However, the sources for Confucius' life are all from a later period and, in many cases, do not distinguish the creative imagination of the later sources from historical reality. Consequently, most of what we know about his life is considered shrouded in myth and is –to a considerable extent– more viewed in an anecdotal way. Thus, finding a clear thread of abstract socioeconomic reflection in his work is not straight forward.

Similarly, we do not find an answer to our question in India's ancient civilisation either, which emerged in the Indus valley in 2600-1500 BC and developed in the Indian subcontinent along this river. The Indus Valley culture still hides many secrets and mysteries even today. For example, scholars of this culture have not yet been able to decipher its writing because of insufficient evidence (Fairservis, 1983). Most known inscriptions have been found on seals or ceramic vessels and contain less than 4 or 5 characters – the longest being 26. Also, to date, there is no further evidence of any complete written text possibly partly due to the perishable material used. Because the inscriptions are so short, some researchers debate whether these symbols constitute an advanced writing system – it has been suggested that this culture used written impressions only to facilitate economic transactions (Possehl, 2002; Robinson, 2015; Wright, 2010).

Concerning the written records that we find in this period, we see that, from the 3rd century BC onward, Prakrit and Pali literature in the north and Tamil Sangam in southern India began to flourish (Chattopadhyaya, 2009; Singh, 2008). The first Upanishads were also composed between 800 and 400 BC, forming the theoretical basis of classical Hinduism – they are also known as Vedanta (the extension of Vedas; Flood, 1996; Mascaró, 1965). During this period, the Sanskrit epics Ramayana and Mahabharata were written – the latter remains the world's longest single poem (Goldman et al., 1984). Many historians have previously assumed that there was an 'epic era' that contributed to the writing of these poems – yet we nowadays recognise that the texts went through multiple stages of development over centuries (Thapar, 1990). For example, the Mahabharata is speculated to have been based on a small-scale conflict (probably around 1000 BC), which was eventually transformed into a big epic war by bards and poets. Thus, there is no convincing archaeological evidence as to whether the events described in the Mahabharata have an actual historical basis. Also, the existing forms of the texts belong to the post-Vedic period, between 400 BC and 400 AD (Brockington, 1998).

Therefore, as in the others, we are not able to pinpoint any single start of abstract socioeconomic reflection and understanding of our world in this space-time context. The main feature in the thought of this early Indus Valley culture is an inextricable and fascinating synthesis between poetry, mythology, and religious insight. This makes it a different kind of writing to the type of socioeconomic and political critical thinking and theorising that we are investigating in this contribution.

3. The Intellectual Cradle of Free Thought in Ancient Greece

Into the same rivers we step and do not step, we are and we are not. (ποταμοῖσι τοῖσιν αὐτοῖσιν ἔμβαίνουσιν ἕτερα καὶ ἕτερα ὕδατα ἐπιρρεῖ.)²

These acknowledgements lead us to the intersection we are looking for, which seems rooted in the first era of Greek antiquity, starting near the 6th century BC (Ober, 2015). Then, for the first time, we have a record that people begin to think in terms we would call today individual, relatively independent of any explicit religious ritual – as citizens, producers, and participants in their democratic polity. In that context, the type of intelligent man as an autonomous being gradually crystallises into a definite form. Here we see a human free to contemplate –but also to write– about the historical origins and future of the world and society in a relatively coherent and even superstition-free way, that overcomes oppressive religious rule, ritual, or some absolutely-controlled administrative routine. In this context, we believe that a 'new human' has emerged, who begins to question, debate, disagree, agree, interpret, and philosophise as an independent-thinking being – a self-reliant, self-empowered citizen and self-legislator of the state (Castoriadis, 1975; Ober, 1999).

There is considerable interest in understanding the contrast between the Aristotelian view of unitary decision-makers in economics and a more nuanced Heraclitean perspective. This latter view suggests that individuals may consist of multiple and often conflicting selves, as argued by Krügel and Uhl (2023).

At that moment in space and time, we see people exploring, for the first time, as autonomous thinkers (Blackson, 2011) –not as docile priests and representatives of divine entities– the distinction

² (Kahn, 1979, p. 52), Fragment L (D. 49, M40a).

between good and evil (by contemplating morality), beauty and ugliness (by studying aesthetics), or right and wrong (by examining the law). Here we see, for the first time, a systematic observation of the real by speaking of physics and the divine will by contemplating metaphysics, always based on distinct human individuality and personal intelligence (Hankinson, 1998). In this context, we see people functioning as autonomous members of society, becoming for the first time named poets, playwrights, artists, actors, artisans, free private traders, and political visionaries (Green, 1996; Hobden, 2013).

We believe that it was in the context of ancient Greek civilisation that the first breakthrough in the historical development of human intellect occurred, which, to a large extent, laid the groundwork for all the scientific fields we know today. As Crombie (Crombie, 1995) aptly puts it, the abstract thinking of the Greeks achieved a triumph of order over the chaos of immediate experience, as it gave primary importance to knowledge and understanding, usually leaving practical utility in a secondary role.

Which early thinker started this intellectual revolution that gave birth to economic science centuries later? Who seems to have formulated the ideas that spawned later socioeconomic thought and science? Heraclitus is at the root of these reflections in our personal and subjective approach.

3.1. Heraclitus, the Weeping Philosopher

We contend that the first explosion of socioeconomic thought occurred on the coast of Asia Minor some 2,500 years ago through the Heraclitean spirit. Heraclitus was one of the most prominent pre-Socratic philosophers for whom we have clear information and written evidence of his thought – some describe him as an obscure and mysterious philosopher (Barnes, 2002; Chitwood, 2004). The texts that have survived are entirely fragmentary and in the form of a few scattered fragments. However, we believe that without these fragmentary insights, our world would have been long overdue in sufficiently understanding social and, by extension, political and economic phenomena in ways that formed the western canon of dialectic thought (Graham, 2009). Without the Heraclitean spirit in this first moment of intellectual cosmogony in human civilisation, socioeconomic contemplation would probably remain on the surface of phenomena, exhausted at descriptive, simplistically static, and repetitive discourses. Certain Heraclitean concepts such as continuous conflict, dialectical synthesis of opposites with their resulting dynamic harmony, and constant evolution of things seem to have contributed significantly to modern social and economic sciences (Eburne, 2016).

3.2. The Political Environment and the Heraclitean Attitude Toward Politics and Power

Heraclitus was born near 500 BC in Ephesus of Ionia, was of noble birth, and was a descendant of Androclus, the city's founder. Biographers (notably Diogenes Laërtius and Strabo) refer to him as always aloof, skeptical, and mysterious (Kofman, 1987). Heraclitus declared himself self-taught and lived an enclosed and rather solitary life. Some biographers judge him even more harshly, as arrogant, incredibly proud, and even contemptuous of others. Even Socrates later, speaking of Heraclitus' thought, observed with some subtle irony (Barnes, 2002): 'The part I understand is excellent, and so too is, I dare say, the part I do not understand, but it needs a Delian diver to get to the bottom of it.' Theophrastus, for his part, claimed that this obscurity probably came simply from his melancholy (Barnes, 2002).

Heraclitus' personality was complex, panoptic, and quite unusual. The fact that he lived in a turbulent and uncertain time, during which radical social and political changes took place, seemingly contributed to this peculiarity. In particular, he lived during the Ionian revolution, when tyrants in the surrounding cities were often forced to resign or forcibly removed (Sandywell, 2002). It was also common for bloody upheavals to take place under the pressure of massive revolutionary popular mobilisations. Heraclitus, for his part, did not support the harshness of this political conflict and its imposed methods. As a result, Diogenes Laërtius notes (Miller, 2018) –and the historian Strabo confirms– he relinquished the title of 'king' so that his brother could succeed to the throne. Thus, even when his fellow citizens asked him to legislate for the city, he refused as 'vice had prevailed' (κεκρατήσθαι τή πονηρά πολιτεία τήν πόλιν), and he did not want to get involved in the violence and corruption that in his view was spreading (Miller, 2018).

3.3. War and Violence in Heraclitean Thought

Despite his apparent aversion to them, Heraclitus did not regard violence and the conditions of conflict as non-natural and exceptional circumstances in the cosmos and human life. For Heraclitus, war was

and will be the primary principle that drives the universe:³ 'War is the father of all and king of all; some he has shown as gods, others as men; some he has made slaves, others free.' He understood that everything is born out of conflict and that nothing can remain peaceful and stable forever. However, Heraclitus was, apparently, not a man who was impressed by power, nor did he pursue it along with the overt violence that always accompanies it. He fully understood –indeed, he was the first to teach– that conflict is the primary source of all evolutionary change. However, he probably viewed power with intense scepticism –possibly disgust– and with a critical distance that many other intellectuals in the history of our world have since maintained (Rudolfovna, 2018).

Heraclitus was not in favour of bloody revolutions nor of the violent imposition of the mob – he often seemed to express himself negatively against the revolutionary base in his society. For Heraclitus, it made sense for positions of power to be occupied only by sober, worthy, and capable people – a condition largely unattainable in the disruptive environment in which he lived. In Heraclitus' thinking, any unrestrained mass imposition of violence to seize and maintain power was to be avoided:⁴ 'The people (demos) must fight for the law as for their city wall.' Therefore, we could say that he was an early exponent of a meritocratic democracy, although he subsequently earned from some of his biographers the title of 'anti-democrat' or even extreme elitist. Timon described him in one of his speeches with the following, not very flattering, words (Miller, 2018, p. 438): 'Among them arose a crower, a riddler, mob-reviling Heraclitus.'

From this perspective, Heraclitus' conception of the socioeconomic 'game' does not resort to a static and 'pacifying' understanding. He does not invoke any 'divine law' as a mechanism for balancing socioeconomic reality, as he conceives and articulates the perpetual law of continuous socioeconomic conflict as the primary mechanism of the evolution of the state (politeia).

3.4. The Heraclitean Panoptic Melancholy

According to Diogenes Laërtius, what Heraclitus seems to have liked most, in the very fluid, uncertain, and particularly violent political conditions that he lived in, was to contemplate and play with 'knucklebones' (astragaloι) and moving pieces in the company of noble young men of Ephesus in the temple of Artemis. He never considered this a subordinate or unworthy occupation as, in his eyes, time itself 'is a child at play, moving pieces in a game. Kingship belongs to the child.' (Αἰὼν παῖς ἐστὶ παίζων, πρῶσσεύων· παιδὸς ἢ βασιλείῃ.)⁵ Therefore, Heraclitus was not a popular demagogue nor a pleasant and sweet-talking orator. Nor was he an intellectual of political action and power. However, Heraclitus was a man of thought and penetrating philosophical contemplation and thus remained quite introverted until his tragic death (Miller, 2018, pp. 436-437).

Although some scholars describe him as a twisted and obscure thinker, we often recall him –as economists– because he drastically enhanced our thinking, clarifying to a large extent the reality that economics tries to interpret. Conflict, change, evolution: concepts full of light for any scientist, in all fields, including economics (e.g., Long, 2009; Mies, 2006; Müller-Merbach, 2006; Shaw, 2019, 2022a, 2022b). Concepts that we appreciate as being fundamental, uniquely valuable, and irreplaceable.

3.5. Pre-Socratics and Dialectics

Heraclitus belongs to the pre-Socratic philosophers who lived from the 7th century BC until the time of Socrates. Their reflection is largely precursory to Socratic thought and the central core of classical Greek philosophy. The pre-Socratics seem to have been the first to formulate concrete and complete philosophical theories, abandoning the strict adherence to their time's dominant polytheistic religious interpretations and superstitions. The issues they studied (Sassi, 2018) covered a vast range of interests, mainly concerning the genesis and functioning of the Cosmos (cosmogony and cosmology) while exploring the possibilities of human perception (gnoseology).

Parmenides is also a pre-Socratic philosopher, teaching that the sensed world is an illusion because it consists of movement (or change) and diversity. According to Parmenides, the 'On' (Nature) is still and finished (all reality is one), and there is no diversity and differentiation within this 'Whole'.

³ (Kahn, 1979, p. 66), Fragment LXXXIII (D. 53, M. 29): Πόλεμος πάντων μὲν πατήρ ἐστι, πάντων δὲ βασιλεύς, καὶ τοὺς μὲν θεοὺς ἔδειξε τοὺς δὲ ἀνθρώπους, τοὺς μὲν δούλους ἐποίησε τοὺς δὲ ἐλευθέρους.

⁴ (Kahn, 1979, p. 276), Fragment LXV (D. 44): μάχεσθαι χρή τὸν δῆμον ὑπὲρ τοῦ νόμου [ὑπὲρ τοῦ γινομένου] ὁκωσπερ τείχεος.

⁵ (Kahn, 1979, p. 70), Fragment XCIV (D. 52, M. 93).

Heraclitus, for his part, stood strictly against this perfectly static conception of the cosmos. Heraclitus is the philosopher of 'gignesthai' (to come into being), the struggle between opposites. He is the philosopher who conceives of the cosmos as a synthesis of processes rather than objects. All the pre-Socratics, especially Heraclitus and Zeno of Elea, gave us the roots of dialectical thinking. Specifically, Heraclitus' thought supported and highlighted the importance of continuous motion, in direct contrast to the views of Pythagoras, Xenophanes, and the Eleatics. Heraclitus emphasised the core of dialectical thinking, that is, the art of arriving at the truth by revealing the contradictions in opposing judgments, leading to their overcoming (Barnes, 2002).

The dialectical method was perhaps the most valuable fruit of philosophical production in ancient classical antiquity. It was a fundamental conceptual weapon in the thought of Plato and Aristotle, which was also exploited by later writers. It was a conception of reality that was judged, tested, often neglected, and rejected by later scholars until it became the basis for Hegel's philosophy (Eburne, 2016) – usually captured in the conceptual scheme of 'Thesis - Antithesis - Synthesis.' Subsequently, Hegel's approach became the foundation of dialectical materialism in Marx and Engels' interpretation of history (Jordan, 1967). As Descombes (1979, p. 16) eloquently observes, studying dialectics as a concept within the history of ideas:

'Nothing is more characteristic than the change of meaning of the word dialectic. Before 1930, it was understood pejoratively: for a neo-Kantian, dialectics was the 'Logic of appearance'; for a Bergsonian, it could only generate a purely verbal philosophy. After 1930, on the other hand, the word is almost always used in an eulogistic sense. It is now fashionable to go beyond the 'analytical reason' (the Kantian *Verstand*), or even the 'mechanism,' thanks to the dialectic. Dialectics even becomes such an elevated concept that it would be unfair to ask for its definition. For thirty years, it will be like the God of negative theology: it was necessary to give up determining it, one could only approach it by explaining what it is not.'

4. Continuous Conflict, Change, and Evolution

'They do not comprehend how a thing agrees at variance with itself; it is an attunement turning back on itself, like that of the bow and the lyre. (οὐ ξυνιᾶσιν ὅκως διαφερόμενον ἐωυτῷ ὁμολογέει· παλίντονος ἁρμονίη ὅκωσπερ τόξου καὶ λύρης.)'⁶

In this emerging context of dialectical thought, Heraclitus' contribution was decisive. The pattern of constant conflict, change, and evolution that motivated his thinking is, we believe, one of the most pivotal contributions to human intellect, which centuries later still applies to all socioeconomic sciences (Figure 1).

⁶ (Kahn, 1979, p. 64), Fragment LXXVIII (D. 51, M. 27).

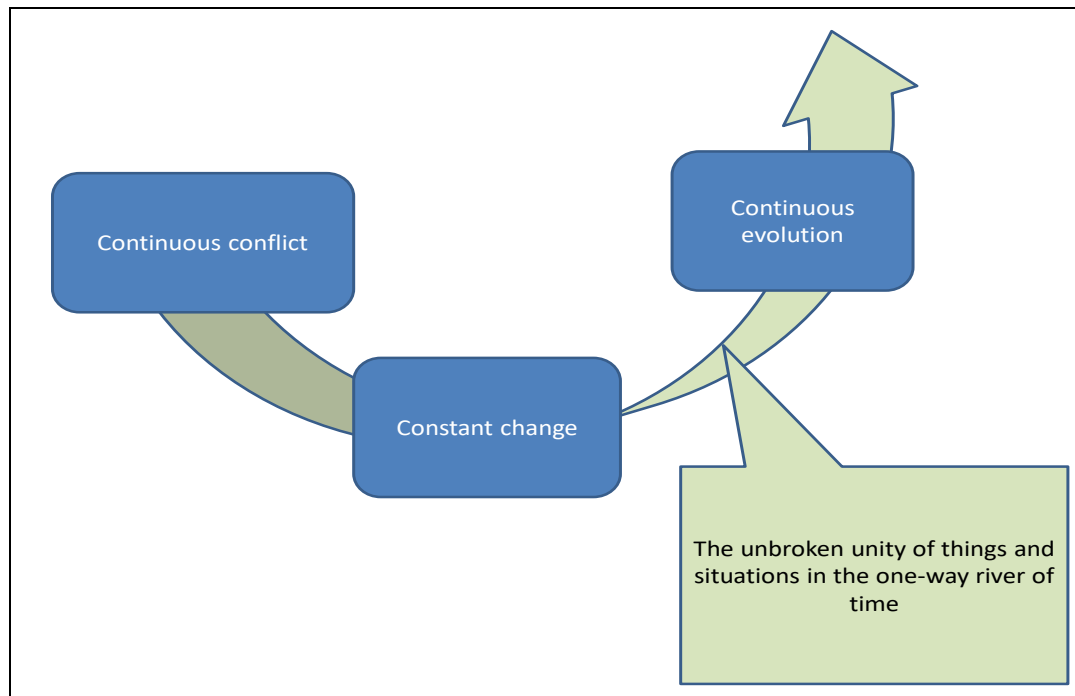


Fig 1: The dialectical thought of Heraclitus

Everything is war from the Heraclitean perspective. But it is this inherent conflict, in any situation, that gives rise to harmony:⁷ 'The counter-thrust brings together, and from tones at variance comes perfect attunement, and all things come to pass through conflict.' Thus, harmony is a temporary equilibrium when a thing opposes itself, with which it is co-identified as a unified whole. We contend that this conception seems necessary for every social scientist and economist: in studying the constant conflict between supply and demand (market), the ongoing strife between different methods of production and consumption (competition), and the perpetual attempt of every new to overcome the old (innovation). Nothing always seems peaceful, created out of passive agreement and inaction. As Heraclitus puts it:⁸ 'The hidden attunement is better than the obvious one.'

