The Plurality of Economic Classifications: Toward a New Strategy for Their Investigation

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24 May 2024

The Plurality of Economic Classifications: Toward a New Strategy for Their Investigation

Published in *Erasmus Journal for Philosophy and Economics*, Vol. 17 No.1 (2024)

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Abstract: The standard strategy involves evaluating whether economic classifications meet criteria derived from a general theory of natural kinds. The first objective of this article is to show the implementation of this strategy by various relevant authors. We argue that the standard strategy has failed due to its lack of a greater sensitivity to the role played by human interests in the design of different types of natural kinds. The second objective is to outline a new strategy for investigating economic classifications. Our departure from the standard strategy can be described as a shift from assessing economic classifications based on general theories of natural kinds to examining specific cases with the aim of theorizing about their design and application. The cases of the cost-of-living index and race are used to succinctly discuss the objectivity of economic classifications and implications for the relationship between science and democracy.

Keywords: natural kinds, economic classifications, essences, objectivity, science and democracy.

JEL Classification: B25, B40, B41, B5

I. INTRODUCTION

Philosophers and economists have examined key economic classifications intending to diagnose the discipline. The 'standard strategy', as we call it, consists in checking whether certain economic classifications satisfy certain criteria adopted by the appraiser. Such criteria typically come from a general theory of *natural kinds*. Although the concept of natural kinds varies across philosophical perspectives, distinct general theories tend to converge on three generic features (Khalidi 2013). First, natural kinds are epistemically precious classifications because they can support multiple generalizations. Second, they refer to the set of properties shared by all members of the kind. Third, the set of shared properties does not accidentally arise but is grounded in some underlying explanation.

Unlike spurious kinds, natural kinds are considered to have the potential to enhance scientific investigation by boosting inductive reasoning. While a spurious kind, such as 'objects in my visual field,' would not be projectable to as-yet unobserved members,

natural kinds like ‘copper’ can ground inductive inferences about new or hypothetical objects that share the same membership (Koslicki 2008). More controversially, natural kinds may be presumed to figure in scientific laws, to be held together by essences, to exist independently of our thoughts and beliefs, and to correspond to nature’s own classifications and not to those invented by us. Be that as it may, once the assessment of economic classifications against the background of natural kinds is completed, it yields a series of implications on which the diagnosis of the discipline is formulated.

The first objective of this paper is to show the implementation of this strategy by various authors (Sections II to V). While the followers of the standard strategy are not unified in the scope of their diagnoses, such a strategy may extend far enough to involve a judgment about why economics, as a whole, risks delivering poor scientific outcomes. The main diagnoses produced by the standard strategy are three: (1) economics is a limited science because its basic classifications lack either the necessary level of causal homogeneity or universality. Thus, they do not qualify as natural kinds that can support inductive reasoning via the formulation of scientific laws; (2) economics regularly deals with classifications that, like money or firms, are mind-dependent, which prevents them from being natural kinds. Therefore, they are unlikely to be significantly useful in the scientific practice of economists; (3) economics may experience events of scientific slowdown or stagnation due to communication problems arising from the multiplicity of definitions that, although using the same term, refer to different and even opposing classifications.

We are not interested in arguing in favor of the existence of a theoretical tradition that links all the authors who will be mentioned as following the standard strategy. If some of them are grouped in the same section, it is only for the purpose of exposition. We intend to highlight that different authors have viewed the notion of natural kinds as a philosophical-theoretical framework for assessing economics, or parts of it.

The second objective of the paper is to outline a new strategy to investigate economic classifications (Section VI.II). We agree with the standard strategy that studying economic classifications is a fertile field for further assessing economics, as well as for imagining alternatives to improve its scientific practice. However, after presenting existing criticisms of the three diagnoses (Section VI.I), we argue that these diagnoses have largely failed due to a common limitation of the standard strategy: its lack of a greater sensitivity to the role played by human interests in the design of different types of natural kinds.

A starting point of the new strategy is, then, the recognition that there are multiple legitimate ways to divide the same domain, each motivated by different human aims (Dupré 1993; Ludwig 2018; Brigandt 2020). Unlike the standard strategy, the new one rejects general theories of natural kinds, that is, those that postulate a single type of natural kind, the properties of which are considered to be the general representation of natural kinds in science. The new strategy, echoing concerns raised by Ludwig (2018), recognizes

that pursuing a general theory of natural kinds may impede a thorough understanding of how scientists approach classification. In particular, the new strategy diverges from the purpose of establishing a set of properties shared by all economic kinds or formulating a novel general theory of natural kinds. Instead, it initiates the analysis by considering the experiences of communities of economists constructing classifications. In contrast to general theories, the new strategy is less concerned with demarcating natural kinds from arbitrary kinds and more focused on theorizing about economic classifications, with a particular emphasis on the role played by human interests in their design and application.

As part of its initial research agenda, the new strategy highlights two crucial topics in economic classifications: *objectivity* and the *relationship between science and democracy*. Using the cases of the cost-of-living index and race, the article briefly explores the potential impact of human interests on the objectivity of economic classifications. It also considers some implications of those classifications in relation to democratic concerns.

II. Mill, Kinds, and the Assessment of Economic Classifications

Our interest in assessing the use of the notion of natural kind in the philosophy of economics leads us to wonder about possible antecedents. A review of the specialized literature shows the existence of a debate about whether there is a tradition that links J.S. Mill with the contemporary discussion about natural kinds, which is commonly associated with the works of Kripke and Putnam. We use this discussion as a backdrop to present Mill's ideas about Kinds. We do not intend to take sides in the debate. However, we consider that Mill can be interpreted as making use of the notion of Kind as part of a strategy to evaluate science. In this regard, Mill coincides with the strategy we are analyzing in this paper, and therefore, we see him as a distant precursor of the standard strategy followed in the philosophy of economics.