Furthermore, it is crucial to emphasise that Heraclitus' belief in change as the only constant in life fundamentally shapes our understanding of institutions, which are subject to continuous transformation. This idea has been explored by Kirti and Kumar (2021), who highlight how institutions cannot be viewed as immune to ongoing change.

In the Heraclitean perspective, conflict generates continuous change⁹ as everything evolves and nothing remains unchanged:¹⁰ 'It rests by changing.' We believe that if Heraclitus were alive today, he would argue that this perspective applies to all spatiotemporal levels of the real (social, political, and economic) – and we think he would be right. This constant change is necessary as it maintains the dynamism and vitality of any system:¹¹ 'Even the posset separates if it is not stirred.' In Heraclitus's perspective, this constant transformation is not timeless, iterative, and unhistorical. Instead, it unfolds on the irreversible historical evolution of things and the flow that allows no returns or repetitions of anything, as it is impossible to enter the same river twice (Vlastos, 1955).

5. Heraclitus' 'Advice' to Today's Social Scientists and Economists

'One cannot step twice into the same river, nor can one grasp any mortal substance in a stable condition, but it scatters and again gathers; it forms and dissolves, and approaches

⁷ (Kahn, 1979, p. 62), Fragment LXXV (D. 8, M. 27): τὸ ἀντίξουν συμφέρον καὶ ἐκ τῶν διαφερόντων καλλίστην ἁρμονίαν (καὶ πάντα κατ' ἕριν γίνεσθαι).

⁸ (Kahn, 1979, p. 64), Fragment LXXX (D. 54, M. 9): ἁρμονίη ἀφανὴς φανερῆς κρείττων.

⁹ According to Kahn (Kahn, 1979, p. 4): 'For Plato Heraclitus is the theorist of universal flux (panta rhei [τὰ πάντα ῥεῖ καὶ οὐδὲν μένει] 'all things flow').'

¹⁰ (Kahn, 1979, p. 52), Fragment LII (D. 84a, M. 56A): μεταβάλλον ἀναπαύεται.

¹¹ (Kahn, 1979, p. 64), Fragment LXXVII (D. 125, M. 31): καθάπερ ὁ Ἡράκλειτός φησι, καὶ ὁ κυκεὼν δίσταται <μῆ> κινούμενος.

and departs. (Ποταμῷ γὰρ οὐκ ἔστιν ἐμβῆναι δις τῷ αὐτῷ καθ' Ἡράκλειτον οὐδὲ θνητῆς οὐσίας δις ἄψασθαι κατὰ ἕξιν [τῆς αὐτῆς]· ἄλλ' ὁξύτητι καὶ τάχει μεταβολῆς σκίδνησι καὶ πάλιν συνάγει [μᾶλλον δὲ οὐδὲ πάλιν οὐδ' ὕστερον, ἀλλ' ἅμα συνίσταται καὶ ἀπολείπει] καὶ πρόσεισι καὶ ἄπεισι.)¹²

We believe that Heraclitus' philosophical approach is one of the most valuable 'tools' we have as economists and social scientists. It helps us escape the static, simplistic, and 'convenient' way of conceiving the economy and from all analytical 'sterilisations' sometimes subjected by the abusive use of the *ceteris paribus* clause. It also helps us escape the superficiality of an ahistorical approach to economic phenomena. We believe that the memorable fragments that survive improve us as modern citizens and scholars of socioeconomic sciences.

Heraclitus explicitly notes the importance of human character, our will and behaviour that shape society (not some faceless 'mechanism' or passive determinism):¹³ 'Man's character is his fate' (Literally translated, his daemon or divinity). Heraclitus also warns us that nature likes to hide and never leads to easy conclusions.¹⁴ Heraclitus still urges us not to make unsupported speculations on significant issues nor to allow logical leaps and escapes from realism.¹⁵ We also see the need for comprehensive theoretical training for any individual who aspires to accurately understand the surrounding reality:¹⁶ 'Eyes and ears are poor witnesses for men if their souls do not understand the language.' Finally, Heraclitus calls us to optimism, perseverance, and constant effort:¹⁷ 'He who does not expect will not find out the unexpected, for it is trackless and unexplored.' Therefore, we understand that, in Heraclitean thought, everything is and remains dialectically interconnected within the ever-evolving mosaic of our cosmos and history: society, politics, power, authority, force, and production, all one.¹⁸

6. Discussion and Conclusions: Heraclitean Perspective and Dialectics in Economic Thinking

'Most men do not think things in the way they encounter them, nor do they recognise what they experience, but believe their own opinions.' (οὐ γὰρ φρονέουσι τοιαῦτα πολλοὶ ὁκοίοις ἐγκυρέουσιν, οὐδὲ μαθόντες γινώσκουσιν, ἐωυτοῖσι δὲ δοκέουσι.)¹⁹

We conclude that socioeconomic science must understand today's complex reality using a dialectical perspective rooted in Heraclitean thought. Figure 2 depicts some milestones in the emergence and use of dialectics up to the present day, thus highlighting Heraclitus' contribution.

¹² (Kahn, 1979, p. 52), LI (D. 91, M. 40c3), Plutarch.

¹³ (Kahn, 1979, p. 80), Fragment CXIV (D. 119, M. 94): ἦθος ἀνθρώπῳ δαίμων.

¹⁴ (Kahn, 1979, p. 32), Fragment X (D. 123): Ἡ φύσις κρύπτεσθαι φιλεῖ. [Nature (physis) loves to hide.]

¹⁵ (Yeroulanos, 2016, p. 284), Fragment 27 (D-K): Μη εἰκὴ περὶ των μεγάλων συμβαλλώμεθα. [Do not pass random judgment on serious matters.]

¹⁶ (Kahn, 1979, p. 34), Fragment XVI (D. 107, M. 13): κακοὶ μάρτυρες ἀνθρώποισιν ὀφθαλμοὶ καὶ ὦτα βαρβάρους ψυχὰς ἔχόντων.

¹⁷ Kahn (1979: 30), Fragment VII (D. 18, M. 11): ἐὰν μὴ ἔλπηται, ἀνέλπιστον οὐκ ἐξευρήσει, ἀνεξερευνήτον ἐὼν καὶ ἄπορον.

¹⁸ (Kahn, 1979, p. 84), Fragment CXXIV (D. 10, M. 25): συλλάψεις· ὅλα καὶ οὐχ ὅλα, συμφερόμενον διαφερόμενον, συνᾶδον διᾶδον, ἐκ πάντων ἓν καὶ ἐξ ἑνὸς πάντα. [Graspings: wholes and not wholes, convergent divergent, consonant dissonant, from all things one and from one thing all.]; From this fragment concerning the unity of the whole with the unit, we believe today's economist can derive important insights into understanding phenomena as simultaneously macroeconomic, mesoeconomic, and microeconomic (Vlados, 2019; Vlados and Chatzinikolaou, 2020).

¹⁹ (Kahn, 1979, p. 28), Fragment IV (D. 17, M. 3).



Fig 2: Critical milestones of the dialectical approach to economic thinking

In the dynamic and conflictual perspective of phenomena, no socioeconomic formation remains unchanged over time, as any equilibrium is always temporary (Vlados et al., 2019). The rediscovery of dialectics and its placement in a central explanatory position in the post-Enlightenment era is mainly due to Hegel (1812), who introduced the dialectical model of Thesis - Antithesis - Synthesis. In this approach, everything starts from a temporary state of equilibrium (Thesis), within which its Antithesis gradually develops as disequilibrium. When the accumulation of quantities becomes so great that the previous system cannot contain it, the inevitable conflict may lead to Synthesis, which leads to an entirely new regime (Figure 3).

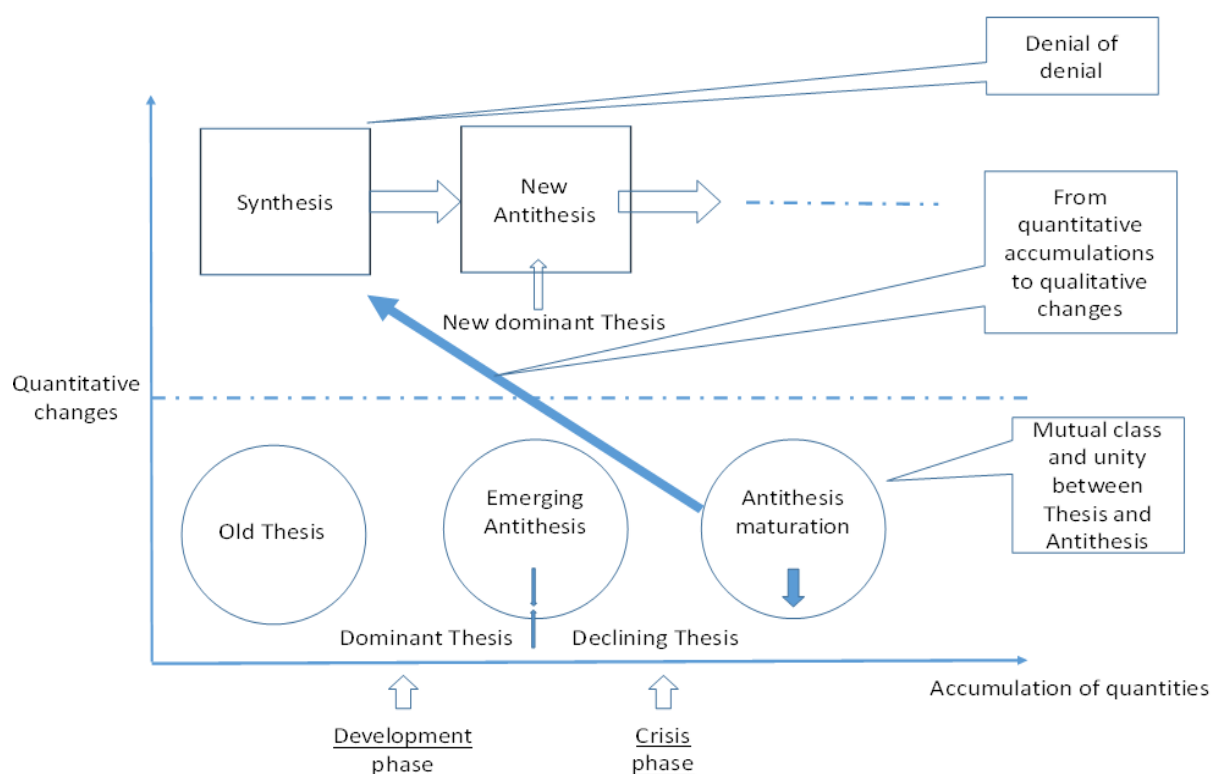


Fig 3: Thesis – Antithesis - Synthesis, according to the Hegelian philosophy (Vlados et al., 2019)

In Hegel's (1812) dialectics, the intrinsic contradiction of phenomena is the essence of all evolution, as an existing Thesis necessarily generates the internal Antithesis. According to the Hegelian view, this subversion upsets the balance and shatters the illusion of 'eternal' dominance in the previous regime. Through the accumulation of quantities and the increase in sizes, the Antithesis continues to mature. At first, it manifests as a simple difference and then gradually escalates, culminating in a direct conflict with the Thesis. Then, the crisis inevitably comes, driving the previous situation to a breaking point as the accumulated quantity implicitly leads to a revolution in quality. Every time the quantitative changes exceed certain limits, the inner structural equilibrium is shaken, and the qualitative dimensions are transformed – the Synthesis has emerged, overturned, and definitively destroyed the previous situation, constituting the new Thesis. Therefore, in a 'denial of denial' logic, Hegelian philosophy proposes the world's evolution as the result of a continuous ascent of dialectical spirals.

In this context, it is undeniable that Heraclitus was the first genuine dialectical thinker, a fact recognised by Hegel. Hegel admired Heraclitus' critical thinking for demonstrating that dialectics is far more than a mere technique for fostering critical reflection, as discussed by Zwart (2022).

Hegel's dialectic also played a central role in the thought of Marx (1859), for whom the conditions of production (the economic base) co-shape the surrounding social structure (the superstructure). For Marx, capitalism is destined to collapse (Dietsch, 2010). In Marx's analysis, the organic composition of capital (surplus value) will continue to increase and cause the rate of profit to fall. Therefore, workers are doomed to gradual alienation and must violently overthrow capitalism –which is unsustainable by nature– and socialise the means of production (Marx and Engels, 1848). In Marx's dialectical materialism, the evolution of human history results from class conflict (Engels, 1872). After overcoming capitalism, Marx argued that there would be a passage to socialism and, through it, to the final stage of communism.

The foremost economist of non-Marxist dialectics is undoubtedly Schumpeter – in a particular liberal way. In the Schumpeterian perspective (Schumpeter, 1942), capitalism is destined to collapse by success rather than through violent socialisation of the production means. For Schumpeter (1934), the prime mover of capitalism is the innovative entrepreneur who aspires to build a 'private kingdom' through the constant denial and transgression of market certainties. The main dialectical contradiction

Schumpeter identified in the discontinuous evolution of capitalism is the 'gales' of creative destruction, signalling the saturation of old industries and the emergence of new ones in their place (Schumpeter, 1942).

Furthermore, game theory understands its reality through the oppositional choices made by agents. It analyses their behaviour in real situations through economic calculus based on the conflictual spirit of dialectics (Milgrom, 1998; Nash Jr, 1950; Roth and Wilson, 2019). Subsequently, evolutionary economics is a school of thought that is an organic continuation of the original Schumpeterian contribution, proposing a dialectic view of reality. According to Nelson and Winter (1982, p. 9), the standard conventional model of profit maximisation as the primary behavioural tool of economic actors cannot explain reality as 'routine' does – and other analogies. Modern evolutionary economics is distinguished by three conditions that make it a distinct discipline (Chatzinikolaou and Vados, 2019): it utilises biological metaphors to explain organisational phenomena, rejects the conventional neoclassical maximising calculus, and incorporates a historical and institutional perspective in studying socioeconomic relations. Evolutionary economics belongs to the heterodox approaches, making its findings dialectically opposite to the conventional economic modelling, mainly of neoclassical inspiration (Nelson, 1994).

Schumpeter (1954, p. 756) did not explicitly advocate the use of Darwinian analogies in economics. However, from about 1990 onward, we see a 'Darwinian revolution' in (evolutionary) economics, similar to what happened in biology (Foster, 1997; Hodgson, 1993; Witt, 1996). A pivotal moment in the evolution of evolutionary economics seems to have occurred with the introduction of modern behavioural approaches to the firm, in which all socioeconomic organisations are co-evolved with their multi-level dialectical internal-external environments. These biologically-inspired approaches to organisational development suggest that the firm is a 'living organism' rather than a machine (Kauffman, 1993) – socioeconomic organisations are more like 'animals' living in their co-evolving 'forest'.

The most recent perspective that seemingly builds on Heraclitean dialectics is the approach of today's emerging new globalisation. According to Perez's (Perez, 2010) neo-Schumpeterian contribution, the long 'Kondratieff waves' (Kondratieff and Stolper, 1935) correspond to specific techno-economic periods in the evolution of capitalism, which periodically reoccur through recessions and significant technological breakthroughs. On this evolutionary thread of thought and utilising a perspective outside the strict national contours of the French School of Regulation, Vados and Chatzinikolaou (2021) have proposed that a new globalisation is emerging in our times following the structural and physiological maturation of the previous evolutionary phase of the global economy. They argue that globalisation encompasses all socioeconomic systems and their different dialectical adjustment trajectories. As a result, globalisation is in a constant state of transformation and dialectical reproduction of theses, antitheses, and syntheses of participating actors. The structural maturation of the old globalisation (circa 1980-2008) is gradually giving way to the new one, as the global system is now evolving in terms of the international regime, the underlying crisis-development platform, and the dynamics arising from entrepreneurial innovation. Today, the international system is in a dialectical search for a new or restructured multipolarity, new forms of realistic hybrid meta-Fordisms, and organic-open innovations (see also Chatzinikolaou and Vados, 2022a, 2022b).

We are confident that the position of this contribution opens new questions and further research work could work on engaging with literature that establishes a foundation for assessing the current economic implications of Heraclitean philosophy. Georgiadis and Sarigiannidis (2024), for instance, offer valuable insights into this area in their work.

The central conclusion of this article is that socioeconomic reflection, in various theoretical traditions since the Enlightenment, is based on the Heraclitean dialectics. As structured in pre-Socratic philosophy, dialectical conflict, change, and evolution seems to be a fruitful node to this day, illuminating the depth of broader and complex socioeconomic phenomena. These older and newer streams of thought that incorporate dialectics at their core seem to reaffirm that Heraclitus' work is the conceptual cradle of scientific socioeconomic reflection.

In conclusion, we believe that further research into the history of philosophy, in its early phases of development in the pre-Socratic and classical periods in ancient Greece, can contribute to a better understanding of the theoretical origins of today's social sciences. In this direction, further investigating the dialectical spirit in the pre-Socratic and Socratic periods (Socrates, Plato, Aristotle) and their opposition to the school of Eleatic philosophers may be of interest. It seems that the dialectical philosophy under consideration is a point of disagreement that had a more profound influence on the development of socioeconomic thought after that, also having a significant impact on the structuring of static and dynamic socioeconomic analyses in our days.

Acknowledgement

I extend my appreciation to Dimos Chatzinikolaou, PhD (c), Department of Economics, Democritus University of Thrace, for his expert editing and comprehensive review of the references, confirming their accuracy and thoroughness.

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SHORT CV

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SUGGESTED CITATION:

VLADOS, Charis (2024) 'Is Heraclitean Spirit Present in Contemporary Evolutionary Socioeconomic Theory?' *Economic Thought*, 12.1, pp. 28-43.

<http://etdiscussion.worldeconomicsassociation.org/papers/is-heraclitean-spirit-present-in-contemporary-evolutionary-socioeconomic-theory/>

Early History of Demand Theory: Anti-Psychologist Thesis Reconsidered

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Abstract

According to a widely shared view, the development of demand theory in the first half of the twentieth century was heavily influenced by the anti-psychological attitudes of economists. I call this view 'anti-psychologist thesis,' and I criticize it on several grounds. I propose an alternative account, according to which the development of demand theory is best characterized as a process aiming towards greater generality. I provide evidence in favor of this 'generalization thesis' and trace the cause of disagreements between advocates of these two alternative accounts. I argue that this cause lies in misunderstandings regarding the aim of the demand theory as well as in the divergent understanding of what it means to abstract from psychological assumptions.

Keywords: demand theory; economics and psychology; anti-psychologist thesis; generalization thesis; the law of demand; utility; revealed preference

JEL codes: B13, B21, D11

The development of the demand theory in the first half of the twentieth century has been described by various authors as a 'story of emptying out of human psychology from the theory of rational choice' (Davis, 2002, p. 145), an 'escape from psychology' (Giocoli, 2003), 'de-psychologization' (Ortmann, 2005), a 'half-century-long flight of neoclassical economics from psychology' (Davis, 2011, p. 8) or a 'retreat from psychology' (Ross, 2014). As these expressions suggest, demand theory was progressively shifting away from its dependence on specific psychological assumptions. What explains this shift?

According to what I call the 'anti-psychologist thesis' (APT), the major cause of this shift were the anti-psychological attitudes of economists of the period. According to Lewin (1996, 1296), economists attempted to 'rid economics of psychology' as an 'unscientific remnant of the past.' Giocoli (2003, p. 43) claims that economists began to 'despise any reference to utility, volition, pleasure and so on.' At least two sources of these attitudes have been identified: logical positivism, which arguably set methodological standards that psychology of the early 20th century did not meet (Giocoli, 2003; Hands, 2010), and economists' 'pathological' preferences, which manifested themselves through downplaying the importance of other disciplines to economics (Lewin, 1996; Rabin, 1998).

In the present article, I critique APT as an inadequate account of the development of demand theory. As an alternative account, I put forward the 'generalization thesis' (GT), according to which economists, rather than trying to get rid of intentional psychology, aimed at a greater generality of the theory. If greater generality was the goal, then economists' attitudes toward intentional psychology were irrelevant to the development of demand theory. Incidentally, the theory was, in fact, becoming more 'psychology-friendly' in the sense that it was becoming more and more compatible with an increasingly larger set of psychological assumptions. GT can also account for the fact that economists rarely discussed these assumptions: It was not because of their alleged anti-psychological attitudes (as argued by APT) but because they subscribed to the division of labor between economics and psychology: since the demand theory was becoming gradually less tied with specific psychological views, economists did not have to resolve issues that were best left to psychologists (Slutsky, 1998 [1915]; Robbins, 1945 [1932]).¹

The term 'generalization,' as used in this article, refers simply to the repeated use of Occam's razor. More precisely, I define it as a process in the course of which a less and less restrictive set of

¹ Arguably, economics separated from ethics for similar reasons (Knight, 1922, 1923; Robbins, 1945 [1932]).

assumptions is used to derive the same set of statements.² Adam Smith aptly described such a process using a machine analogy:

'[Philosophic/scientific] systems in many respects resemble machines. [...] The machines that are first invented to perform any particular movement are always the most complex, and succeeding artists generally discover that, with fewer wheels, with fewer principles of motion, than had originally been employed, the same effects may be more easily produced' (Smith, 1982 [1776], p. 66).

To use Smith's analogy, I attempt to show that the primary 'effect' that the demand theory intended to 'produce' was the law of demand, i.e., the inverse relationship between the quantity demanded of a good and its price. The development of this theory is then driven by discoveries that some 'wheels' (such as diminishing marginal utility or the notion of utility as such) are not necessary to produce the desired effect (i.e., to explain the law of demand) and were therefore disposed of. I argue that this thesis can adequately explain the development of the demand theory and that economists' attitudes towards psychology played, at best, a minor role in this development.

APT seems widely accepted; nonetheless, I may not be the only one who sees rifts in it. Several authors have suggested that the relationship between economics and psychology in the first half of the twentieth century was more complex than what is suggested by APT. For instance, Hands (2010) challenges the view that psychology was driven out of demand theory during the ordinal and revealed preference revolutions. In his interpretation, the main role in the development of this theory was played by economists' unwillingness to commit either to a causal science of behavior or to a notion of human volition.

Another example is Giocoli (2003), who, without denying the APT, argues that the true engine behind the development of the demand theory is the intellectual need of economists to 'improve the logical intelligibility of the theoretical representation of economic behavior' (Giocoli, 2003, p. 45). He also claims that economists used catchwords such as behaviorism and operationalism only as a veil to 'be free to pursue their search for generality and conceptual integrity through formalist methods' (Giocoli, 2003, p. 38). Giocoli's and Hand's accounts still consider APT important, albeit too simplistic; I go further and argue that APT is problematic and its role in explaining the development of the demand theory is small, if any at all. The crucial difference between mine and their accounts is that they assume that the goal of demand theory was to explain behavior; I argue that the theory aimed to explain the law of demand, i.e., changes in behavior in response to price changes.³ I discuss this difference in more detail in Section 1.

Angner and Loewenstein's (2012) historical account of the relationship between economics and psychology subscribes to both APT and GT. On the one hand, these authors argue that there was a 'rejection of psychological foundations' by neoclassical economists (Angner and Loewenstein, 2012, p. 650). On the other hand, they also point out that these economists 'did not deny that people might be motivated by pleasure, pain and/or other mental states'; instead, they 'chose to remain agnostic about questions of motivation, preference formation, and choice' (Angner and Loewenstein, 2012, p. 648). The problem is that APT and GT cannot hold at the same time: How does one 'reject' psychological foundations and 'not deny' them at the same time? In Section 4, I discuss this issue, arguing that advocates of APT fail to distinguish between 'agnosticism about psychology' and 'anti-psychological attitudes' or, more generally, between 'precise' and 'non-precise' abstractions (Long, 2006).

There are accounts of the development of the demand theory which do not focus primarily on the relationship between psychology and economics. Notably, Moscati (2007) argues that this development is regulated by the rule 'more realism, but without loss of systematicity.' By 'realism,' he means consistency of assumptions and implications with common-sense evidence and data; 'systematicity' refers to the 'power to derive the largest possible set of exact implications concerning a certain phenomenon from the smallest possible set of assumptions.' Systematicity is closely related to what I call generalization. Therefore, Moscati's account is broadly in line with GT. Yet, he interprets the attempts to account for the stylized facts of the demand theory without reference to psychological assumptions as a manifestation of APT rather than GT: in particular, he assumes that economists of the early twentieth century were implementing the behaviorist program. I challenge this view in the following section.

² Mäki (2001) uses the term 'derivational (logical) unification' to describe what I call generalization.

³ In contrast, Hands (2010) refers to demand theory as 'consumer choice theory'. Giocoli (2003, p.41) speaks of 'neoclassical theory of economic behavior' and he claims that its 'major theoretical goal' is the 'explanation of the individual behavior' (Giocoli, 2003, p.42).

1. Anti-Psychologist Thesis: An Assessment

Although APT is a hypothesis about the development of a theory, it is usually associated with normative assessment. Advocates of APT not only argue that economics of the first half of the twentieth century has shifted away from psychology; they also claim that this shift was unfortunate. For instance, Lewin (1996) and Bruni and Sugden (2007) state that there were unexploited exchange opportunities between economics and psychology. Behind this view, there is an implicit assumption that both psychology and economics attempt to account for behavior, and so the lack of cooperation between the two is regarded by the advocates of APT as a puzzle. This puzzle has been labeled 'Sen's paradox' (Lewin, 1996): How are anti-psychological attitudes of economists compatible with the fact that economics has to rely on some sort of psychology? The paradox is typically resolved by arguing that economists, under the influence of behaviorism and logical positivism, downplayed the importance of psychology to economics (Lewin, 1996; Giocoli, 2003; Hands, 2010).⁴

Nonetheless, the influence of behaviorism and logical positivism on mainstream economics seems exaggerated. Edwards (2016) even argues that rather than affecting the demand theory of the 1930s, behaviorism related to its institutional critics, such as Veblen, Mitchell, and J. M. Clark.⁵ Moreover, most economists in the first half of the 20th century were neither behaviorists nor positivists (Hands, 2010), and methodological arguments specific to these philosophical traditions were not used as the main arguments in theoretical debates. In fact, it is well-known that Hutchison's (1960) attempt to introduce logical positivism in economics received 'less than enthusiastic welcome' (Giocoli, 2003, p. 35). The influence-of-behaviorism/logical-positivism hypothesis does not explain why ordinal utility and revealed preference theories were, and are today, embraced by non-positivist economists.⁶ An account of the history of demand theory must be able to explain why many economists thought (and continue to think) about ordinal and revealed preference revolutions as progress.⁷

According to GT proposed in this article, the demand theory aims not to account for behavior but primarily for the law of demand – i.e., changes of behavior in response to price changes. In pursuing this aim, economists attempted to build a theory that would not commit to particular psychological views and that would be compatible with various psychological foundations. And so, although it is perhaps true that economics has to rely on some sort of psychology, economists believed (and subsequently proved) that it does not have to rely on a specific kind of psychology, such as hedonism. Thus, in the course of the development of the demand theory, more restrictive assumptions were replaced with less restrictive ones: Ordinal utility theory generalized cardinal utility theory, and revealed preference theory, in turn, generalized ordinal utility theory. In contrast to GT, APT turns a blind eye to the fact that in the course of its development, demand theory progressively became more compatible with an increasingly larger set of psychological assumptions. Furthermore, it cannot explain why the increase in generality occurred as the demand theory developed.⁸

Since it has been sometimes argued that ordinal utility theory does not, in fact, represent a generalization of cardinal utility theory (e.g. Mirowski, 1989, p. 362) and that revealed preference theory is not a generalization of ordinal utility theory (e.g. Wong, 2006 [1978]), the next section demonstrates that ordinal and revealed preference revolutions do in fact represent steps towards greater generality. Then, in Section 3, I provide some evidence that economists who played the main role in developing these theories were motivated by the desire for greater generality rather than anti-psychological attitudes. Next, in Section 4, I argue that a careful distinction has to be made between 'rejection of psychology' (precise abstraction from psychological assumptions) and 'not going into psychological details' (non-precise abstraction from psychological assumption). This distinction marks the difference between APT and GT. Finally, Section 5 discusses possible objections to GT.

⁴ An alternative hypothesis is that there were no gains from trade between psychology and economics as psychology of the period was just emerging and 'was not very scientific' and therefore 'economists thought it provided too unsteady a foundation for economics' (Camerer and Loewenstein, 2004, p. 5).

⁵ This is the exact opposite of Lewin's (1996) thesis.

⁶ For instance, the idea that preference is demonstrated by choice embraced by Mises (1996 [1949]) who at the same time was a staunch critic of logical positivism.

⁷ As Mirowski (1989, p. 365) notes, 'not one single neoclassical economist today acknowledges that [revealed preference theory] was an abortive or futile program.'

⁸ As pointed out by an anonymous referee, another reason why APT seems implausible is that it is difficult to imagine that leading economists of the period would put such energy merely into removing psychology from economics. Moreover, if APT is correct, why didn't they spend more time criticizing psychology directly?

2. Generalization Thesis

When constructing the demand theory, economists of the late 19th and early 20th primarily attempted to explain the law of demand, i.e., the observation that the quantity of a good demanded decreases (or at least does not increase) as its price increases.⁹ More specifically, economists asked under what conditions this law can be derived. What variables must be held constant along the demand curve? What assumptions about consumer behavior are required? I argue that along the way, explanations using more restrictive assumptions were replaced with explanations using less restrictive ones. Therefore, the demand theory was becoming compatible with increasingly more psychological views.

In this section, I briefly review three main accounts of the law of demand (in chronological order): cardinal-utility-based explanation, ordinal-utility-based explanation, and revealed-preference-based explanation. I show that the third explanation is a generalization of the second, which itself is a generalization of the first.¹⁰ I present a rational reconstruction or an 'internal history' (Lakatos, 1970): I focus on ideas as such rather than on the interpretation of specific economists' views. In particular, I am looking for the answer to the following question: How would an economist with given analytical tools account for a downward-sloping demand curve? In other words, I ignore the idiosyncrasies of individual authors, which also means that the 'typical' answer to this question may not be attributable to a concrete person. An 'external history' which discusses the ideas of specific authors is the subject of Section 3.

The first important explanation of the law of demand, developed especially by Marshall, (1882 [1890]), ran along the following lines:¹¹

- (A1) (i) *Maximizing behavior.* Consumer compares the utility of various quantities of good with the utility of various quantities of money. He chooses a combination of the quantity of the good and money which maximizes his total utility subject to his budget constraint.
 (ii) *Ceteris paribus clause.* Nominal income and the prices of goods other than the one in question are held constant along the demand curve.
 (iii) *Non-satiation.* Consumer's utility is strictly increasing in the amount of good and money.
 (iv) *Diminishing marginal utility of the good in question.*
 (v) *Constant marginal utility of money.*¹²
 (vi) *Additively separable utility function.*

To illustrate the logic behind (A1), consider a decrease in the price of a good. By assumptions (ii) and (v), prices of goods other than the one in question and the marginal utility of money are held constant. Therefore, in the consumer optimum, the marginal utility of the good has to decrease as well. This is achieved by increasing the quantity demanded of the good because, by assumption (iv), the marginal utility diminishes with the increase of the quantity of the good, and by assumption (vi), the quantity of the good does not affect the marginal utility of money. The assumptions (i)-(vi) thus ensure that the law of demand holds (cf. Hicks, 1946 [1939], p. 26).

Although (A1) can account for the law of demand, there are several problems with it. Firstly, it focuses only on one good (the other good being 'money'). Therefore, this framework is not suitable for the analysis of complementarity and substitutability between goods.¹³ Secondly, contrary to the assumption (v), the marginal utility of money is arguably not always constant. The theory does not apply to the situations in which this assumption is violated. Moreover, as shown by Samuelson (1942), this assumption has several implausible implications, such as income elasticity equal to zero. Thirdly, the

⁹ As put by Samuelson (1963 [1947], p. 97): '[Derivation of demand functions] is the whole end and purpose of our analysis of consumer's behavior. As has been reiterated again and again, the utility analysis is meaningful only to the extent that it places hypothetical restrictions upon these demand functions.' See also Samuelson (1938b, p. 347) and Hicks (1986 [1956], p. 189).

¹⁰ For a related account of the development of the demand theory, see Hudik (2013). See also Drakopoulos (1990, p.365) who argues that economists such as Pareto, Robbins, Hicks, and Samuelson 'did not invent a new theory but suggested that the same principles can be constructed without psychological assumptions.'

¹¹ (A1) relies on the dominant Hicksian interpretation of Marshallian demand theory. For alternative interpretations of Marshall see e.g. Friedman (1949) and Hudik (2020).

¹² There are several interpretations of 'constant marginal utility of money' (see e.g. Samuelson, 1942; Georgescu-Roegen, 1968). I follow the Hicksian interpretation of this assumption as quasilinearity of the utility function.