Hacking (1991) identified a philosophical tradition centered on the notion of natural kind, which he traced back to Mill's introduction of the term 'Kind' (with a capital K) to English philosophy in 1843. Mill's discussion of Kinds was influenced by Whewell's *Philosophy of the Inductive Sciences* (1840), which examined the extent to which the highest taxa in biology reflect reality versus being mere intellectual constructions. Mill expanded this discussion beyond biology, exploring its implications for induction and scientific inquiry more broadly.

The tradition surrounding natural kinds would continue with John Venn's introduction of the phrase 'natural kind' in 1866. Russell later reintroduced the phrase to English philosophy in 1948, maintaining the connection to the ongoing discussion about induction. From there, the phrase natural kind appeared in the debate around realism, as seen in H. H. Price's work in 1953, to be evidenced in the philosophy of language with the seminal contributions of Putnam and Kripke. Hacking's view of this tradition, which includes other figures like Peirce and Quine, has been widely accepted (Bigelow, Ellis,

and Lierse 1992; Shain 1993; Mayr 1996; Bellucci 2015) and is now considered the standard (Magnus 2014a).

Despite its widespread acceptance, Magnus (2014a) has taken issue with the standard narrative of the natural kind tradition. In his view, the currently active tradition, which includes the 'Putnam-Kripke revolution', is only around half a century old and is disconnected from the Millian tradition. For Magnus (2014a), a crucial difference between the two traditions is essentialism. While the Putnam-Kripke approach seeks to identify essences, Mill is part of a tradition that rejects essentialism outright. According to Magnus (2014a, 7), "for Mill, a Kind is constituted by the indefinite list of shared properties possessed by its members […] Yet for Putnam and company, a natural kind is constituted by an essence which (initially, at least) is just characterized as whatever 'holds together' the kind".

While we agree with Magnus (2014a) that proving the existence of a single continuous tradition of natural kinds stretching back to Mill is challenging, we also acknowledge that it is not easy to speak of total independence. Magnus (2014a) remarked that Mill did not use the term natural kind and that Venn did not mention Mill as the origin of the phrase. However, Magnus (2014a) himself acknowledged that Putnam, in personal communication, indicated that he had taken the phrase natural kind from Mill's work. As is often the case in such instances, it may be impossible to determine the exact moment an idea originated and the precise extent to which it influenced the work of subsequent authors. We believe that what is remarkable for our purposes is Mill's concern for two common practices in scientific activity: classification and inference.

According to Mill (1843), induction is the method of science because it is capable of producing knowledge that goes beyond what is contained in the premises of a deductive argument. Notably, Mill believed that this method was applicable to all sciences, and while its application is most commonly associated with the natural sciences, there is no reason why social sciences cannot attain scientific status through its use (Shain 1993).[1]

Mill pointed out that in everyday life, people make classifications based on their senses, which can lead to errors such as the use of the same name to refer to different things or different names to refer to the same thing. To overcome these errors, science must aim to establish laws of or uniformities across nature. These uniformities can be of two types: *uniformities of succession*, which are explained by the law of general causation, and *uniformities of coexistence*, which correspond to the similar properties of kinds of things. By identifying and studying these uniformities, science can classify things accurately and develop a more precise understanding of the world (Shain 1993).

[1] Indeed, Mill engaged in theorizing about the nature and justification of economics in *Principles of Political Economy* (1848), in *On the Definition of Political Economy and the Method of Investigation Proper to It* (1844), and in *A System of Logic* (1843), where he tried to construct a logic of the human sciences based on causal explanation (Anschutz 1998, Hausman 1981).

Mill's theory of Kinds addresses two challenges: how to distinguish between arbitrary kinds and Kinds, and how to establish the objective reality of Kinds. To tackle the first challenge, Mill (1843, 171) argues that Kinds are "distinguished from all other classes by an indeterminate multitude of properties not derivable from another", which means that they are not arbitrarily defined. For the second challenge, Mill (1843) asserts that Kinds correspond to laws of nature, making them real and existing in the world. While some classifications may be arbitrary, like white things or red things, Kinds such as sulfur or phosphorus are based on how things are, and thus they are not nominal. In his own words, "the class is nothing but the objects contained in it: and the dictum de omni merely amounts to the identical proposition, that whatever is true of certain objects, is true of each of those objects" (Mill 1843, 235). Classifications based on Kinds allow for greater control over existing knowledge and enable the discovery of infinite similarities between known and unknown objects of the same Kind. For Mill (1843) to have a comprehensive nomenclature for Kinds in any field of knowledge is a feature of scientific progress (Shain 1993, 276–278; Schwartz 2013, 936; Magnus 2015, 273). Conversely, the absence of a precise nomenclature for Kinds can lead to scientific stagnation.

Mill's theory of Kinds implies that although our experience is subjective, Kinds are objective and independent of purpose (Shain 1993, 276–278; Magnus 2015). They are discovered "when we are studying objects not for any special, practical end, but for the sake of extending our knowledge of the whole of their properties and relations" (Mill 1843, 167, 171). Furthermore, according to Mill (1874, 98), there should be an "unfathomable chasm" among Kinds, which distinguishes them clearly from each other. Likewise, the distinction between arbitrary kinds and Kinds is not a matter of degree, as there are an unknown number of properties that differentiate the latter (Khalidi 2013, 65; Magnus 2014a). This perspective is significant in that it emphasizes the importance of distinguishing among Kinds based on their objective properties, rather than subjective preferences.

Magnus (2014a) has defended the idea that it is incorrect to link an 'anti-essentialist', like Mill, to the essentialist tradition of Putnam and Kripke. We refrain from taking a position in this paper on who is right about whether they belong to some tradition in this regard. We also do not intend to imply that Mill started a tradition convinced that the sciences must have Kinds to be considered as such. Instead, we conclude that Mill's work coincides with contemporary positions, often of the essentialist predilection, that defend the idea that scientists must identify natural kinds from which to obtain classifications that merely reflect the nature of what exists. Thus, such classifications will have the ability to support multiple generalizations and to figure in scientific laws or theories that, in turn, can be used for explaining, predicting, measuring, controlling, transforming, etc., reality. In this regard, we remark that Mill seems to reflect a pattern of analysis according to which Kinds are a key element in evaluating science. Thus, we see him as a distant

precursor of the standard strategy, whose most prominent examples from the contemporary philosophy of economics are discussed in sections III to V.