¹³ This is the case for cardinalism of Marshallian variety. Cardinalism can, of course, dispose of the assumption (vi) (e.g. Edgeworth, 1881). The reason I choose the Marshallian version is that it served as a main starting point for the subsequent development.

concept of utility is not well-defined.¹⁴ 'Most economists understood the term "utility" in a broad sense as a concept that accounted for the fact that something was desired or wanted by the individual.' (e.g. Fisher, 2007 [1896], 1918; Wicksteed, 1970 [1888]; Pigou, 1932 [1920]; Davenport, 1902).¹⁵ Nevertheless, this formal notion of utility seemed incompatible with the assumption of diminishing marginal utility (assumption (iv)). Moreover, under this interpretation, utility was often defined in a circular way: it was said that a commodity bundle was chosen because it maximized utility and it maximized utility because it was chosen (Sweezy, 1934; Samuelson, 1938b).

Most of the above-mentioned problems were solved by ordinal utility theory developed mainly by Fisher (2007 [1896]), Pareto (1971 [1906]), Johnson (1913), Slutsky (1998 [1915]), Hicks and Allen (1934a, 1934b) and Hicks (1946 [1939]). This theory accounts for the law of demand as follows:

- (A2) (i') *Maximizing behavior.* A consumer decides how to allocate his income across various goods. He chooses the commodity bundle that maximizes his utility subject to his budget constraint.
 (ii') *Ceteris paribus clause.* Nominal income and the prices of goods other than the one in question are held constant along the demand curve.
 (iii') *Non-satiation.* Consumer's utility is strictly increasing in the amount of goods.
 (iv') *Diminishing marginal rate of substitution.* The marginal rate of substitution between each pair of goods Y and X diminishes with the increase of the quantity of X.¹⁶
 (v') *Substitution and income effects.* The income effect is positive, or it is negative but smaller than the substitution effect.¹⁷

Can the law of demand be derived from the assumptions (i')-(v')? Consider again a decrease in the price of some good X. Since by the assumption (ii') the prices of other goods are held constant, there is also a decrease in the price of the good X relative to the prices of other goods. Nevertheless, by the assumption (ii'), also the nominal income is held constant, and therefore, there is an increase in the real income. Consider the two effects of the price decrease, one on the relative prices and the other on the real income, in isolation. Since the relative price of X decreases, consumer optimum implies that the marginal rate of substitution between Y and X has to decrease as well. By the assumption (iv'), this is achieved by an increase in the quantity of X (substitution effect).

Now consider the increase in real income. The increase in real income may result in an increase in the quantity of X (positive income effect, the good X is normal) or in a decrease in the quantity of X (negative income effect, the good X is inferior). The total effect of a decrease in the price of X on the quantity of X is obtained as a sum of the substitution and the income effect. Nevertheless, under the assumption (v'), the law of demand holds.

(A2) generalizes (A1) in several ways. First, it explicitly considers more than one good rather than using 'money' to represent all other goods than the one good in question. Consequently, under Hicks' (1946[1939]) composite commodity theorem, the approach used in (A1) becomes a special case of the utility function of (A2). Second, (A2) drops the assumption (vi) of an additively separable utility function. These two modifications make a general analysis of complementarity and substitutability between various goods possible. Third, the assumption (v) of constant marginal utility of money is replaced with the assumption (v') about the income effect. In general, (A2) allows for cases when the income effect is negative, which may result in the violation of the law of demand (Giffen behavior). Consequently, (v') needs to be assumed to ensure that the law of demand holds. In contrast, in (A1), the assumptions (v) and (vi), together with the assumptions (i)-(iv), imply zero income effect. Therefore, (A2) generalizes (A1) to the cases of the non-zero income effect. Fourth, the 'law of diminishing marginal utility' (iv) is generalized by the 'law of diminishing marginal rate of substitution' (iv'). This new assumption is defined only in terms of the first derivatives of the utility function, and therefore, utility can

¹⁴ Hicks (1946 [1939], p. 12) asks: '...what is this 'utility' which the consumer maximizes? And what is the exact basis for the law of diminishing marginal utility? Marshall leaves one uncomfortable on these subjects.'

¹⁵ Hudik (2015) argues that also classical economists thought about utility in this formal sense.

¹⁶ For more than two goods, diminishing marginal rate of substitution has to be generalized to prevent the possibility of profitable substitutions between various combinations of goods at given prices. Intuitively, the marginal rate of substitution has to diminish in all directions (see e.g. Hicks, 1946 [1939], p. 25). In modern analysis, this assumption has been replaced with alternative assumptions, such as strict quasi-concavity of the utility function.

¹⁷ The substitution and the income effect can be defined in multiple ways. The reason is that there are various possible ways of defining the constancy of real income, such as constancy of utility (Hicks, 1946 [1939]), or constancy of purchasing power (Slutsky, 1998 [1915]). Usual choice in theoretical analyses is Hicks' definition in terms of constant utility. Mosak (1942) shows that Slutsky's definition of the real income in the limit approximates Hicks' definition. Friedman (1954) reviews various definitions of real income used in demand theory.

be, without contradiction, interpreted as a purely formal construct representing the consumer's preference scale.¹⁸

The generalization of (A1) by (A2) is illustrated in Figures 1a and 1b, respectively. Figure 1a shows the case of diminishing marginal utility of commodity X, constant marginal utility of commodity Y, and additively-separable utility function. Consider a decrease in the price of X (a change of the budget line from BL to BL'). The assumptions about the utility function contained in (A1) yield the zero-income effect (the optimum quantity of X under the budget lines BL' and BL'' is the same). Figure 1b shows a decrease in the price of X under the assumption of a positive income effect with the restrictions on the utility functions imposed by (A2). The crucial point is that while Figure 1a and 1b are two special cases under (A2), the situation in Figure 1b is outside the scope of (A1). In particular, (A2) does not deny the possibility that the utility function may have properties postulated by (A1).

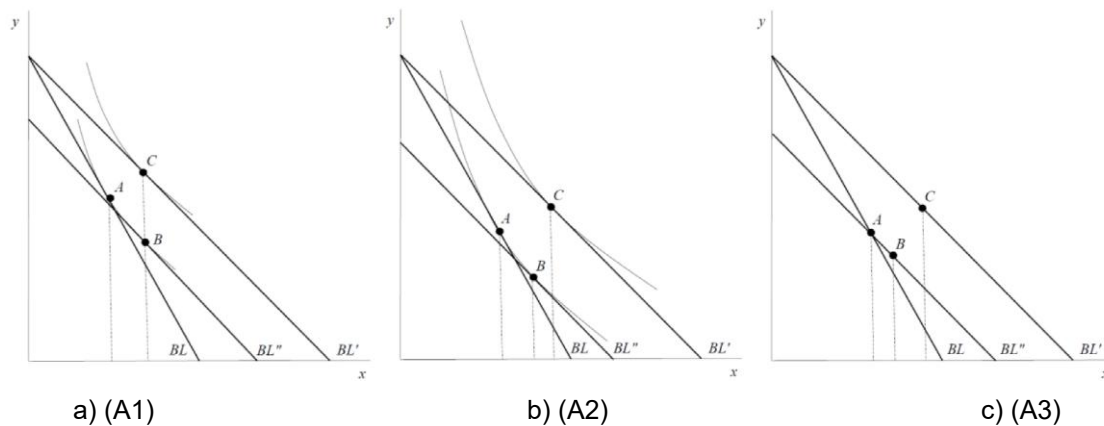


Figure 1: Derivation of the law of demand under different assumptions

Although (A2) successfully solved most of the problems of (A1), it continued to use the ambiguous utility concept (or preference concept, which faced the same problem of circular definition mentioned above): Since the expression 'A is associated with higher utility than B' (or 'A is preferred to B') was interpreted as equivalent with: 'A is chosen over B,' one could certainly dispense with the concept of 'utility' ('preference') and build the theory directly on the concept of choice. To use Adam Smith's machine analogy, there still seemed to be a dispensable 'wheel' in the 'machine.' This problem was addressed by Samuelson's (1938a, 1938b, 1963 [1947], 1948) revealed preference theory, which was further elaborated in particular by Little (1949), and Houthakker (1950). The new reformulation of the demand theory enabled obtaining a negative substitution effect merely from assumptions about consumer choices.

- (A3) (i'') *Weak axiom of revealed preference. A commodity bundle A is revealed preferred to a commodity bundle B if A is chosen in a situation where B is available. The weak axiom of revealed preference states that no choice should also reveal B as preferred to A.*
 (ii'') *Ceteris paribus clause. Nominal income and the prices of goods other than the one in question are held constant along the demand curve.*
 (iii'') *Substitution and income effects. The income effect is positive, or it is negative but smaller than the substitution effect.*¹⁹

To see how the law of demand can be derived from (A3), consider a commodity bundle A chosen under given prices and income. Assume a decrease in the price of the good X accompanied by a compensating budget decrease so that the initially chosen bundle A is just attainable with the new budget and the new price (the compensating budget decrease isolates the substitution effect from the income effect of the price change). Since the bundles containing a lower quantity of X than bundle A were available at the original prices and budget and yet were not chosen by the consumer, by the assumption (i''), they also cannot be chosen under the higher price of X and the new budget. Assuming that each set of prices and income uniquely determines each commodity bundle chosen by the consumer, the initial bundle A also cannot be bought under the new budget and the new price.

¹⁸ Nevertheless, as argued by Drakopoulos (1990), remnants of hedonism remain present in economic textbooks.

¹⁹ Note that unlike in (A2)(v'), real income cannot be defined in terms of utility. See also fn. 17.

Therefore, the lower price of X must be associated with a higher quantity of the good X . Thus, we obtain the negative substitution effect (Figure 1c). The law of demand is then derived from the assumption (i''), together with the ceteris paribus clause (ii'') and the assumption about the income effect (iii'').²⁰

The assumption (i'') of (A3) replaces the assumption of utility maximization (i') of (A2) and naturally also assumptions imposing restrictions on the utility functions (iii') and (iv'). Since the expression 'utility-maximizing alternative' was seen as equivalent to the expression 'chosen alternative,' the former expression is dropped as redundant. Therefore, (A3) generalizes (A2). This generalization can be illustrated by comparing Figures 1b and 1c. Figure 1c shows the derivation of the law of demand under (A3). Unlike in (A2), it is not assumed that the consumer consults a preference scale or a utility when making choices. However, (A3) does not deny the possibility that consumers may consult preference scales or utilities as postulated by (A2).

The claim that (A3) is a generalization of (A2) has been questioned in literature (Wong, 2006[1978]). After Houthakker's (1950) article, which introduced the Strong Axiom of Revealed Preference – a more restrictive assumption than (i'') –, it turned out that an individual whose choices are internally consistent in the sense of the strong axiom acts as if he was maximizing something, i.e., in line with (i'). The two approaches, choice-based and preference/utility-based, can, therefore, be seen as equivalent – this was also Samuelson's position (Samuelson, 1953, pp. 1-2, 1998, pp. 1380-1381). Yet there are at least two reasons why to consider (A3) as a generalization of (A2): Firstly, it allows for choice rules other than maximizing, even though these other rules can be described as maximizing. Secondly, and more importantly, if the concepts of 'utility' and 'preference' are seen as problematic for one reason or another, one can point to (A3) as evidence that these concepts are only mathematical conveniences and play no explanatory role in demand theory. Finally, the critical point from the perspective of the GT is that the move from (A3) to (A2) was driven by a search for less restrictive assumptions that would explain the law of demand. The fact that the end-product of this process allows for alternative interpretations is another issue because Samuelson could not predict Houthakker's result.²¹

3. Textual Evidence

In the previous section, I have shown that the development of demand theory *can be interpreted* as a process aiming towards greater generality; in this section, I provide some evidence that economists who played the main role in the development of the demand theory – Hicks, Allen, and Samuelson – actually cared about greater generality of the theory rather than about rejection of psychology.

3.1. From Cardinal to Ordinal Utility

In Hicks and Allen's (1934a, 1934b) *Reconsideration of the Theory of Value*, I find nothing suggesting that their aim is to reject psychological assumptions of the demand theory. Instead, there is a remark which illustrates that they considered the move from cardinal to ordinal utility as a generalization of the theory.

'It has become increasingly hard to accept Edgeworth's contention that the existence of theories of Public Finance and Industrial Conciliation depending on measurability of utility ought to be regarded as an argument in favor of maintaining that assumption. For its abandonment need not imply the abandonment of these undoubtedly valuable doctrines; it serves instead as a *stimulus to the construction of new theories of wider validity, into*

²⁰ Wong (2006 [1978], 46-50) criticizes the revealed preference theory for not being able to explain consumer behavior; this criticism is, however, misses the point because the aim of the revealed preference theory is not to explain consumer choices but the law of demand. See also Hudik (2019).

²¹ The observation that (A3) calls for a different branch of mathematics led Giocoli (2003) to hypothesize that after the World War II, under the influence of logical positivism and mathematical formalism the image of economics was changing from the 'system of forces' view (represented by rationality-as-maximization principle) to the 'system of relations' view (represented by rationality-as-consistency principle). While Giocoli's hypothesis finds some support in consumer theory, it does not explain why the 'system of relation' view does not dominate in the producer theory. An alternative to Giocoli's account is that the revealed preference approach enabled the use of the new branch of mathematics, rather than the other way round. That said, I do believe that economics was shaped by the use of mathematics as such. In fact, as pointed out by an anonymous referee, generalization in the sense of this paper is characteristic for mathematic approach.

which the traditional teaching can subsequently be fitted as a special case, depending on the introduction of a particular ethical postulate.' (Hicks and Allen, 1934b, p. 54n, emphasis mine)

There is further evidence in their other writings. In *Value and Capital*, Hicks makes clear that the notion of cardinal utility was not negated by the new theory:

'Now of course this does not mean that if any one has any other ground for supposing that there exists some suitable quantitative measure of utility, or satisfaction, or desiredness, there is anything in the above argument to set against it' (Hicks, 1946 [1939], p. 18).²²

Allen (1936, p. 120) points out that his and Hicks's reconsideration of the demand theory was an attempt to 'develop a theory of consumers' choice on Paretian lines which would be, at the same time, more consistent and more complete than the theory as left by Pareto himself.'

Notwithstanding these proclamations, some commentators saw Hicks and Allen's reformulation of the theory differently. For instance, according to Wong (2006 [1978], p. 19, emphasis mine), 'the use of [utility conceived as quantitatively measurable concept] is *declared illegitimate* by Hicks and Allen because Pareto proved that utility is immeasurable from observations of behavior.'²³ Wong quotes the following passage from Hicks and Allen to support his claim:

'[Pareto proved] that the facts of observable conduct make a scale of preferences capable of theoretical construction...but they do not enable us to proceed from the scale of preference to a particular utility function' (Hicks and Allen, 1934a, p. 55; quoted in Wong, 2006 [1978], p. 19).

I do not see how this quotation substantiates Wong's claim: the inability to proceed from the scale of preferences to a particular utility function is merely a statement of a fact, which does not necessarily mean that utility is illegitimate. The evidence provided above speaks in favor of the hypothesis that Hicks and Allen did not think about cardinal utility as an illegitimate concept, or at least they did not use it as the motivation for their reformulation of the demand theory.

3.2. From Ordinal Utility to Revealed Preference

Let us now examine the revealed preference revolution. Samuelson opens his paper by introducing revealed preference theory with an interpretation of the development of demand theory, which corresponds to the interpretation presented in this paper: 'From its very beginning the theory of consumer's choice has marched steadily towards greater generality, sloughing off at successive stages unnecessarily restrictive conditions' (Samuelson, 1938a, p. 61).

It appears that Samuelson thought about his theory as another step in this march towards greater generality. In particular, he made clear that revealed preference theory 'does not preclude the introduction of utility by any who may care to do so' (Samuelson, 1938a, p. 62). In line with this claim, he concludes:

'Woe to any who deny any one of the three postulates here! For they are, of course, *deducible as theorems from the conventional analysis*. They are *less restrictive* than the

²² Similar remark is to be found also in Hicks's *Revision of Demand Theory*: 'It is certainly not the case that the econometrist is obliged to believe that utility is purely ordinal. He does not claim to be able to prove a universal negative. If he has some independent reason for believing in the possibility of a cardinal measure, there is nothing in the nature of the econometric problem which can shake his belief. If he sees some advantage, in some other field of research (perhaps altogether outside economics), from assuming a cardinal index of satisfaction, there is no reason why he should not assume it. What does have to be maintained is that the special properties of a cardinal index are irrelevant to the econometric theory of consumers' behavior' (Hicks, 1986 [1956], pp. 8-9).

²³ Similar claim is made also by Lewin (1996, p. 1310): 'Treated historically (in the sense of its place in the history of economic thought) or rhetorically, Hicks and Allen (1934) was clearly part of the antipsychological movement within mainstream economics, and it brought economic theory one step closer to eliminating all psychological elements.' Moscati (2007) argues that Hicks-Allen paper 'belongs to the behaviorist camp'.

usual set-up, and logically equivalent to the reformulation of Hicks and Allen' (Samuelson, 1938a, p. 70, emphasis mine).²⁴

Yet, the issue is not clear-cut: in opposition to these claims, Samuelson elsewhere speaks about the 'progressive movement toward the *rejection* of hedonistic, introspective, psychological elements' (Samuelson, 1938b, p. 344, emphasis mine). Furthermore, he also famously proposes to drop off the 'last vestiges of the utility analysis' (Samuelson, 1938a, p. 62). This last line has often been interpreted as a manifestation of Samuelson's behaviorist views. For instance, according to Hands (2008, p. 466):

'[Samuelson's original paper on revealed preference theory] was an effort to move consumer choice theory completely away from the notion that consumers have preferences or utility functions governing their behavior, and to replace the entire earlier theoretical apparatus with a purely *behaviorist* theory.'

As he further puts it: '[Samuelson's (1938a)] purpose was to eliminate all reference to preferences or other BAD notions' (Hands, 2008, p. 467, capitalization in the original). My own reading of Samuelson (1938a) is different:²⁵ Samuelson wanted to drop off the last vestiges of the utility analysis not because utility is 'BAD' but because it lacks explanatory power: if 'utility maximizing alternative' is defined as 'chosen' alternative, then utility maximization cannot explain choice behavior. As Samuelson puts it: 'The discrediting of *utility* as a psychological concept robbed it of its only possible virtue as an *explanation* of human behavior in other than a circular sense, revealing its emptiness as even construction' (Samuelson, 1938a, p. 61, italics in the original).²⁶ He then invokes the argument mentioned in the previous section, namely that the ordinalist approach faces exactly the same problem of circularity of definition as the cardinalist approach: 'Even on the advanced front we are confronted with this dilemma – either the argument with respect to indifference varieties is circular or to many people inadmissible (at least without further demonstration)' (Samuelson, 1938a, p. 61).²⁷

There are two additional reasons to believe that Samuelson's primary motivation was to achieve greater generality of the demand theory rather than to impose behaviorism on economics.²⁸ Firstly, Samuelson does not refer to behaviorist literature to 'sell' his theory to fellow economists (cf. Lewin, 1996; Hands, 2010). Secondly, if we accept that Samuelson's early motivation was primarily anti-psychological, then there seems to be inconsistency in his writings: At first, he proposes revealed preference theory to drop off the 'last vestiges of the utility analysis,' while later he thinks of the same theory as a part of the program of 'arriving at the full empirical implications for demand behavior of the most general ordinal utility analysis' (Samuelson, 1950, p. 369 emphasis in the original) (this potential inconsistency in Samuelson's writings is discussed at length by, e.g., Wong, 2006 [1978] and Hands, 2014). If Samuelson was motivated mainly by the desire to achieve greater generality, then the problem of inconsistency disappears.

4. Possible Causes of Disagreement

Having laid down my arguments in favor of GT, I now attempt to trace the cause of disagreement between my interpretation of the development of demand theory and the APT.

One possible source of disagreement is that any statement suggesting that psychological considerations are not relevant to the demand theory (and one can, of course, find many of them) is automatically interpreted as evidence supporting APT without examining the arguments advanced in favor of these statements. In contrast, I argue that the attempts to avoid psychological considerations were driven by the belief that these psychological considerations were –to use again Smith's machine analogy– unnecessary 'wheels' in the 'machine' of the demand theory. In my interpretation, economists

²⁴ It should be pointed out that Samuelson was not at advocate of pursuing generality at any price. See his remarks in Samuelson (1950, p.374) and Samuelson (1998, p. 1381n).

²⁵ See also Mongin (2000) and Moscati (2007, p. 145) for a similar reading of Samuelson (1938a).

²⁶ Samuelson (1938b) is even more explicit on this issue. For instance, he writes: 'That some modern formulations of the utility concept are empty, circular, and meaningless in the above sense, is hardly open to doubt' (Samuelson 1938b, p. 344). See also Samuelson (1963 [1947], pp. 91-92).

²⁷ According to Wong (2006 [1978], p. 50), Samuelson did not identify explanation as a major result of ordinal utility theory and concludes that Samuelson misunderstood this theory. In fact, Samuelson argues that utility (whether cardinal or ordinal) cannot be used to explain behavior unless it is defined independently of behavior.

²⁸ Edwards (2016) provides further evidence that Samuelson cannot be considered behaviorist.

aimed at a theory that would be general in the sense that it would be compatible with various psychological assumptions. For instance, Slutsky writes: '[...] if we wish to place economic science upon a solid basis, we must make it completely independent of psychological assumptions and philosophical hypotheses' (Slutsky, 1998 [1915], p. 3). This quotation seems to support APT; however, Slutsky continues:

'On the other hand, since the fundamental concept of modern economics is that of utility, it does not seem opportune to disregard all connections existing between the visible and measurable facts of human conduct and the psychic phenomena by which they seem to be regulated. *Utility must therefore be defined in such a way as to make it logically independent of every disputable hypothesis or concept, without however excluding the possibility of further research regarding the relations between the individuals conduct and his psychic life*' (Slutsky, 1998 [1915], pp. 3-4 emphasis mine).

I read this as evidence for the GT: Slutsky is simply delimiting borders between economics, which does not go into the details of individual decision-making and other disciplines. Slutsky does not suggest that the research of individual 'psychic life' is illegitimate or unscientific.

But there seems to be a more fundamental difference between my interpretation of the development of demand theory and the advocates of APT: According to my interpretation, as the demand theory developed from the cardinal utility approach to the revealed preference approach, it used less and less restrictive assumptions and was thus becoming in a sense increasingly 'psychology-friendly.' In this interpretation, the concept of ordinal utility does not mean that utility is not cardinal; it means that utility *may or may not* be cardinal. Likewise, the revealed preference approach by avoiding psychological concepts does not deny the existence of preference scales or utility; according to this approach, consumers *may or may not* have preferences or utilities.

Advocates of the APT seem to think about the issue differently: in their interpretation, the concept of ordinal utility means that utility is positively not cardinal, and the avoidance of psychological concepts in revealed preference theory is interpreted as a denial that people have minds (cf., e.g. quotations from Wong (2006 [1978], p. 19) and Hands (2008, p. 466) in the previous section). To use the old distinction revived by Long (2006), advocates of the APT interpret abstraction as 'precise' (i.e., characteristics abstracted from are *specified as absent*), while I interpret abstraction as 'non-precise' (i.e., characteristics abstracted from are *absent from specification*).

To rephrase the argument of this article in these terms: I have argued that there was no de-psychologization of the demand theory in the precise sense (rejection of psychology); instead, there was a 'de-psychologization' in the non-precise sense (not going into details of psychology). It is, however, misleading to speak about 'de-psychologization' in this latter sense (hence the quotation marks) since this process was not a manifestation of anti-psychological attitudes but rather a matter of division of labor. Economic theory was seen as a complement to psychology rather than a 'more scientific' alternative.²⁹

I have attempted to show that the demand theory developed in the first half of the 20th century is a well-argued (though not perhaps unproblematic) explanation of the law of demand for which there did not seem to have been a superior alternative. Nevertheless, there are questions for which this theory does not provide an answer. For instance, this theory does not provide an explanation of choice behavior (e.g., Wong, 2006 [1978], pp. 46-50),³⁰ or it does not portray human beings accurately (Lewin, 1996, p. 1317). However, it is illegitimate to criticize a theory for not being able to answer questions that it did not aim to answer: the fact that revealed preference theory is an inadequate theory of choice behavior does not invalidate it as a theory of demand.³¹ On the other hand, it is perfectly legitimate to preach that economists should ask different questions than they do.

This point can be well illustrated by the works of Wesley Clair Mitchell, who as early as 1910, realized that the issue is not that the economists studying demand theory disagreed with psychologists. As he puts it:

'Anyone who challenges the worthwhileness of the mechanics of self-interest [as exemplified by the works of Jevons, J. B. Clark and Fisher] may find that its exponents can

²⁹ For more on this issue from a methodological perspective and with reference to modern debates, see Hudik (2019).

³⁰ For an argument that economics is not a science of behavior, see Hudik (2011).

³¹ As pointed out by Hands (2012, p.1105), '[rational preference theory] can be good economics without being a good methodological template for all of choice theory.'

admit everything which [social psychologist] McDougall urges without impairing the logical coherence of their system, and without impairing their own confidence in its scientific merits' (Mitchell, 1910a, p. 110).

His argument was not 'do what you do differently' (give different answers) but 'do something else' (ask different questions).³² Mitchell wanted economists to change the focus of their interest, especially towards the study of institutions by which term he meant 'psychological entities – habits of thought and action prevailing among the communities under observation' (Mitchell, 1910a, p. 112). For example, he argued:

'Technical methods in industry, and accounting as a method of control, are things which the race has learned by slow degrees. To understand the present situation it will not suffice to take these methods for granted. On the contrary, it is one of the economist's chief tasks to account for them. The like holds true of all the great economic institutions, such as the capitalistic organization of business enterprise, the use of money, private property, the economic responsibility of the individual. It holds true further of the ultimate psychological traits of human nature, with which the economist sets out' (Mitchell, 1910b, p. 201).

Mitchell's argument boils down to a complaint that most economists of his time were interested in questions different from his own. For better or worse, he did not succeed in persuading them to change their focus.

5. Potential Objections to GT

There are two potential objections to GT. One objection may be that my account (just like APT) is too simplistic in seeing increasing generality as the dominant factor in the development of the consumer theory; it could be argued against my account that reality was much more complex and that other factors played a role.

I readily accept that different economists may be motivated by different considerations in their research – in this sense, the multi-causal account is correct. However, my concern is not primarily with the various motivations of single individuals (although I examined the motivations of some of them in Section 3); instead, my aim is to account for the 'market level,' which individuals have only limited power to influence: I am interested in the question why some ideas came to be accepted by the professional community, while others did not. In this sense, I consider my mono-causal account adequate. GT can fully explain the development of demand theory from cardinalism to revealed preference. In contrast, I do not find any evidence that approaches to demand theory were rejected because they were 'too psychological' as implied by APT.

The second possible objection is that my story is based on the assumption that the law of demand was the primary concern of economists developing demand theory; nevertheless, it could be argued that there were other issues that economists considered equally important.

I certainly do not deny that there were other concerns than the law of demand; for instance, I have already mentioned that one of the weaknesses of (A1) was that it did not allow for the analysis of complementarity and substitutability of goods or situations, where income elasticity is different from zero. Admittedly, there are some concerns, such as welfare analysis, that I do not mention in my story at all. For example, Lange (1934) was willing to accept ordinal utility theory as a basis of demand theory but argued for preserving cardinal utility as the basis of welfare considerations. Hicks (1986 [1956]) also considered applications of demand theory to welfare economics important.

The reason why these and other areas are not part of my story is that both ordinal utility and revealed preference theories were first developed to address the issues of the demand theory, and their application to the problems of welfare economics came only later.³³ To be sure, the debates about welfare issues were important for the acceptance of ordinal utility and revealed preference approaches and could have pushed the development of consumer theory in a different direction. Nevertheless, they

³² In other words, he saw the problem on the demand side, not on the supply side of the market for ideas.

³³ For a similar reason is the application of utility theory to welfare economics left out by Stigler (1950a, 1950b) in his survey of the field. As he points out, 'most economists of the period [i.e. 1776-1915] used utility theory primarily to explain economic behavior (particularly demand behavior) and only secondarily (when at all) to amend or justify economic policy' (Stigler, 1950a, p. 307). In my view, this is also true for the years 1915-1950, notwithstanding the fact that there were important contributions to welfare economics in this period.

did not because it turned out that welfare economics could be built on the basis of these approaches. I, therefore, left them out of the story to keep the scope of the article in manageable proportions.

6. Conclusion

In this article, I challenged the rejection-of-psychology account of the development of the demand theory and proposed the generalization account as an alternative. I have shown that the GT is not only consistent with the facts but also does not suffer from the problems that beset the APT. In particular, it does not assume that economists ignored the potential benefits of cooperation between economics and psychology.

My conclusion is that demand theory, as developed by Hicks, Samuelson, and others, gives adequate answers to certain specific questions, but whether these questions are the only ones, or the most important ones that should have been asked, is another issue. If the discontent with the development of the demand theory is rephrased in this way, then one may consistently hold the view that this theory is a formidable achievement while at the same time, one may wish that intellectual resources available in the first half of the 20th century would have been allocated differently.

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SUGGESTED CITATION:

HUDIK, Marek (2024) 'Early History of Demand Theory: Anti-Psychologist Thesis Reconsidered.' *Economic Thought*, 12.1, pp. 44-58.

<http://etdiscussion.worlddeconomicsassociation.org/wp-content/uploads/2020/03/Hudik-05-Feb-20.pdf>

Structural Change in Post Keynesian Monetary Theory: A Non-Compensatory Disequilibrium Framework

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Abstract

Post Keynesian Economics has shifted away and even defied Keynes' original research program, i.e., the Unemployment Equilibrium thesis, endogenous money and liquidity preference determination of interest rate in which both money and uncertainty play fundamental roles. This paper attempts to bring back the Keynesian counter-revolution spirit into Post Keynesian Monetary Theory by introducing a Non-Compensatory Disequilibrium Framework (NCDF) that allows structural breaks in budget constraints that lead to a model where Walras's Law does not hold.

Keywords: NCDF, Money, Endogeneity, Uncertainty, Budget constraints, Structural breaks.

JEL: E12, E25, E43, E52

1. Introduction

It is argued that Post Keynesian theory has shifted away from Keynes' original research program. Furthermore, Post Keynesian monetary theory has resulted in a choice between the Structuralist vs Horizontalist (S-H) hypothesis, both of which misrepresent Keynes' work. This paper attempts to bring Post Keynesian theory back to Keynes to fully represent the three fundamental concepts in Keynes' monetary theory, i.e., uncertainty, liquidity preference determination of interest rates, and endogenous money.

In section 2 and 3 the current state of Post Keynesian monetary theory will be critically analysed with a view to showcasing its shortcomings to represent Keynes' ideas. This failure covers the main elements of Keynes' monetary theory, and it results from disregarding the full implications of the nature of money and uncertainty stemming from Keynes' view of modern economies, i.e., low elasticity of production and low temporal and inter-temporal substitution for commodities. In section 4 the nature of money in Keynes' work is examined leading to a Non-Compensatory Disequilibrium Framework where temporal and inter-temporal budget constraints might not compensate each other, i.e., Walras's Law does not hold. In disequilibrium, as already discussed by Clower, individuals are constrained in markets and cannot attain their potential demand. Section 5 and 6 expand the analysis to different types of disequilibrium which lead to structural breaks in the dynamic behaviour of individuals and markets thus contradicting current Post Keynesian and Non-Post Keynesian monetary theories. Section 7 concludes.

2. Structuralists Vs Horizontalists (S-H) Debate

Keynes was aware that the money supply might not be 'kept constant in all circumstances' Keynes (1936, p. 92). However, base money supply by the CB and the supply of deposits by the banking system might be totally inelastic (verticality) with respect to the long rate (Keynes' point); although they might be totally elastic (horizontality) with respect to the base rate. On this dependence, Structuralists reject the totally elastic money supply because of an alleged constancy of expectations⁷¹. Keynes understood that: 'the process of revision of short-term expectation is a gradual and continuous one, carried on largely in the light of realised

⁷¹ 'Expectations are normally changing over time, and this is the main shortcoming of their (Horizontalists) approach' Fontana (2004, p. 379).

results; so that expected and realised results run into and overlap one another in their influence' Keynes (1936, p. 31).

The complex mutual interaction between expected and realized results is a continuous process that works out within the Keynesian period. That is why Keynes asserted that expectations could be assumed to be fulfilled on average. However, this hypothesis cannot be confused with the rational expectations hypothesis (REH) as these assumptions are based on different frameworks. In the REH theoretical framework expectations are not revised within the single period⁷² and individuals can never be wrong; on the other hand, in the Keynesian period expectations are revised continuously and individuals are therefore also continuously wrong. In this way, unless Horizontalists rely on a Hicksian period and not on a Keynesian period to set up the endogenous theory of money, Keynes' hypothesis cannot be accused of relying on a constancy of expectations assumption. Additionally, the CB' short rate in both Keynes' and Horizontalists'⁷³ models might react to changes in both itself and individuals' expectations by adjusting its monetary policy stand.

Keynes might have been ambiguous when he wrote that '[...] [the] quantity of money as determined by the Central Bank' (Keynes, 1936, p. 123), which might have misled Kaldor and Moore into thinking that the quantity of money was being assumed constant. I think Keynes here means that the quantity of money is created⁷⁴ or originated by the CB through minting base money. Keynes was trying to explain that the upward pressure on interest rates from a higher liquidity preference by the public was subjected to the ability or willingness of the banking system to produce credit money out of base money. If banks are always willing to supply deposits on demand independently of long rates, the ability to create deposits must depend on banks' ability to find free reserves. Hence, the banking sector ability to supply liquidity, given the state of preferences and technology, will hinge on the monetary base, i.e., the amount of fiat money held in cash balances by the public plus the amount of amount of fiduciary reserves legally required to be held by the banking sector which itself depends on deposits held by the public and hence subjected to the liquidity preference of the public.