III. The Failure of Economics as a Whole is due to the Absence of Natural Kinds

The contemporary notion of natural kinds in economics was first discussed by Rosenberg (1980) and Nelson (1990). In this section we show that, for these authors, the fundamental classifications of economics are not natural kinds because they lack the necessary level of either causal homogeneity or universality to successfully support inductive reasoning via scientific laws. The absence of natural kinds is then a major factor hindering economics from achieving the same level of scientific success as the natural sciences, despite its advanced mathematical formalism. Without natural kinds, economics is deprived of the inductive support that such kinds provide, thereby impeding the discipline's ability to deliver robust scientific outcomes.

III.I. Rosenberg: 'beliefs' and 'desires' are not natural kinds

At first, Rosenberg (1976) believed that microeconomics could establish general laws akin to those of natural sciences. However, later on he reversed his position due to the ongoing debates about economics' predictive capacity. In his subsequent works (1992, 1994), he argued that economics ought to be viewed as either a form of normative political philosophy or applied mathematics, but not as a science. This viewpoint was met with disapproval by many economists, who largely ignored it. Rosenberg then turned his attention to the philosophy of biology, which ultimately brought him back to economics with a more amicable tone. He then suggested that economics is both a historical and a biological science (Hausman 2009; Rosenberg 2009, 58).

Despite Rosenberg's change of position, it is worth noting that his earlier work in 1980 and 1992 tackled the topic of natural kinds in economics and its impact on the discipline's scientific progress. In particular, Rosenberg (1992) argued that economics was an inexact science that had not improved in terms of accuracy since its inception, unlike other sciences. He attributed this lack of progress to economics' reliance on the explanatory strategy of folk psychology, which posits that individuals always act in the most appropriate way to achieve their goals. In economics, this principle is reflected in the assumption that economic agents act to attain their most preferred available alternative.

According to Rosenberg (1992), improving the measurement of the mental states of the agents studied in economics could potentially reduce its inaccuracy. However, the main challenge is that there is no way to measure the strength of an agent's preferences or beliefs independently of those preferences or beliefs and without assuming the utility maximization hypothesis. In this regard, Rosenberg (1980, 1992, 1994) argued that economics presented an empirical obstacle to improving its explanations and predictions.

Rosenberg (1980, 110) defined natural kinds as a "class of causally homogeneous objects" and argued that natural kinds enable the formulation of general laws. He believed that in economics, preferences and beliefs served as the classes through which the causes of individual actions were systematized. Thus, preferences and beliefs were the potential natural kinds that, through general laws, could be used in explaining and predicting actions. However, in Rosenberg's later work he concluded that:

> 'beliefs' and 'desires'—the terms with which ordinary thought and the social sciences describe the causes and effects of human action—do not describe 'natural kinds.' They do not divide nature at the joints. They do not label types of discrete states that share the same manageably small set of causes and effects and so cannot be brought together in causal generalizations that improve on our ordinary level of prediction and control of human actions, let alone attain the sort of continuing improvement characteristic of science. (Rosenberg 1992, 325)

To put it another way, according to Rosenberg (1992), preferences and beliefs lack the necessary level of causal homogeneity to qualify as natural kinds. As a result, there are no true universal general laws about human actions that economists can discover: "the hypothesis that the terms in which we describe and explain human action are not natural-kind terms will explain why we have not found any laws of human action" (Rosenberg 1980, 113). Without the support of natural kinds and their ability to facilitate inductive reasoning, economics cannot formulate general laws.

Notice, finally, that Rosenberg also ended up endorsing a nomological criterion to determine the naturalness of kinds (Kincaid 1995). According to this criterion, classifications only earn the status of natural kinds by featuring in scientific laws, as Rosenberg's (1980) own reasoning confirms for why 'race', 'beliefs', and 'desires' are not natural kinds. In contrast to arbitrary kinds, natural kinds must feature in general laws.

III.II. Nelson: commodity is not a natural kind

For Nelson (1990), 'commodity' was a key concept in general equilibrium theory. In particular, he saw commodities as more than just convenient labels for goods and services. Rather, they represent the real-world objects that agents choose to produce. In this way, commodities could be seen as putative natural kinds of economics, possessing a real ontological status, and thus offering support for inductive reasoning.

One initial consideration is that the concept of commodity already exists in the layperson's pre-theoretical understanding of economics. Nelson (1990, 120) noted that commodity is deeply ingrained in our "folk economics", raising questions about what work economics has left to do if natural kinds are already known before scientific inquiry. To address this issue, Nelson (1990), like Rosenberg (1980, 1992), turned to the philosophical debate about the status of folk psychology.

Nelson (1990) countered the argument that science must necessarily eliminate folk concepts. He noted that there were well-established theories in physics that relied on folk concepts, such as the concept of body in Newtonian mechanics. Nelson (1990) also highlighted that, in both physics and economics, the concepts of body and commodity underwent theoretical refinement, becoming unfamiliar to those without proper training. Therefore, the use of folk concepts in science is not inherently problematic, and rather than eliminating them, science should aim to refine them into more precise and useful concepts.