Furthermore, Keynes viewed the determination of the long interest rate as balancing both the eagerness and readiness for liquid resources which occurs when there are no free reserves in the banking sector. Using free reserves banks can reduce the interest rate to induce firms demand for credit or they can bid up bond prices by investing in the bond market. The existence of free reserves implies an unsatisfied supply of liquid resources as well as an unsatisfied willingness to supply credit by the banking sector. In this sense, Keynes does not use liquidity preference theory to explain the failure of coordination between savers and investors in a loanable funds approach as loans can be created *ex nihilo* by the banking system on demand. Ex-post savings are always equal to ex-post investment. However, the required increase in loans to finance the difference between ex-ante and ex-post savings 'must raise the rate of interest unless either the banks or the rest of the public become more willing to release cash, so (as I now add) an increase in planned activity must have a similar, superimposed influence' Keynes (1937, p. 667). According to Davidson, this dependency on planned expenditures⁷⁵ renders the demand for money the type of unpredictable instability unaccounted for in orthodox monetarist models. Furthermore, monetarist's economic policies based on quantity targets⁷⁶ might have failed to control the money supply because they did not take into account the endogenous nature of money creation whilst for Keynes the supply of money is endogenous and the unwillingness or unresponsiveness of the CB to accommodate reserves will set movements in the interest rate until there are no unused reserves left.

Moreover, the degree of reserve accommodation by the CB is another disputed issue in the S-H debate. We should note that the CB does always fully accommodate banks' demand for reserves insofar as it cannot refuse to accept deposits from the legal depository institutions. Strictly speaking, there should not be any disagreement between Horizontalists and Structuralists regarding accommodation of reserves.

⁷² Note here the difference between Hicksian single period and the Keynesian period. Hence, it cannot be a difference between Horizontalists and Structuralists.

⁷³ Although Structuralists have criticised the allegedly exogenous determination of the base rate 'Horizontalist analysis suffers from an overly simplistic formulation of policy that specifies an exogenous policy interest rate rather than representing policy in terms of a policy reaction function or policy rule.' Palley (2008, p. 12).

⁷⁴ '[...] quantity of money created by the monetary authority [...]' Keynes (1936, p. 102)

⁷⁵ See Davidson (1978)

⁷⁶ Goodhart (1989)

Nevertheless, the debate around CB's reserve accommodation capability seems to have challenged whether the CB would be willing to provide the liquidity demanded by banks and not whether reserves will be supplied on demand. According to Horizontalists, when the CB is accommodating, the supply of money will be topped up according to the endogenous increase in banks' demand for liquidity at any given interest rate set by the CB. The result is a simple fully elastic supply of reserves function at the exogenously set interest rate. According to Structuralists, when the CB is not fully accommodating the volume of reserves, the supply of reserves function would be a stepped line increasing for higher levels of interest rates. This alleged positive relationship between market rates and volume of reserves might as well be too simplistic as it does not take into account the changing conditions in the market.

Nevertheless, even when the CB is not accommodating its outstanding monetary base to the changing conditions in money markets, under given conditions the supply of money is endogenously adapting to the demand for it, as we can see in section 4, which corroborates the Horizontalist view. The endogeneity of the money supply would therefore be independent of any accommodationist view taken. However, for a given state of long run expectations, technology, and preferences, the CB's accommodation stand will have an effect on the long rate by changing both the willingness to supply funds and the eagerness to demand them. Nevertheless, as it can be seen in figure (1.a), the endogeneity of the money supply could be represented in a model where the supply of money is a vertical line in the (ib, M) plane as Keynes did. Money Supply and interest rates could then be determined endogenously, although monetary policy might in principle shift the given conditions in financial markets and control the short and long rate exogenously. For Horizontalists, the interest rate is fixed as a mark-up on the base rate and hence it is exogenously determined. However:

'[...] empirical work on the relationship between the official rate and market rates (on loans, deposits, bonds and whatever else, and in a range of countries) suggests that there are large and persistent variations in spreads in response to a change in the policy rate [...]' (Howells, 2007, p.4).

In this sense, Structuralists are more Keynesian in spirit than Horizontalists as they do allow for an endogenous determination of interest rates. Nevertheless, Keynes stressed that this level of interest need not be the same interest level⁷⁷ that will clear the labour market.

Keynes' model also allowed for out of equilibrium-excess supply of money periods. In section 4 we can see how excess supply of money could be brought about. However, it has been argued by Lavoie that 'there can never be an excess supply of money' Lavoie (2001, p. 8). In Horizontalists and Circuitists⁷⁸ models banks can always issue debts on themselves to finance loans granted to firms and banks are always able to accommodate creditworthy demand for loans, deposits are then credit driven and created ex nihilo. Furthermore, according to Parguez and Seccareccia (1999), Post Keynesians tend to ignore the impact of state expenditure on bank reserves. If reserves are excessive due to an excessive monetary-financed public deficit, banks will stop borrowing reserves or purchase new bonds lowering interest rates. The CB must then increase the supply of bonds to keep the interest rate at a given level.

However, if the Government is forced to finance its deficit through T-Bonds, instead of by expanding the monetary base, forcing the reflux of reserves from the public, there will not be any increase in reserves in the banking system. On the other hand, even if deficits are immediately financed by issuing fiat money, this will lead to rocketing bond prices and the CB will be forced to increase the supply of T-Bonds to drain the extra reserves anyway. To avoid the unnecessary price instability the CB might instantly neutralize the effect of the monetary influx and no such effect as described by the Circuitists would occur. Hence, the CB faces the complicate task of allowing the maximizing behaviour of banks keeping free reserves to minimum levels pushing financial assets' prices up and guaranteeing the smooth functioning of the financial system by discouraging un-stabilizing speculative behaviour. Nevertheless, contrary to Horizontalists' point of view, even when the proportion of government deficits financed by T-Bonds is decided by the public, excess demand for bonds might be brought about by out of equilibrium interest rates in other than T-Bond markets. This inability by the CB to induce long rates was already expressed by Keynes 'Thus a monetary policy which strikes public opinion as being experimental in character or easily liable to change may fail in its objective of greatly reducing the long-term rate of interest' (Keynes, 1936, p. 101).

⁷⁷ The natural level of interest rates as stated by Classical economists.

⁷⁸ See Parguez and Seccareccia (1999).

Circuitists believe that in an economy where money is never held in cash balances and the banks do not have to keep regulatory balances of fiat money in the CB, money supply can never be in excess and it would be totally endogenous and infinitely elastic. Without disagreeing with them in this sense, we could observe that in such event fiat money would cease to be money altogether as there would be no need for it. Nevertheless, as long as Fiat money is needed by the public or banks, credit cannot be given without the limit imposed by the public's willingness to hold cash balances and legally compulsory reserves, making the public's preference for liquidity a relevant variable determining long rates. Hence, as we see in section 4, contrary to Cottrell's⁷⁹ position, even when the supply of money is assumed to be equal to the demand for it, liquidity preference still plays a relevant role in interest rate determination. The slope of the loans supply curve would also play a role in it.

However, this is another point of disagreement between Structuralists and Horizontalists. The amount of funding per capital required for a particular firm is related to the lender's assessment of the risk involved and hence the interest rate charged should be positively related to the amount of funding. What Horizontalists disagree with is that increases in the number of firms willing to invest will inevitably imply an increase in the lenders' risk analysed at the aggregate level and hence an upward sloping supply of loans on long rates⁸⁰. As firms use borrowed funds to invest, other firms' profits increase and so are their capital reserves and ability to qualify for a loan. On the other hand, risk might just be the qualifying assessment tool used by banks to apply the same rate to all risk-qualified borrowers. It seems that the best simplification could be a horizontal supply of loans. Further, any hypothesis could be included in a monetary integrated model.

3. Current State of Post Keynesian Monetary Theory

Post-Keynesian economics originated as an opposing view to the so-called 'bastard Keynesianism' as a legitimate interpretation of Keynes' legacy. This rejection to accept any similarity to the neo-classical equilibrium framework has led Post Keynesian theory to shift away and even deny Keynes' original research program, i.e., the Unemployment Equilibrium thesis and liquidity preference determination of interest rate in which money and uncertainty play a fundamental part.

The current state of Post Keynesian monetary theory as a choice between the Structuralist versus Horizontalist's (S-H) hypothesis, cannot be a logical representation of Keynes' work on different grounds.

Keynes' monetary theory entails three main concepts: Uncertainty, liquidity preference determination of interest rates and endogenous monetary creation. Whilst Post Keynesian monetary theory has preserved the importance of uncertainty for monetary analysis, it has not fully understood its relationship with money. The other two pillars of Keynes' theory have been misunderstood and therefore his ground-breaking departure from neo-classical economics has been perverted.

First, the Post Keynesian's view about uncertainty revolves around the epistemological vs ontological debate. Keynes' fundamental uncertainty should include both the limitation to knowledge due to limited human capabilities and the complex nature of reality. Whilst Post Keynesian economists have been engaging in this debate, DSGE models have been successful in evolving from anticipated utility models to models that incorporate expectation formations that considers forward-looking agents that can adapt the stochastic properties of current beliefs. In such models, agents are aware that they just do not know everything – a concept that relates more closely to Keynes' fundamental uncertainty. Whether or not it is possible to obtain a stochastic formation of referential demands defined to conform to the type of uncertainty that Keynes had in mind is something that will be out of the scope of this paper. But what it will be argued here is that even if that were possible, an efficient future path of optimal decisions cannot be guaranteed today. To show this, we will focus on the deep connection in Keynes' work between uncertainty and the role of money in a modern economy in contrast to a barter economy. Money in productive monetary economies does not have substitutes and therefore commodities cannot be used as a mean of exchange for inter-temporal substitution. Hence, the existence of money interferes with inter-temporal budget constraints that might not compensate each other, i.e., Walras' Law does not hold. This realization problem and its link to uncertainty is the base of the Non-Compensatory Disequilibrium Framework (NCDF)

⁷⁹ 'It is thus quite possible to combine endogenous money with important elements of LP theory, provided that the former is not taken as implying that the supply of money always and necessarily equals the demand' Cottrell (1992).

⁸⁰ See Hein (2010).

introduced in section 4, and which will be used to show that structural change due to budget constraints affect the dynamic properties of the system in disequilibrium thus rendering future path of optimal decisions implausible to achieve.

Secondly, the role of liquidity preference in Post Keynesian monetary theory has been severely weakened from its crucial stance of long interest rate determination to a marginal meaning for short rates. The reason why Post Keynesian monetary theory moved from a liquidity preference theory of interest determination to a mark-up theory was influenced by the dissatisfaction of Heterodox economists with 'bastard Keynesianism' that was based on general equilibrium principles. Yet, in doing so, they have misrepresented Keynes' liquidity preference theory by redefining it as a choice between two assets very close to the short-period spectrum which depends on the short interest rate. Liquidity preference defined in this form will have a very limited⁸¹ role to play in the determination of long rates, something that remains at odds with Keynes' original theory. NCDF allows agents' liquidity preference to affect long rates, and structural breaks present in them alter the relation between quantity of money and long rates as exposed in sections 5 and 6.

Thirdly, Post Keynesian models also explicitly accept that 'Keynes also assumed, along with everyone else, that the supply of money was exogenously determined' (Rousseas, 1998, p. 37), which would undermine Keynes' meticulous and lengthy definition of different types of deposits that are included in his definition of the supply of money and which are determined by the banking system. The fact that he did not repeat the same painstaking analysis in the *General Theory* is a reflection that this work represented for Keynes 'a natural evolution in a line of thought' (Keynes, 1936: i). As he says: 'In my *Treatise on Money* I studied the total demand for money under the headings of income-deposits, business-deposits, and savings-deposits, and I need not repeat here the analysis which I gave in chapter 3 of that book' (1936, p. 125). In the *Treatise* Keynes had already stressed the role of credit by the banking system to achieve equilibrium between investment and saving. Hence, in a monetary productive economy, credit is essential for entrepreneurs to realize their planned investment. The increase in the quantity of money as credit expansion is as indispensable for production to happen as necessary to reach equilibrium between investment and savings. In the *General Theory* Keynes assumes equilibrium between investment and savings; yet this implicitly implies the endogenous increase in credit and the quantity of money.

As we have seen above, Keynes already stated in the *Treatise* that money is endogenous even though its relationship with interest rates is not unique. 'It follows that a given M_2 will not have a definite quantitative relation to a given rate of interest of r ; – what matters is not the absolute level of r but the degree of its divergence from what is considered a fairly safe level of $r[\dots]$ ' (Keynes, 1936, chapter 15). The NCDF also sheds light on this as the underlying structural changes in the quantity of money in disequilibrium might explain Keynes' impossibility proposition of modelling the quantity of money by a unique and continuous function with respect to interest rates.

4. Non-Compensatory Disequilibrium Framework

Further from dispelling transactional uncertainty, Post Keynesian economics views the introduction of money⁸² into the system as as the source of the realization problem⁸³ that arises due to the nature of money and reveals the uncertain nature of the market clearing condition that does not arise in a barter economy. Moreover, due to the role of money as a store of value, economic agents can hold wealth without incurring into the costs and risks that holding product would have brought about. Therefore, money transforms the temporal link between production periods by letting uncertainty to slither into the economic system, shaping agents' liquidity preference and altering the certainty of the market clearing condition that rules barter economies.

In a monetary economy of such nature, individuals do not know how much of the initial endowment will be sold or bought and, within this uncertain condition where future equilibrium prices cannot be known,

⁸¹ It could have a role by making the mark-up endogenous somehow. However, for a constant mark-up the interest rates spread is also constant.

⁸² Túnéz (2016) for an explanation of the realization problem and its relevance in the invalidity of Walras' Law.

⁸³ 'In a real exchange economy, Say's law applies because money income is ultimately spent, either directly or indirectly, in order to realise use-values. But in a monetary economy, this simple postulate no longer applies.' Lucarelli (2010, p. 5).

they must take decisions that affect everyone else in the market. In a Keynesian world⁸⁴, individuals must take decisions within a completely uncertain environment, where money takes a decisive role that defines the entire workings of the economic system. The introduction of money into the system itself hinges on the structural institutional set up that requires the smooth functioning of financial markets providing liquidity to markets and individuals⁸⁵. The failure of financial markets to provide liquidity to markets poses such a threat to the workings of the economic system that governments must constantly supervise financial institutions aiming to avoid that kind of endemic risk.

To capture the realization problem, a Non-Compensatory Disequilibrium Framework (NCDF) based on budget constraints is set up, where real flows of commodities and services must be matched by monetary flows⁸⁶. Within a framework governed by the principle of monetary exchange, the NCDF considers the effect of structural breaks caused by disequilibrium on behavioural economic variables and agents' budget constraints. A 5-agent model will be introduced: Households, Non-Financial Corporations, Banks, Government and a CB, as it can be seen in the descriptive NCDF matrix in table (2.1).

$$\begin{aligned} Ch + pb \Delta Bh + Mh + Dh + w Ne + Th + Eh + w Nu = \\ w Nsh + Msh + ib pb Bsh + Dsh + Esh + ief Esf + ieb Esb + id Dsh \end{aligned} \quad (3.1)$$

Equation (3.1) is the households' budget constraint, where households' initial cash holdings (Msh) and bank deposits (Dsh) are highly liquid assets. The initial holdings of treasury and firm bonds (pb Bsh) and equity funds (Esh) will not be readily converted into money unless there is a buyer. Equity funds are assumed to be non-tradeable⁸⁷. Households are indifferent from holding firms or treasury bonds⁸⁸. Households also supply labour services (Nsh), of which (Ne) is sold but (Nu) is unemployed, and capital services from their holdings of bonds (ib pb Bsh) and equity (ief Esf + ieb Esb). In equation 3.1, we can see that individuals demand cash balances (Mh), bank deposits (Dh), bonds (Bh), equity funds (Eh), goods (Ch) and pay taxes (Th); and they are constrained by their supply of labour and capital services and holdings of cash, deposits, bonds and equity.

$$Inve + \Delta Mf + \Delta Df = \Delta Lf + \Delta Ef + \Delta Bf \quad (3.2)$$

$$ief Esf = Y - w Nf - ib Lsf - ib pb Bsf + id Dsf = \Delta Ef = PROFF \quad (3.3)$$

Equation (3.2) is the firms' budget constraint where firms' investment (Inve) plus their increase in cash (ΔMf) and deposits (ΔDf) are financed by their increase in loans contracts (ΔLf), the increase in bonds (ΔBf) and the supply of equity by firms (ΔEf). Firms' profits (PROFF) increases firms' equity which is assumed to be owned by households and reinvested in the firm to raise deposits or fixed capital as in equation (3.3). It is noted that loans do not only finance gaps between revenues and expenditures. As a matter of fact, that is generally not the case as loans are made before investment has taken place and profit is realized. Also, the ratio of loans to investment is affecting the *Tobin-q* and cannot be considered constant.

$$pb \Delta Bb + \Delta Lf + \Delta Rb = \Delta Eb + \Delta DLb + \Delta Db \quad (3.4)$$

$$ieb Esb = ib pb Bsb + ib Lsf - Tb + idl DLsb - id Dsb = PROFb = \Delta Eb \quad (3.5)$$

As before, banks do have a budget constraint expressed in (3.4) that explains that they can only demand bonds (pb ΔBb), supply loans (ΔLf) to firms and increase their reserves (ΔRb) as they obtain funds via

⁸⁴ Understood as a positive definition to capture those models that resemble Keynes' research programme which would include the existence of the involuntary unemployment equilibrium thesis and the inexistence of an inherent tendency towards full employment even under classic assumptions.