For Nelson (1990), however, there is a crucial difference between both concepts. 'Body' is a universal concept, as it is a fundamental aspect of the physical world that is experienced by everyone: "the universality of the experience of bodies seems closely related to their constituting a natural kind" (Nelson 1990, 129). In contrast, 'commodity' is a concept that lacks universality, as it depends on specific systems of property, production, and exchange. In societies that do not have these systems, the concept of commodity does not exist. This lack of universality prevents 'commodity' from being a natural kind. In his own words:

> Economics *never* gets it really right because *commodity* is not a natural kind. If commodities are not natural kinds in *any* society, there cannot be an empirical science about them. If I am right, we should not think of economics as a false theory about things that are in the world; its lack of success is, instead, inevitable because the things that it is supposed to be dealing with are not there. (Nelson 1990, 130, italics in the original)

The argument put forward by Nelson (1990) implies that there are no general laws to be found in economics due to the non-universality of economic classifications. This idea converges with Rosenberg's nomological criterion to distinguish between natural and arbitrary kinds. Unlike natural kinds, which would apply to all types of societies and can serve as a basis for formulating general scientific laws, economic classifications lack the necessary universality and are thus better understood as nominal, arbitrary kinds.

Like Rosenberg (1980, 1992), Nelson (1990) found that economics' scientific achievements are inevitably limited by the absence of natural kinds. In other words, economics is deprived of the inductive support that natural kinds are assumed to provide. This would be the reason why economics cannot match the scientific success of natural sciences, despite its high level of mathematical sophistication.

IV. Economics Deals with Mind-Dependent Kinds that are Not Natural Kinds

To understand the functioning of market societies, it is necessary to study the institutions that make them possible, such as money, private property, banks, and contracts. These

institutions not only serve as objects of study in economics but also play a critical role in explaining and predicting a wide range of phenomena. However, the question arises as to whether these institutions can be considered natural kinds. In this section, we show that prominent philosophers in the field of social ontology, including Searle (1995) and Thomasson (2003a), argue that many institutional kinds cannot be considered natural kinds due to their dependence on human beliefs for their existence and boundaries. Consequently, they cannot provide the necessary foundation for scientific inquiry in economics.

Searle (1995) proposed a fundamental distinction between 'brute facts' and 'institutional facts'.[2] Brute facts are those that do not depend on human beliefs for their existence, such as the fact that the earth rotates around the sun. In contrast, institutional facts require human beliefs and actions for their existence. For instance, the fact that a piece of paper in your pocket counts as money depends on people believing that such a piece of paper is money and recognizing it as such. According to Searle (1995), this dependence on human beliefs and actions is a defining characteristic of institutional facts.

While money is a prominent example of an institutional fact in Searle's (1995) theory of institutions, his terminology is confusing because, as noted by Epstein (2015, 59, italics in the original), "money is not a fact—it is a social object, or maybe a social kind. *I have a dollar in my pocket*: that is a fact, a social fact [...] But *dollar*: that is a thing or a kind of thing, not a fact".[3] To clarify the confusion regarding the terminology used by Searle in his theory of institutions, Khalidi (2013) proposed to refer to the institutions studied by Searle as institutional kinds rather than institutional facts. This approach emphasizes that institutional kinds are groupings of social objects that require specific human beliefs to exist.[4]

In line with this, Thomasson (2003a, 2003b) held that mind-dependence did not pertain to a causal claim about the way institutional kinds come into existence. Rather, drawing from Searle's account of institutions, she argued that an institutional kind only exists if people believe in a constitutive rule that specifies the conditions C for X to count as K, where X is a physical object and K denotes an institutional kind. Once the rule is collectively accepted, anything X that satisfies C is considered part of K. Hence, the mind-dependence of institutional kinds pertains to a constitutive dependence in which "the very idea of something being money *presupposes* collective agreement about what counts as money" (Thomasson 2003a, 581; italics added).

[2] For an earlier contribution to the analysis of brute facts, see Anscombe (1958).

[3] Other authors who have regarded money as a kind rather than a fact are Thomasson (2003a), Mäki (2009), Smit, Buekens, and du Plessis (2011, 2016), Khalidi (2013), Guala (2016a; 2016b), Guzmán and Frasser (2017), and Frasser and Guzmán (2020, 2023).

[4] For a philosophical discussion of the ontology of money involving liquidity beyond the outdated, overused, and sometimes misleading example of a dollar bill, see Frasser and Guzmán (2020) and Guala (2021).

However, Thomasson's (2003a, 2003b) aim was not only to highlight the ontological dependence of institutional kinds but also to explore the epistemological implications that follow from it. She identified two criteria for ontological realism about natural kinds, neither of which are satisfied by institutional kinds: independence and natural boundaries. As previously explained, institutional kinds lack independence since there are no objects of the kind K that can exist independently of the human mind. Moreover, natural boundaries require the classification to correspond to a natural division rather than being a mere human invention. Thomasson (2003a), however, concluded that many institutional kinds do not have natural boundaries. In her own words:

> Whereas natural kinds (on a realist view) can exist even if no one knows of their existence or any facts about their nature, institutional kinds do not exist independently of our knowing something about them. Similarly, whereas, in the case of natural kinds, any substantive principles any individual or group accepts regarding the nature of the kind can turn out to be wrong, in the case of institutional kinds those principles we accept regarding sufficient conditions for the existence of these entities must be true. (Thomasson 2003a, 590)

The failure of many institutional kinds to satisfy the two criteria of ontological realism has an important epistemological consequence for economics. Rather than being an empirical matter, the existence of institutional kinds would require only conceptual analysis, and therefore they would not be open to scientific investigation. Since the nature of institutional kinds is knowable a priori, scientific discovery of many institutional kinds would not be conceivable. Consequently, the main concern for economics is that since many institutional kinds are not natural kinds, they "are unlikely to be projectable and unlikely to be of any use for scientific purposes" (Guala 2016a, 55).[5]

V. Natural Kinds Avoid Terminological Disputes that Threaten Scientific Progress

A hallmark of Geoffrey Hodgson's intellectual project is the engagement with the topic of the nature of definitions in institutional economics. Hodgson (2019) emphasized the importance of having workable definitions for scientific progress in economics. In this

[5] Thomasson (2003a) argued that there may still be institutional kinds that possess natural boundaries. For instance, a recession could occur without anyone being aware of it or even having the right concept. Searle (2010) agreed with Thomasson (2003b) that there may be institutional kinds that do not require collective acceptance to exist. In his reasoning, mind-dependent kinds would correspond to lower-level institutional kinds. In contrast, higher-level institutional kinds—that is to say, those that do not require collective acceptance—would be macro consequences of the lower-level institutional kinds. According to Searle (2010), macroeconomics could focus on studying such macro institutional kinds. However, in other parts of his theory, the impact of mind dependence on the scientific scope of economics seems more severe. For instance, Searle (2010, 201) complained that in standard economics courses, the "economic realities were treated as part of the realities of the scientifically investigable world".

section, we show that for him the lack of a single, commonly accepted definition of a term may be an obstacle to scientific progress. We show that his proposal of establishing definitions through essences can be seen as an effort to address this concern. This is because if definitions are formulated in this way, they will correspond to natural kinds and thus provide a remedy for the risk of scientific slowdown or stagnation that results from the coexistence of multiple definitions.

Hodgson (2019) noted that the social sciences are marked by a significant number of ongoing debates around definitions, open problems arising from the lack of consensus on important terms, and the abandonment of definition-making practices by some scholars. He argued that the sufficiently deep differences in meaning could result in economists being trapped in terminological disputes and unable to conduct empirical research. In fact, Hodgson (2019, 222) suggested that a potential reason for the slowdown in innovative research on the theory of the firm is the "failure to establish a shared [...] definition of the central object of analysis". Therefore, Hodgson (2019, 218) advocated for economists to develop definitions that avoid "disagreement and impair communication", ensuring that they do not hinder scientific progress.

To achieve this objective, Hodgson (2019) proposed the use of taxonomic definitions, which he defined as classifications aiming to establish a shared understanding of the objects of analysis. Hodgson's notion of analysis encompasses dimensions such as the origin, structure, composition, operations, and functions of a given type of entity. In contrast, a taxonomic definition serves as a preliminary step, ensuring that various scientists are referring to the same entity. As Hodgson (2019, 215, italics in the original) emphasized, "some prior consensus must be reached on definitions among the researchers involved *before* the analytical and empirical work yields some fruit". Taxonomic definitions, therefore, must precede analysis, as researchers need to establish first a common understanding of the phenomena they are investigating.

Hodgson (2019, 220–221) did not view the existence of various definitions of the same term as a reason to abandon "the formulation and promotion of one best definition", but rather as a motivation to strive for "a single, commonly accepted taxonomic definition". As argued elsewhere (Frasser and Guzmán 2023), the taxonomic definition project includes the prescriptive claim that we should aim to achieve a broad consensus on a single definition. It is important to note that this prescriptive claim plays a key role in addressing concerns of scientific slowdown or stagnation resulting from communication difficulties. By agreeing on a single definition, economists can curtail the proliferation of definitions and minimize terminological disagreements, thus avoiding the threat of scientific slowdown or stagnation. However, the specific method for achieving this prescriptive claim still needs to be established.

Two approaches to establishing taxonomic definitions were examined by Hodgson (2019, 210), both rooted in the Aristotelian dichotomy between real and nominal definitions. In the first approach, a taxonomic definition is considered real when it arises

from the identification of essential properties: "From an Aristotelian perspective, the task is to identify a *minimum* number of essential properties that can substantiate a taxonomic definition" (Hodgson 2019, 216, italics in the original). In the second approach, the taxonomic definition is nominal when it is determined by scientists based on epistemic convenience and analytical usefulness. Therefore, nominal taxonomic definitions can be seen as "categorizations of convenience that we impose upon collections of entities" (Hodgson 2019, 215).[6]

To achieve the prescriptive claim of a single, commonly accepted definition, nominal taxonomic definitions are not helpful, as the intervention of human aims is responsible for the existence of multiple definitions of the same term (Frasser and Guzmán 2023). The same term has multiple meanings because the different aims pull the definition in different directions. In contrast, taxonomic definitions based on essential properties can provide economists with a path toward consensus. In essentialism, the possession of essential properties is the ontological criterion for natural kinds. Thus, if taxonomic definitions are established through the identification of essences, they can be regarded as natural kinds.[7] Specifically, identifying a set of essential properties to establish a taxonomic definition ensures that the definition corresponds to a natural kind, and consequently, the meaning of the term is not open to arbitrary human intervention. By defining terms based on essences rather than on human aims, definitions would correspond to natural kinds, and economists could achieve consensus while circumventing terminological disputes that could inhibit scientific progress.

VI. An Alternative to the Standard Strategy

In this section, we first summarize existing criticisms of the three diagnoses discussed in previous sections. This summary exposes several flaws that compromise the credibility of their conclusions and unveils misconceptions about economics and natural kinds embedded in those diagnoses. We then introduce an alternative strategy for investigating economic classifications. The new strategy rejects general theories of natural kinds: that is to say, theories that postulate a single type of classification with properties believed to represent natural kinds across science. Thus, it does not seek to establish a given set of properties that every economic kind must share. Instead, it requires clarifying how communities of economists construct their classifications and put them to work. The cases of the cost-of-living index and race are used to briefly discuss the objectivity of economic classifications and some implications for the relationship between science and democracy.

[6] Hodgson (2019) seems to believe that the separation between real and nominal is not as abrupt as Aristotle pointed out. For Hodgson, nominalism does not imply a rejection of realism, and nominal definitions can involve essential properties.

[7] Hodgson (2015, 2019) prefers to use kinds over the standard term natural kinds.