⁸⁵ Post-Keynesians and Institutionalists have stressed out the importance of this structural institutional set up to understand how money is introduced in the economic system. 'Keynesian analysis is institutionally specific; it analyses a capitalist economy with a sophisticated banking and financial system whose principal activity is financing business' Fazzari and Minsky (1984, p. 106).

⁸⁶ This characteristic is also the base of Social Accounting Matrix (SAM) models.

⁸⁷ Equity prices are assumed to be given by the equilibrium long rate. Keynes assumed a high degree of substitutability between shares and bonds in the same risk class. For him, both assets' prices would adjust until their return will be the same.

⁸⁸ Hence, long rates will not reflect idiosyncratic risk but only market risk.

discount loans from the CB (ΔDLb), equity funds (ΔEb) or deposits from firms and households (ΔDb). Bank profits ($PROFb$) are assumed to be totally reinvested in equity funds. Banks supply deposits (ΔDb) on demand for any chosen deposits rate (id) which can be portrayed as a horizontal line respect to (id). Hence, banks are assumed to be always willing to supply deposits to the public and to reinvest their profits as in equation (3.5). However, the same supply curve can be represented in the (ib, D) plane as a vertical constantly moving line⁸⁹. Nevertheless, as it will be discussed in section 5, the volume of the money supply and deposits at any given long rate will still be the result of the interaction of supply and demand conditions.

$$\Delta DLb + pb \Delta Bcb = \Delta Ms + \Delta Rb + idl DLsb + Bcb \quad (3.6)$$

The CB increases the outstanding currency in circulation (ΔMs) when it gives discounted loans⁹⁰ (DLb) to banks or increases its holdings of bonds (ΔBcb); and decreases it when receives interest ($idl DLsb$) or principal ($DLsb$) payments or banks increase their reserves (ΔRb) as the budget constraint in (3.6). Profits made by the CB could be accounted for as reverting to the government sector and decreasing deficits or as it has been done here by taking a Circuitist approach as a reflux from the private sector and decreasing the amount of outstanding currency in circulation⁹¹.

$$G - Tg + ib pb Bsg = pb \Delta Bg \quad (3.7)$$

The government budget constraint is set up in (3.7). If it is further assumed that the government deficit ($G + ib pb Bsg - Tg$) and hence the supply of Bonds (ΔBg) is restricted to the willingness of the public to finance the deficit, any possible increase in reserves through this kind of fiscal policy will be ruled out. The result of having two different constraints for the CB and the Government is that deficits now cannot be monetized. However, the possibility of debt monetizing could be easily added as in Kaldor (1982), where the proportion of deficit financed by bonds is an endogenous variable determined by individuals' portfolio decisions. Nevertheless, it must be noted that this is just a very convenient modelling procedure to guarantee that there would not be any excess demand for bonds. If Government expenditure is lower than taxes Government surplus arises. This surplus might be used to purchase bonds from the public restoring reserves or from the CB decreasing its holdings of bonds, outstanding currency and banking reserves. However, individuals' net demand for bonds might not be realized in purchases of bonds, i.e., excess supply of cash holdings might appear. By ruling out this possibility, we will assume in this section that the bond market clears⁹².

There are similarities⁹³ between equations (3.1) to (3.6) and the stock-flow integrated equations of Godley and Lavoie's (2007) model that uses a methodological comprehensive accounting procedure represented in a flow of funds table. However, even though both sets of equations cause the supply of money to be equal to the demand for money under certain range of conditions, as it can be seen in section 5, it does not represent the agents' behavioural constraints in all states.

The full story, which will not be exposed until section 6, needs to account for structural breaks that occur in disequilibrium. The appearance of disequilibrium affects the budget constraints of all individuals intervening in that market which alter their behavioural dynamics. Neither Structuralists nor Horizontalists models consider those structural changes in the analysis of individuals' behavioural constraints⁹⁴.

⁸⁹ This interpretation is coherent with Howells (2007).

⁹⁰ According to the Federal Reserve Bank of New York 'Under the administration of the discount window revised January 9, 2003, an eligible institution need not exhaust other sources of funds before coming to the discount window'

⁹¹ Free reserves are accounted for as an increase in reserves in the CB.

⁹² Assumption that will be relaxed in the next section to allow for disequilibrium in the bond market.

⁹³ For example, in equilibrium, equation (3.1) could be obtained by joining two different matrices in the Godley and Lavoie's model. There are some differences made for simplification purposes but in any case, both models integrate stocks and flows consistently in a constraint that determines the behaviour of individuals.

⁹⁴ See Tunes (2017) for an explanation of structural breaks in disequilibrium.

5. The Endogeneity of the Money Supply

In the previous section, the basic underpinnings of the NCDF have been presented. There remains the requisite of defining behavioural equations like asset demand functions which could be assumed to follow Tobin's portfolio choice theory as Godley and Lavoie (2007) have done or to have a more Keynesian outlook by assuming that investors do consider stock value expectations into their optimum portfolio. Hence, investors would not only demand bonds for their return but also for their expected capital appreciation. This section will assess the claim that whatever demand functions are chosen, the supply and demand for money are always equal, as Lavoie and Godley (2007) have asserted⁹⁵, for equal or lower than equilibrium levels of long rates.

Moore's horizontal approach has been criticized for not placing any key role to the demand for money in his endogenous monetary theory. However, as discussed in this section, the liquidity preference plays a vital part in the determination of the long rate in the market. It is further assumed, as Keynes did⁹⁶, that short run expectations are fulfilled within the Keynesian period and individuals are not restricted in any market⁹⁷. Hence, given the demand for money equation (4.1)⁹⁸, households are indifferent to demanding any type of bonds (4.2) and must also be holding a certain desired level of deposits for any given budget constraint and hence there will be no need to include that equation.

$$M_h = l_p(ib, p, Y, \dots)^{99} \quad (4.1)$$

$$\frac{\Delta B_h}{\Delta B_g} = b_h \frac{\Delta B_h}{\Delta B_f} \quad \text{and if } \Delta B_f = b_{fg} \Delta B_g \rightarrow b_h = b_{fg} \quad (4.2)$$

$$M_f = m_f(Inve, ib, p, Y, \dots) = 0 \quad (4.3)$$

$$\Delta B_f = \Delta L_f \quad (4.4)$$

$$R_b = r_{bl} D_b \quad (4.5)$$

$$\Delta B_g + \Delta B_f = \Delta B_h + \Delta B_b + \Delta B_{cb} \quad \text{and} \quad E_h = E_{sh} + \Delta E_b + \Delta E_b \quad (4.6)$$

$$P_b \Delta B_{cb} = f_{cb} \quad (4.7)$$

To simplify matters, we will assume that firms only keep liquid balances as bank deposits but not as cash balances (equation 4.3). Firms are indifferent to choosing between supplying bonds or demanding loans for investment financing (4.4). Banks must choose between giving loans or buying bonds and hence they will also have to adjust loan rates to market conditions¹⁰⁰. Banks can also keep cash balances in the CB as legal reserves (4.5). Equation (4.6) is the bond and equity market equilibrium. In this section it will be assumed that the nominal value of bonds sold by firms are equal to the total price of bonds bought by households, banks and the CB. Firms are also supposed to issue as much equity as it is demanded by households at all times (4.6). In general, dividends will not be totally reinvested in the firm and entrepreneurs might also sell other assets to obtain equity instead of raising debt or using capital reserves as it is assumed for simplification purposes. The CB's demand for bonds is supposed to be set by its Monetary Policy stand as in equation (4.7).

First, let us define the supply of money (MS) as in (4.8), the demand for money (MD) as in (4.9) and the Quantity of Money (QM) will be defined as the effective holdings of money for each level of long-term interest rates and equal to MD in equilibrium as in (4.11). Keynes uses supply of money and quantity of money indistinctively, although he does distinguish between them and the effective quantity of money, as he wrote: '[...] when money is relatively scarce, some means is found to increase the effective quantity of money' (Keynes, 1936: chapter 21).

⁹⁵ In chapter 5 this assertion will be shown to be false for higher than equilibrium interest rates.

⁹⁶ 'the theory of effective demand is substantially the same if we assume that short period expectations are always fulfilled' (Keynes 1973, p. 181).

⁹⁷ This assumption will be relaxed in the next section as we discuss the effect of disequilibrium in budget constraints.

⁹⁸ Notation as above.

⁹⁹ Keynes never denied the maximization principle of consumer choice theory as for him the principles do not lead automatically to full employment. 'On certain assumptions, however, as to the distribution of the propensity to consume through time [...] for the community as a whole, it would maximise satisfaction' Keynes (1936, chapter 22). In fact, the propensity to consume is a consequence of individual preferences. Hence, in a Keynesian framework consumer's demand for money, bonds and consumption goods should respond to the maximization of consumers' preferences.

¹⁰⁰ Hence, bond, loan or just long rates are assumed to be equal and endogenously determined by supply and demand conditions in financial markets.

$$MS = Rsb + \Delta Rb + Dsb + \Delta Db + Msh + \Delta Ms \quad (4.8)$$

$$MD = Rb + Db + Mh \quad (4.9)$$

For lower or equal levels of the long interest rate, we can see that the volume of outstanding currency in circulation ($Msh + \Delta Ms$) is always equal to individuals' demand for cash and then subjected to individual preferences. Hence, as deposits in commercial banks, as well as deposits in the CB, are supplied on demand, for equal or lower than equilibrium long rates the money market is always in equilibrium (equation 4.10) thus corroborating Godley and Lavoie's model (2007).

$$\Delta Ms + Msh = Mh \quad (4.10)$$

Furthermore, the money supply as defined in (4.8) can also be considered endogenous as it expands or shrinks according to both individual preferences and long run state of expectations (even despite an alleged unresponsiveness of the CB not giving discounted loans or participating through open market operations in the bond market). Endogeneity, for equal or lower than equilibrium interest rates, is then an inherent property of the system independent of behavioural dynamic requirements.

Second, given the above defined assumptions, additional deposits are created 'at a rate that is exactly matched by the willingness of the community to hold additional wealth in that form' (Howell, 2007, p. 3). However, contrary to Howells' statement, the slope of the equilibrium quantity of money (QM)¹⁰¹, which is showcased as the bold line in Figure 1.a, below, might not be horizontal as we can see in equation (4.13). The quantity of money will be higher for lower levels in the required amount of cash balances by households; the less tight monetary policy is, the higher the monetary base or lower reserve requirement will be, and it could be positive or negative depending on the magnitude of those changes.

$$QM^e = \emptyset(fcb, \Delta DL, Inve, G, i_{dl} \dots) \quad (4.11)$$

$$lb^e = \delta(fcb, \Delta DL, Inve, G, i_{dl} \dots) \quad (4.12)$$

$$\frac{dQM^e}{dib^e} = \frac{\frac{\partial \emptyset(fcb, \Delta DL, Inve, \dots)}{\partial fcb} dfcb + \dots + \frac{\partial \emptyset(fcb, \Delta DL, Inve, \dots)}{\partial i_{dl}} di_{dl}}{\frac{\partial \delta(fcb, \Delta DL, Inve, \dots)}{\partial fcb} dfcb + \dots + \frac{\partial \delta(fcb, \Delta DL, Inve, \dots)}{\partial i_{dl}} di_{dl}} \quad (4.13)$$

The quantity of money as specified in (4.11) emerges from solving the system of equations set up in the previous section. After solving the system with *Mathematica*, the resulting equation is too long and only the reduced form is here shown. This equation is not a supply of money in the orthodox sense as it considers both supply and demand conditions. Thus, although the supply of fiat money could be assumed to be exogenous with respect to long rates –hence the vertical lines in Figure (1.a)– the quantity of money cannot be either vertical or horizontal except for a very restricted set of conditions. This has led to the confusion between supply curves and equilibrium / disequilibrium curves where both supply and demand conditions need to be considered. Setterfield's indetermination of the dynamic credit supply function in Post Keynesian models hinges on this confusion between supply curves and market equilibrium functions¹⁰². As Setterfield put it: '[...] identify[ing] either an upward sloping or a horizontal dynamic credit supply schedule a priori is equivalent to identifying a determinate long run equilibrium position' (Setterfield, 2017, p. 407).

The problem is that dynamic credit supply schedules cannot be identified with equilibrium curves as these represent different market conditions. A money supply schedule should only represent supply conditions. If those conditions are independent of long interest rates, then it can be depicted as a vertical line with respect to long rates, as in Figure 1. Yet, this is different and it must not be confused with a constant quantity of money assumption. As stated above, in the *Treatise on Money* Keynes already stressed the role of credit by the banking system in order to reach investment/saving equilibrium and hence its endogenous nature.

¹⁰¹ Equilibrium Quantity of money is defined as the volume of cash in circulation plus reserves plus demand deposits at the equilibrium long rates.

¹⁰² Supply functions do not reflect equilibrium rates as they do not consider market conditions but only supply conditions. Hence, dynamic credit supply schedules cannot be identified with equilibrium curves as Setterfield does.

Third, despite the Structuralists' argument¹⁰³ of a less-than-perfectly elastic supply of reserves, as we have already seen in the previous section, the CB does always fully accommodate banks' demand for reserves as much as it cannot refuse to accept deposits from the legal depository institutions. However, the CB must take the decision to choose one of the available options to provide this needed liquidity to pursue the goals set by the Monetary Policy Committee's (MPC) monetary policy. Even if we assume that the CB accommodates the volume of loans through the discount window to the increase in compulsory reserves held at the CB to ensure the stability of the short rate, the slope of the QM function with respect to the long rate might still be positive depending on the stance of the monetary authorities and liquidity preferences.

Fourth, innovation or asset and liability management could reduce the volume of reserves needed to be held at the CB by the banking system. Banks could diminish their volume of bonds to obtain the required reserves and no immediate accommodation for the monetary authorities will be needed, despite the Horizontalists' assumption. However, depleting excess bonds might shoot up the long rate and the CB might be forced to supply the reserves, notwithstanding, to keep the long rate within a benchmark band. Banks could also turn to the interbank lending market¹⁰⁴ where banks could obtain liquidity daily to overcome any temporal shortage of reserves with the CB. When the interbank market dries up the CB intervenes in monetary markets to keep this rate close to the base rate.

Fifth, the equilibrium long rate is achieved when the banking system is using all their reserves, i.e., there are no free reserves. Furthermore, as liquidity preference changes affect bonds demand, the bond market would not be in equilibrium until the money market clears. Hence, at the equilibrium long rate, both the bond and the money market must clear simultaneously.

Sixth, any interest rates term structure can be reconciled with Keynes' liquidity preference theory as the difference between short and long rates depends on other variables on top of individuals' preference for liquidity. Specially, the role of monetary policy might be substantial in determining the long run equilibrium rate (equation 4.12)¹⁰⁵.

However, at lower than equilibrium long rates, i.e., lower than (ib^1) in Figure 1.a, 1.b and 1.c private and public willingness to spend is higher than the readiness to invest money in the form of demand for bonds or supply of loans. Yet, it can be shown¹⁰⁶ that the money market is still in equilibrium and so the excess supply in the bond market might not have a compensatory disequilibrium somewhere else in the system, thus corroborating Walras's Law¹⁰⁷ does not hold. An excess supply of treasuries hinders the government ability to finance all their desired public expenditure projects. This restriction in financial markets shifts the expenditure function and all the variables linked to it. The amount of public expenditure that can be financed becomes an endogenous variable determined by the following equation.

$$G = C_g + w N_g = bg pb (\Delta Bh + \Delta Bb + \Delta Bcb) + Tg - itb pb Bsg \quad (4.14)$$

Public expenditure (G) is equal to public consumption of private goods (C_g) plus the public employment wage bill ($w N_g$) and is determined by (bg) the proportion of the demand for bonds that will be allocated to the supply of government bonds¹⁰⁸.

At (ib^0) households' demand for cash balances and deposits are with respectively $(M0D)$ and $(D0D)$ and the maximum amount of loans is $(L0M)$. The supply of loans is assumed to be horizontal until the maximum amount is reached, i.e., there is no credit rationing for risk-worthy borrowers until maximum amount is reached. However, the maximum loan function, i.e., the curve (L) between (ib^1) and (ib^0) in figure 1.b is positively sloped on long rates due to the positive effect of the decrease in liquidity preference on the loan multiplier. Interestingly, we can observe that although the demand for deposits is negatively sloped

¹⁰³ See Pollin (1991).

¹⁰⁴ The interbank lending market, although capable to alleviate the liquidity pressures of individuals banks, cannot ease systemic liquidity constraints. Furthermore, it seems that the participants in the interbank market form close relationships in the same geography based on their dissimilarity in their cash flows. See Afonso, Kovner and Schoar (2014).

¹⁰⁵ Although Keynes was very dubious about the ability of Monetary Policy to affect the long rate.

¹⁰⁶ Calculations were done using *Mathematica*.

¹⁰⁷ The invalidity of Walras' Law in a monetary economy without and with bonds has already been asserted in Tüñez (2016) and (2017) respectively.

¹⁰⁸ This allocation could be determined by the ratio of government's supply of bonds to the total supply of bonds if there is not preference for government bonds or higher if the public prefers government bonds.

with respect to long rates, at lower than equilibrium long rates, the deposit function (D), the bold line in Figure 1.c, might be positively sloped.