VI.I. The limits of the standard strategy

In an early criticism of the first diagnosis, Kincaid (1995) points out that for Rosenberg (1980, 1992) and Nelson (1990), there is a significant link between natural kinds and universality, understood as a criterion for lawfulness. The underlying ideas in the first diagnosis are that good science is characterized by producing laws, that laws differ from accidental generalizations due to their universality, and that laws are based on natural kinds. However, Kincaid (1995, 373) offers a critical perspective on these ideas, asserting that: (a) "universality in the syntactical sense seems not to matter at all, since any statement referring to particulars can be transformed into one that does not"; (b) natural sciences provide numerous examples where particular aspects of our planet are crucial (geology, evolutionary biology, molecular biology, ecology, for instance); (c) there is philosophical literature wherein laws do not seem sufficient or necessary for explanation.[8]

The second diagnosis claims that mind-dependence threatens the realism of institutional kinds. However, Khalidi (2016) has argued that taking mind-independence as a criterion for deciding on realism about classifications is incorrect. He holds that there are classifications in the natural sciences that refer to synthetic chemicals, genetically engineered plants, and artificially selected animals that can arguably be regarded as real kinds. However, all of them depend to some extent on human beings and their minds, and they could never have been instantiated without the influence of the human mind. Furthermore, the constitutive dependence argument expressed by Thomasson (2003a) does not seem to apply to prominent institutional kinds like money (Guala 2016b). In hyperinflation, the value of fiat currency declines so severely that often the currency is no longer accepted in trade, despite being issued by a central bank. Although people may continue calling it money, the currency no longer circulates in trade and becomes fundamentally a piece of paper without liquidity. Thus, contrary to the diagnosis proposed by mind-dependence theorists, the institutional kind termed 'money' is not just constituted by "arbitrary conventions concerning the issuing of paper bills" (Guala, 2016b, 169).[9] Consequently, mind-dependence does not necessarily deprive institutional kinds of the inductive potential by virtue of which they participate in scientific inferences and explanations.

Regarding the third diagnosis, we have argued elsewhere (Frasser and Guzmán 2023) against essentialism for establishing definitions in economics. Essentialism offers a

[8] Based on an anonymous referee's comment, one could conjecture that the excessively strong diagnoses made by Rosenberg and Nelson (denying the possibility of any successful scientific work in economics) may have contributed to a certain lack of interest in the philosophy of classifications among philosophers of economics. In this regard, we hope that the new strategy we are presenting will promote the revival of the topic.

[9] Of course, institutional kinds are mind-dependent in a causal fashion. However, this type of mind dependence is just an example of "mundane" mind dependence (Jenkins 2005, 199). Both mental activity and social practices "make no non-causal contribution to the causal structures of the phenomena scientists study" (Boyd 1992, 173). If scientific investigation is largely concerned with the causal structures of the world, then there is nothing in the causal influence of the mind that makes the mind-dependent kinds, as a matter of principle, inaccessible to scientific research (Mäki 2011; Haug 2011; Guala 2016b).

method to implement the prescriptive claim that we should strive to achieve a single, commonly accepted definition of a term. However, we contend that essentialism seems impracticable in economics because essences are either mostly unavailable or useless. We discuss examples such as liquidity, money, and bitcoin to illustrate how human aims contribute to the emergence of numerous definitions and that the plurality of definitions is a feature, rather than a bug, of economics (Frasser and Guzmán 2023). Economic classifications do not merely track nature's divisions, as essentialism requires, but crucially respond to human aims. Moreover, the examples of the capital theory controversy and liquidity reveal that the absence of a single, commonly accepted definition does not necessarily lead to negative outcomes such as the total lack of communication, an unmanageable proliferation of definitions, or a hindrance to scientific progress. Consequently, the third diagnosis seems to exaggerate the risks associated with the coexistence of multiple definitions of the same term.[10]

Apart from the specific criticisms mentioned above, we believe that a common limitation of the standard strategy is the lack of a greater sensitivity to the role played by human interests in the design of different types of natural kinds. In the absence of such sensitivity, the standard strategy endorsed the existence of a set of properties—typically proposed by a general theory of natural kinds—that is presumed to be shared by all natural kinds in science. Thus, for instance, the three diagnoses respectively endorsed that natural kinds are universal, mind-independent, and held together by essences. Contrary to this perspective, we contend below that the notion of a shared set of properties across all natural kinds in science is flawed. This is because human interests are responsible for the development of a plurality of types of classifications that differ in their properties. To support this viewpoint, we will now outline an alternative strategy for studying economic classifications, whose starting point is the recognition that there are multiple legitimate ways to divide the same domain, each motivated by different human aims.

VI.II. A new strategy: an outline

Nature seldom presents clear-cut contexts for defining the categories to which objects belong. Instead, the context is typically provided by the specific objectives of scientists and stakeholders involved in the classificatory activity (Dupré 1993, 2006; Ludwig 2018; Brigandt 2020). Accordingly, the intervention of human interests in classifications should not be regarded as a distinguishing feature of bad science (Kincaid, Dupré and Wylie 2007). It is a general feature of science that an object's categorization must be decided within the framework of the overarching goals that motivate the classification. Insofar as human pursuits vary across scientific communities, scientific categorization will be pulled in different directions, giving rise to a wide array of disagreements in dimensions such as the final boundaries of kinds, their empirical interpretations, and their attributions

[10] This scenario is not unique to economics but appears to be a shared characteristic across the sciences, as shown by Moss (2003) and Wilson (2006).

of relevance. Instead of a single type of categorization, the result will be the existence of a plurality of kinds, each crafted for the purposes sought by the scientific community responsible for the classification.

Our departure from the standard strategy can be described as a shift from assessing economic classifications based on general theories of natural kinds to examining cases in which communities of economists embark on creating classifications. The primary objective is to delve into these cases with the explicit aim of theorizing about the design and applications of such classifications. The new strategy shares the worry that pursuing a general theory of natural kinds may hamper the thorough understanding of how scientists undertake classifications (Ludwig 2018). This becomes evident in the case of general theories, such as essentialism (Ellis 2002), which rejects human influence on the design of scientific classifications and instead focuses solely on investigating the properties of nature's divisions. However, it also applies to general theories that allow human intervention but claim that, regardless of such intervention, the properties of the natural kinds remain the same across science. Thus, for instance, the homeostatic property cluster theory of natural kinds (Boyd 1992, 1999) allows scientists to decide the final boundaries among distinct causal mechanisms (Craver 2009). However, such an intervention does not prevent the theory from postulating a general representation of natural kinds. Natural kinds will always display a cluster of properties that regularly co-occur, along with a mechanism responsible for the co-occurrence of the cluster (Reydon 2009).