If monetary policy is too restrictive the demand for loans is higher than the maximum amount of loans, firms' financial requirements will be constrained in financial markets to finance their investment projects by the bank's ability to find reserves as in (4.15). The constraint in money markets outlines the possible inability of the banking system to obtain financial resources. Under this scenario, at lower than equilibrium interest rates the demand for loans might shift rightwards for higher long rates as the effect of increasing activity, due to releases of liquidity into the system, more than offsets the negative effect that higher rates might have had on investment demand. Thus, even though the slope of the demand for loans with respect to long rates is negative, once it is adjusted for output changes it might become positive.

$$Investment^M = L^M + bd \Delta Bf \quad (4.15)$$

This is the case of insufficient savings to finance investment where an increase in interest rates does bring the system to higher levels of economic growth. As individuals release part of their cash holdings into the market by demanding a higher ratio of bonds and deposits, banks' maximum ability to supply loans will be expanded.

The quantity of money when long rates are lower than equilibrium is depicted as the bold line passing through (QM_0, ib^0) in Figure 1.a and equation¹⁰⁹ (4.17).

$$QM = \phi(C_h, fcb, \Delta DL, ib \dots) \quad (4.17)$$

At lower than equilibrium long rates, any decrease in interest rates will be viewed by more agents as increasing the chances of future increases which will, in turn, increase their demand for cash, while any increase in interest rates will release part of the household's cash holding into the banking sector through higher reserves or the bond market due to the increased willingness to invest. Hence, the slope of QM with respect to long rates might be positive due to the expansionary effect of higher long rates on bond demand and to the maximum loan function.

When it becomes apparent that the lack of liquidity in money markets is restricting the optimizing behaviour of economic agents, the pressure on the CB to intervene actively in the markets will build on. If the CB does not respond, interest rates will shoot up until the equilibrium rates are reached. If the CB does change its monetary stand and react to the increase in households' and banks' demand for fiduciary money by increasing the outstanding currency in circulation, it will equip banks to provide additional credit. This can be seen as a rightward shift in the MS curve in Figure 1.a.

If monetary policy is sufficiently expansionary (for example by increasing the discounted loans to banks to (ΔDL^*) in such a way that banks are now not reserve-constrained) firms will be able to access the banking system even though they are unable to find finance in the bond market. This enhanced demand for loans (ΔL^d) , due to firms' excess supply of bonds, can be assumed now to be lower than the maximum amount of loans.

$$\Delta L^d = \Delta L^f + \alpha \Delta Bf \quad (4.18)$$

An expansion in the quantity of money as in (4.19) will be now correlated with the increase in income due to the lower interest rate.

$$QM^* = \phi(C_h, fcb, \Delta DL^*, ib \dots) \quad (4.19)$$

In this case, the path towards the equilibrium long rate follows a different trajectory represented in Figure 1.a as (QM^*) . Monetary expansion could also bring the equilibrium curve downwards. However, as Keynes noted, the long rate is more recalcitrant than the short rate and 'may fluctuate about a level which is chronically too high for full employment' (Keynes, 1936, p. 130). To put it in a different way, the interest rate equilibrium level might be higher than the neutral, full-employment interest rate.

¹⁰⁹ Again, the solution of the system using *Mathematica* produces an equation that is too long if expressed explicitly.

6. Excess Supply of Money and Structural Breaks

At higher than equilibrium long term interest rates cash balances kept by the public are no longer the desired ones as individuals are restricted in the bond market. The undesired liquidity or any over-issue of outstanding currency is partially reverted in the CB by an increase in banks unused reserves as banks are also restricted in financial markets. This money excess brought about by constraints in the bond market is explained in this section.

According to Lavoie: 'A clear implication of Godley's model is that money is endogenous and cannot be otherwise' and 'there can never be an excess supply of money' (Lavoie, 2001, pp. 2, 8)¹¹⁰. However, Keynes' model allowed for out-of-equilibrium money supply excess periods. As Keynes put it:

'There may be, for example, some fairly stable proportion of the national income more than which people will not readily keep in the shape of idle balances for long periods [...] The opposite tendencies will set in if the quantity of surplus money is an abnormally low proportion of the national income' (Keynes, 1936, chapter 21).

When the amount of this excess of money is abnormally kept at a high level, Keynes assumes that there will be a tendency for the interest rate to fall and revert to the normal proportion determined by the psychology of the public.

Nevertheless, although disequilibrium might still exist, it is far from obvious how disequilibrium feeds back into the structural properties of the economic system. That has already been the cause of intense academic debate since Walras's famous work on general equilibrium. In this paper, disequilibrium can shift the constraints faced by economic agents involved in the market system without an automatic, hydraulic compensatory mechanism characteristic of general equilibrium models. In Godley's and Lavoie's integrated accounting model those types of structural breaks cannot occur. Furthermore, for these authors excess of reserves will be channelled towards financial markets thus pushing bond prices up and interest rates down which could, in turn, trigger wealth-induced consumption booms. This process of pushing interest rates down will not stop until reserves are fully used up. However, if interest rates are still too high, the willingness to purchase bonds might be higher than the eagerness to obtain financing through bonds. The consequence of too high an interest rate is that households cannot purchase all they would have purchased had they not had any restriction in the bond market. Therefore, they can only manage to buy a proportion (r_{bh}) of the total increase in the supply of bonds, discounted for the assumed exogenous role of the CB in acquiring a policy-determined level of bonds as in equation (5.3). Hence equation (4.2) should be replaced by equation (5.1) as individuals are restricted from buying their chosen bundle. Nevertheless, although individuals cannot hold their desire nominal value of bonds, their budget constraint still holds true for the restricted final bonds holdings.

$$\Delta B_h = r_{hh} (\Delta B_g + \Delta B_f - \Delta B_{cb}) \quad (5.1)$$

$$\Delta B_b = r_{bb} (\Delta B_g + \Delta B_f - \Delta B_{cb}) \quad (5.2)$$

$$\Delta B_{cb} = f_{cb} \quad (5.3)$$

$$R_b = r_{bl} D_b + FRB \quad (5.4)$$

Banks could also be restricted in bond markets as can be seen in equation (5.2). Consequently, banks are not able to use up all reserves to buy bonds. This volume of free reserves (FRB) will revert with the CB. Hence, the volume of reserves held by banks might now be higher than the legally required quantity as in equation (5.4). The outstanding currency in circulation will be lower than in equilibrium, *ceteris paribus*, although the amount of bank reserves has increased. However, the monetary base might be higher than before if the CB does change its intervention through open market operations or discounted loans.

$$QM = \gamma(\Delta L_{cb}, Inve, \Delta B_{cb}, ib \dots) \quad (5.5)$$

¹¹⁰ Lavoie and Godley assume that only expectational shocks can explain excess supplies of money. To avoid that kind of excess supply of money, expectational shocks are assumed away.

By solving the new system of equations, we can now observe that the quantity of money in the economy is determined by equation (5.5) rather than by (4.11) revealing the structural break in the money market due to the constraint in the bond market. The quantity of money for higher than equilibrium long rates is represented in Figure 1.a as the dashed bold line. We can also see that investment has a positive influence on the current quantity of money function. As individuals are restricted by an insufficient supply of bonds at the given long rate, an increase in investment implies both an increased volume of loans in the market and an increased amount of deposits in the banking system. The slope of the quantity of money function with respect to long rates is now negative.

The disequilibrium might be temporary, as there will be a tendency for the interest rate to drop. However, the lower bound of interest rates might be inhibiting the system to reach equilibrium. At this point, the economy is in a liquidity trap¹¹¹ such as the Japanese economy since the 1990s, as Krugman (1998) pointed out. However, Krugman's analysis asserts that monetary policy is ineffective in creating inflation due to a lack of credibility as markets do not believe the increase in base money will be sustained in the future¹¹². For this author, expectations management becomes the main concern for policy making purposes, although such a significant role is left mainly unexplained, i.e., it seems rather unconvincing that even after a few years of the CB commitment to expansionary monetary policy and inflation, the equilibrium price in the future (P^*) is still independent of current values. In Krugman's analysis, monetary policy has a contemporaneous effect on the price level but not on the long run level which is assumed to be constant by definition and therefore independent of any policy outcome by design. On the other hand, if expansionary policies have not produced the sought-after inflationary effect in the past, it is also rather unconvincing that the CB of Japan could do so in the future. Nevertheless, he asserts that if the CB of Japan could persuade markets about its inflationary bias in the long run, it could swing the economy out of the liquidity trap problem.

Contrary to Krugman's analysis, the liquidity trap is a natural consequence of the structural characteristics of the economic system, in which the willingness to invest at any interest rate is not sufficient to guarantee the full utilization of all the funds that individuals would be willing to lend for a given state of long-term expectations.

Keynes recognized that the quantity of money could be temporarily at a high or low proportion, as we have seen above. This disequilibrium triggers off interest rates to fall until equilibrium is reached. However, in a liquidity trap, the nominal interest rate cannot fall, so the tendency towards this normal proportion cannot happen through interest rates movements.

Furthermore, at low interest rates, Keynes asserted that further decreases in rates will reinforce the belief that rates are too low, increasing the demand for liquidity as capital losses are now perceived to be more likely to happen in the future. Part of the excess of money supply can be absorbed by increasing cash balances demand, i.e., an increase in the preference for liquidity. Yet, there might still exist a remnant excess of money that cannot be allocated to any viable investment opportunity given the prevailing market conditions. In this situation, in contrast with Krugman's analysis, an increase in the base money supply by the CB will not be transformed neither into increased investment nor inflation as households and banks are restricted in financial market¹¹³ by viable investment opportunities.

7. Conclusion

The intrinsic endogenous nature of the money supply is perfectly coherent with a vertical money supply with respect to long term interest rates. The ongoing and unresolved issues within the endogeneity of money debate have also been reviewed. The simplifications introduced by the Horizontalists are too simplistic and as Goodhart has claimed, Moore has gone too horizontal. Although, had he made the interest

¹¹¹ Although Keynes rejected a perfectly inelastic demand for money function, the liquidity trap defined in this paper is not due to a given change in individuals' liquidity preferences but their inability to find investment opportunities at a given state of long-term expectations.

¹¹² This issue will be explored in forthcoming papers as a model of the consumer choice theory needs to be introduced before we can examine Krugman's analysis further.

¹¹³ It has been assumed that the relation between households' cash holdings and deposits is constant and independent of interest rates. If individuals are assumed to hold the desired level of cash balances, the excess of liquidity will be entirely held in deposit accounts in the banking system. This excess is shown by the difference between the desired and realized amounts.

charged by banks an endogenous variable he could have gone even more endogenous. On the other hand, Structuralism have missed Horizontalists' claim that under given conditions the money supply might be always equal to the demand for money at the interest rate determined by the monetary authorities without '[...] ignoring money demand, the complexities of policy, the endogenous nature of bank behaviour, and the existence of asset market spillover effects' (Palley, 2008, p. 18). In reality, both approaches have departed from Keynes' work.

Using a Non-Compensatory Disequilibrium framework to analyse the (S-H) debate about the endogeneity of the money supply, a different view has been put forward. A view that reveals the existence of disequilibrium – induced structural shifts that might trigger path dependency dynamics and behavioural pattern change. This framework to disequilibrium and monetary economics has unearthed a new approach to disequilibrium dynamics analysis. Additionally, given the complex inter-relations of the financial system, simplifications were made with the objective of revealing part of that complexity.

Structural breaks in the behaviour of individuals can be explained by the existence of intertwined disequilibrium that restrict individual choices and might deter them from obtaining the optimal amount at any given time. Therefore, to analyse interactions among individuals and markets it is required to have an integrated approach that examines both structural breaks and market constraints. Those restrictions shift the behavioural functions of the model prompting breaks in the pattern of behavioural variables which are not accounted for neither in the Godley and Lavoie's Horizontalist integrated approach nor by the Structuralist models

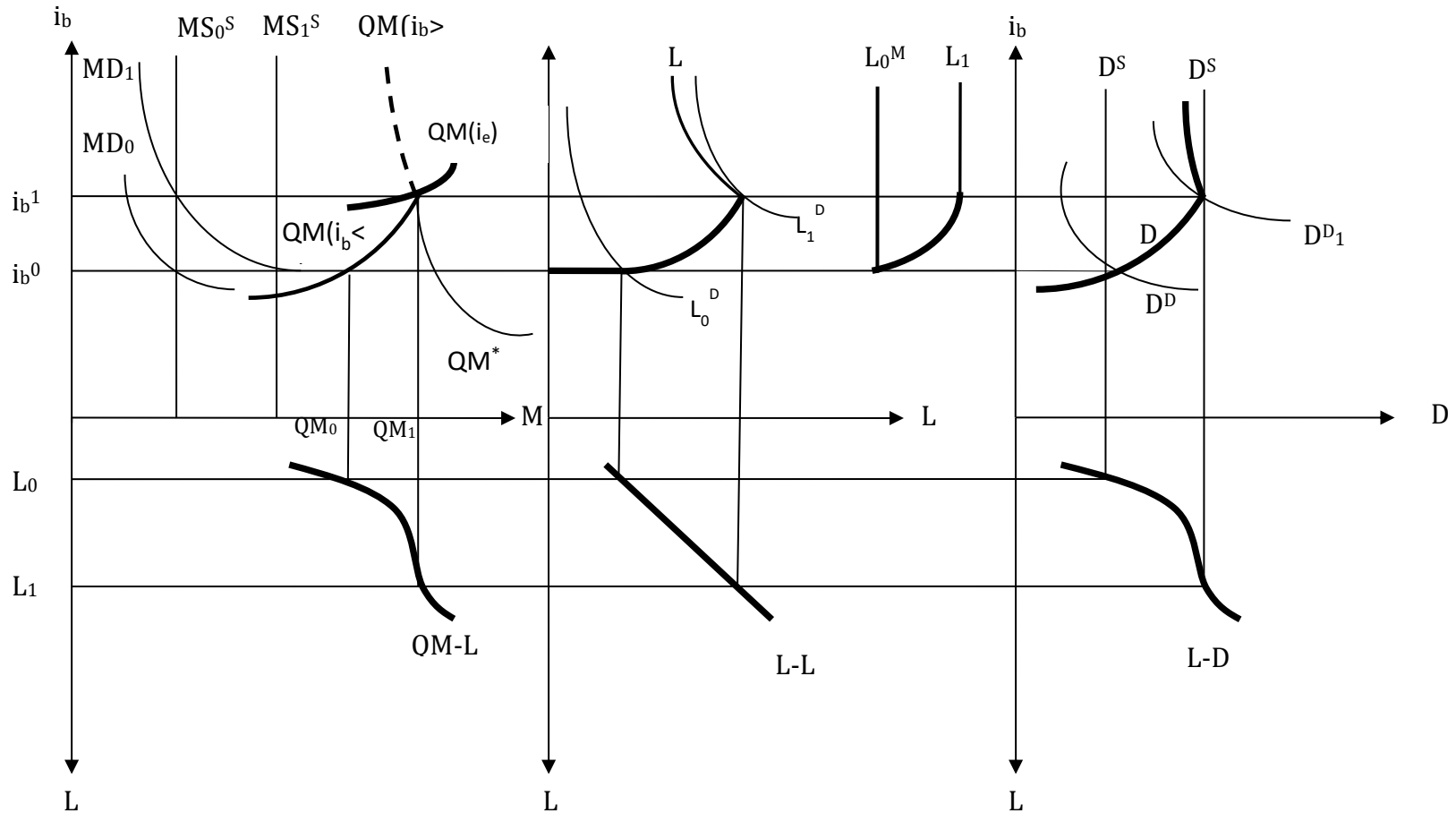
Table 1: The NCDF Matirx

NCDF		B	E	L	DL	M	D	R	BS	ES	LS	DLS	LBS	T	Y	TOTAL
RESOURCES	H	pb Bsh	Esh			Msh	Dsh		Bsh	ie Eh			w Nf			HR
	F	pb ΔBf	ΔEf	ΔLf			Dsf								Y	FR
	B	pb Bsb	ΔEb	Lsb	ΔDLb		ΔDb	Rsb	Bsb		ib Lsf					BR
	CB	pb Bscb				ΔMs		ΔRb				idl DLst				CBR
	G	Pb Bg												Tsg		GR
	SUM															TOTR
USES	H	pb Bh	Eh			Mh	Dh							Th	Ch	HU
	F						Df		Bsf	ief Esf	ib Lsf		w Nf	Tf	Inve	FU
	B	pb Bb		Lb				Rb		ieb Esb		idl DLst		Tb		BU
	CB	pb Bcb			ΔDLb											CBU
	G								Bsg				W Ng		Cg	GU
	SUM															TOTU
	EX	0	0	0	0	0	0	0	0	0	0	0	0		0	0

Figure 1.a: Supply and Demand for Money

Figure 1.b: Supply and Demand for Loans

Figure 1.c: Supply and Demand for Deposits



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SUGGESTED CITATION:

TÚÑEZ-AREA, Narciso (2024) 'Structural Change in Post Keynesian Monetary Theory: A Non-Compensatory Disequilibrium Framework.' *Economic Thought*, 12.1, pp. 59-76.

<http://etdiscussion.worldeconomicssassociation.org/wp-content/uploads/2022/02/pkmt-ET2-9-21-1.pdf>