A more comprehensive list of general theories also includes Kinds' inductive-grounding ability (Mill 1843), functionalism (Weiskopf 2011; Beck and Grayot 2021), success and restriction clauses (Magnus 2012), categorical bottlenecks (Franklin-Hall 2015), stable property kinds (Slater 2015), and nodes in causal networks (Khalidi 2013, 2018). Instead of considering them as general theories, the new strategy regards them as partial theories that account for specific classification practices of scientists in particular scenarios. In some contexts, scientists design a homogenous classification aimed to support many generalizations. They may rely on a set of intrinsic properties whose possession is individually necessary and jointly sufficient for membership in the category. In other contexts, scientists design a classification aimed to support a single generalization. This classification has the epistemic advantage of holding over a large range of heterogeneous objects, which are only united by a common function. It may also happen that, in different contexts, the most convenient for the human purposes at hand is to design stable property kinds, nodes in causal networks, and so on.

Therefore, the new strategy seeks neither to establish a set of properties that every economic kind must share, nor develop a novel general theory of natural kinds.[11] In agreement with modern general theories of natural kinds, which heavily rely on examples

[11] It implies that we also agree with those who advocate for discarding the term 'natural kind' to better grasp the role of human aims in shaping economic classifications.

of scientific categories, the new strategy begins with the analysis of experiences of economists' communities constructing classifications. However, unlike (both old and modern) general theories of natural kinds, the new strategy is less interested in drawing a demarcation criterion between natural kinds and gerrymandered kinds[12] and more interested in theorizing about classifications as they appear in economics, with a special emphasis on the role played by human interests in their design and application.

We are still in an early stage and cannot offer a full-fledged theorization along the lines mentioned above. As part of the initial research agenda of the new strategy, we believe that two topics are worth considering from the angle of economic classifications: objectivity and the relationship between science and democracy. For now, we would like to use the cases of the cost-of-living index and race to briefly explore the potential impact of the intervention of human interests on the objectivity of economic classifications and some implications of such an intervention for the relationship between science and democracy.

Although it now plays a routine role in measuring inflation, the Consumer Price Index (CPI) has a contested history dating back to the early 20th century (Stapleford 2009). Back then, controversies mainly revolved around the definition of 'standard of living' and the methodology for tracking its cost. Under the influence of U.S. institutionalist economists, the Bureau of Labor Statistics (BLS) understood the cost of living as the value of a fixed standard of living, the proxy for which was a constant market basket. To calculate changes in the cost of living over time, the BLS measured changes in the prices of the goods included in the market basket.

Union representatives were dissatisfied with this methodology. They believed that measuring the cost of living could not be based on a constant market basket in an environment where, due to the aftermath of World War II, drastic changes in purchasing habits and the quality of goods were taking place. At the same time, in response to growing concerns about high and persistent inflation, the U.S. government created the Office of Price Administration (OPA), whose main objective was to establish price controls throughout the economy.

The BLS faced pressures from two sides. On the one hand, labor unions sought to modify the cost-of-living index to account for changes in the standard of living. On the other hand, the OPA pushed to keep the index unchanged, arguing that the inclusion of a constant market basket made the index a useful tool for tracking and controlling prices. Far from settling the dispute on technical grounds alone, the final fate of the index was influenced by political motivations. BLS officials sided with the OPA's interests, and as a result, the bureau viewed its index more as a tool for price controls than for adjustments

[12] As we saw in Section II, this distinction has been part of the project of natural kinds since its inception, with Mill trying to distinguish between Kinds and arbitrary kinds. More recently, Magnus (2014b, 263) has described Khalidi's aim as follows: "[He] wants to understand what distinguishes the categories identified by various sciences from arbitrary and frivolous ones". See also Ludwig (2018).

in wages. As Stapleford (2009, 211) mentions, "an index that originally had been established to adjust wage rates in wartime was now seen primarily as a measure of retail price inflation, and only secondarily in relation to wages".[13]

The American Progressive Era (1890s–1920s) has become a focal point for studying how racism permeated economic theories (Leonard 2016; Chassonnery-Zaïgouche 2020). During this time, some economists openly attributed challenges faced by African Americans to alleged racial inferiority, while conceptual frameworks like 'race suicide', 'unemployables', and 'low-wage races' emerged in parallel (Leonard 2005a, 2005b). Advocates of these views, however, asserted objective statistical proof for their theories. Walter F. Willcox, a prominent economic demographer and leader in the American Economic Association during the Progressive Era, exerted substantial influence on the field through his racist beliefs. He selected members for the Committee to Investigate the Condition of the Negro in 1900. Additionally, serving as a Census Bureau statistician, Willcox played a pivotal role in shaping and publishing essential data on Negroes. Advocating the use of objective statistical facts to address the 'race question', Willcox positioned the researcher as an impartial judge presenting evidence, distancing from advocacy. This concept of the scientist as an objective data gatherer, revealing unbiased truths about race, played a crucial role in Willcox's economic demography work on blacks (Aldrich 1979).

However, Wilcox's studies inadvertently armed extreme white supremacists, exemplifying how economists' scientific racist studies could justify oppressing black Americans. He believed statistics unveiled cause-and-effect hypotheses, such as the inferiority of Negroes, as inferences drawn from objective data. Willcox's work systematically compared black and white experiences, rather than comparing blacks in the past and present, often showcasing inferior outcomes for blacks and ignoring potential political oppression as a major source of blacks' problems. His role in the Census Bureau's decision not to collect lynching statistics reflected his inclination to steer away from aspects that might challenge the scientific racist narrative (Aldrich 1979). The apparently objective nature of those studies gained support, especially from politicians who perceived them as providing scientific backing for policy proposals, such as restrictive immigration legislation and sex-specific minimum wages, reinforcing racism and sexism under the guise of progress (Leonard 2016).

The above examples challenge the ideal of interest-free classifications in economics, revealing the influence of both epistemic and non-epistemic interests in creating and implementing economic categories. The impact of such involvement on the objectivity of economic classifications depends on the endorsed notion of objectivity. If one subscribes to the notion of objectivity as the 'view from nowhere', where economic categories should faithfully reflect nature's divisions rather than human interests, the objectivity of

[13] The cost-of-living index finally evolved into a consumer price index (CPI). For a discussion of the influence of human values in the CPI, see Reiss (2008).

the two classifications above is severely compromised. Alternatively, it can be argued that only the introduction of non-epistemic interests threatens the objectivity of our examples. For instance, Khalidi (2013, 222) claims that "objectivity when it comes to natural kinds is a matter of being guided by epistemic purposes". According to this alternative vision, classifications exclusively influenced by epistemic interests would still be objective. Therefore, the potential impact of human aims on objectivity varies based on our ability to identify and eliminate non-epistemic interests from economic classifications.

While the latter notion of objectivity can accommodate a certain intervention of human interests, it is criticized for assuming an unambiguous distinction between epistemic and non-epistemic interests. As Longino (1996) notes, the pursuit of values such as *simplicity* or *consistency* is not solely an epistemic interest; the choice of these values is influenced by social and political values. Furthermore, the fact that many scientific kinds are descriptive and normative simultaneously suggests that classifications, to be relevant for humans, may need to satisfy both epistemic interests (for example, in explanation or prediction) and non-epistemic interests (for example, in prescription or condemnation) (Griffiths 2004; Dupré 2007). This invites us to reconsider the possibility of maintaining objective classifications while allowing a role for non-epistemic interests.

The example of race in economics reflects that the intervention of non-epistemic interests may have harmful consequences. However, other evidence suggests that not every intervention of non-epistemic interests necessarily harms objectivity. Wylie and Nelson (2007) provide examples in archaeology and biology where adopting a standpoint of gender sensitivity enriched research programs empirically. For instance, they refer to an archaeological context in which the initial classification of skeletal material yielded a high prevalence of male specimens. Researchers with a gender perspective received the result with skepticism, arguing that Aboriginal women should not be expected to exhibit a smaller level of skeletal robustness than their male counterparts, given their typical physical activities. The reason for the initial imbalance was found to be the projection onto Aboriginal women of measures of skeletal robustness that presupposed different norms of gender-segregated physical activity.

We do not intend to imply that the discussion about the relationship between the so-called non-epistemic interests and objectivity is close to being settled in the philosophy of science. Assuming there is a sufficiently convincing argument that non-epistemic interests do not necessarily threaten objectivity, a challenge for the new strategy is determining under what circumstances human interests are likely to improve the objectivity of economic classifications and under what circumstances they are likely to compromise it. As Wylie and Nelson (2007, 79) put it, "the prospects for enhancing the

objectivity of scientific knowledge are most likely to be improved not by suppressing contextual values but by subjecting them to systematic scrutiny".[14]

The new strategy also seeks to weigh in on the relationship between science and democracy. The cases of the cost-of-living index and race reveal that economic classifications, as influenced by human aims, might conflict with democratic values. Feminist contributions, in particular, have explored power relations between dominant groups (often funders and beneficiaries of scientific research), scientists, and marginalized groups (Keller 1985; Harding 1986; Haraway 1988; Longino 1990, 1996, 2001; Anderson 1995). This has led to an explosion of research topics related to the interaction between science and democratic societies, along with new ways of conceptualizing that interaction. An innovative proposal has been the creation of institutions able to intervene in cases where democratic values are regarded to be threatened by scientific work. This includes the possibility of ambitious institutions, such as an oversight committee responsible for reviewing the scope of funded and pursued research and determining if there are gaps that need to be addressed (Jasanoff 2005; Koskinen 2020; Douglas 2021; Malecka 2021).

Economics can significantly influence vast populations, including particularly vulnerable groups, through policy decisions often based on economic classifications. Economists, like any other professionals, are not immune to biases, vested interests, and potential corruption. From what will be learned about the design and implementation of economic classifications, the new strategy should discuss whether the framework for the relationship between economics and society may involve establishing institutions that can better balance the capacities of various interest groups to influence decision-making, as well as the different levels of vulnerability to the consequences of those decisions.

VII. Final Remarks

The ideas presented in the article stand in opposition to the objective of formulating a general theory of natural kinds. However, this does not imply that there is no space for philosophical discussion regarding the construction and application of scientific classifications. We believe that renouncing the purpose of a general theory of natural kinds can release the intellectual energies needed to engage in philosophical work about the influence of human interests in economic classifications. Examining concrete classifications produced by economists is crucial for enhancing our comprehension of

[14] A related issue is the concern about the possibility that scientific classification might become a mere human invention without any correspondence with the world and its causal patterns (Griffiths 1997; Khalidi 2013). Mantzavinos (2006) has argued that definitions are not inherently true or false in the sense that they make claims about the world. However, the scientific value of definitions can be assessed based on their suitability as a foundation for constructing testable hypotheses and their capacity to facilitate the formulation of explanatory and predictive principles, which should be evident in theories with substantial empirical content. Similarly, Reydon and Ereshefsky (2022) posit that a classification's ability to fulfil its purposes should be grounded in the world. Thus, successful classifications must rely on relevant aspects of the world and not solely on our interests and conceptions.

how such classifications have been formulated and applied to meet the requirements of a scientific community. It also allows us to derive insights regarding the circumstances under which the intervention of human aims may be beneficial or harmful to the objectivity of economic classifications. Furthermore, it may prompt discussions about the relationship between science and democratic societies, including how the use of economic classifications might yield outcomes that benefit privileged groups while adversely affecting marginalized individuals.

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