

# ECONOMIC AND PHILOSOPHICAL IMPLICATIONS OF HAYEK'S KNOWLEDGE PROBLEM

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## Abstract

We argue that the canonical reading of Hayek often falls short of the implications of Hayek's insights. We present Hayek's knowledge problem (how order in a society is possible without the required knowledge for that order being possessed by any particular individual), and we discuss some of the implications that follow from Hayek's work. We show that Hayek's knowledge problem has deep economic and philosophical implications.

## Introduction

According to Hayek (1948, pp. 33-56), the task of economics is not to describe the properties of an economic equilibrium but to explain how it is reached. This question is referred in the literature as Hayek's "knowledge problem," which Hayek considers is at the core of the economic problem that market participants try to solve. The relevance of Hayek's "knowledge problem" can be measured by the fact that many scholars have embraced the knowledge problem as one of the pillars of their research program.

Hayek's knowledge problem places a constraint on the type of assumptions economics can apply to the real world. Therefore, for Hayek assumptions that eliminate the knowledge problem are not valid simplifications for the study of the market process. Similarly, economic policy should not be implemented without assuming *too much* knowledge on the part of policy makers. In this paper, we argue that the canonical reading of Hayek often falls short of the implications of Hayek's insights. As a result, many of the core insights in eco-

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nomic theory, even if they remain extremely important, fall short of addressing the knowledge problem.

In the next section, we focus on the knowledge problem as it most directly applies to the market process. Section three discusses the consequences of the limits of the mind and complex phenomena. In section four, we offer concluding remarks.<sup>3</sup>

## Information, Knowledge, and the Market Process

### *From Mises to Hayek*

Hayek's study of the knowledge problem begins as a follow-up of Mises's (1920, 1922) criticism of socialism.<sup>4</sup> At the time of Mises's writings, socialism was considered a social order in which even if there is private property for the consumption of goods, there is no private property for the factors of production. Mises argues, similarly to Max Weber and Boris Brutzkus, that it is not feasible for a large society (a commonwealth) to allocate efficiently resources without private property in the means of production because without private property rights in the means of production means that no exchange will take place and, therefore, there cannot be market prices that would allow for a "rational" (economic) way to distinguish the activities that benefit society (profits) from those that fail to contribute to society (losses.) As opposed to small tribes and families, for whom the intimate knowledge among members allows for an efficient organization without the need to resort to economic calculation, the anonymous nature of trade in large societies requires economic calculation to take place to ensure that scarce resources are allocated to their most valued uses.

Marx, who did not offer an explanation of how socialism would work after the capitalist age, characterized as utopian the socialists who offered a description of life under socialism (i.e., Saint-Simon and Fourier.) Mises' challenge contributed to the shift in the socialist literature from describing alluring but unreal and imaginary societies to recognizing the challenge of achieving efficiency without prices.

<sup>3</sup> For a review of Hayek's work, see Caldwell (2004), Hayek (1994), and Machlup (1974).

<sup>4</sup> It is important to note that we do not use the term "socialism" or "socialist" in their political sense but rather in the economic sense. We refer to "socialism" as an economic system where the means or factors of production are publicly owned, that is, are owned by "the society" or its representative the State or government.

Hayek (1948, Chapters I–IX) enters the debate by addressing the socialist's reaction to Mises's challenge, which was to argue that if we assume that we possess the required knowledge to reach the equilibrium, then reaching such equilibrium is possible and, therefore, Mises's challenge is erroneous. Hayek's reaction is well-known and no less misread according to some scholars (Boettke and O'Donnell, 2013; Sarjanovic, 1989; Thomsen, 1992).<sup>5</sup>

In the first place, Hayek argues that if we take for granted the assumption of perfect information, the necessity of processing such a large amount of data makes the socialist project unfeasible. The "if" is not a minor point, and it has been interpreted by many that Hayek's position was that socialism is not possible because of the difficulty of addressing all of the necessary data. However, Hayek is posing the question to Mises's critics as to "who" provides such perfect information and "to whom" it is given. The problem, as Mises advanced to his critics, is not what the equilibrium conditions are but how the transition to equilibrium is possible when the required information is given to no one. Just as a can cannot be opened by simply assuming a can opener, the economic calculation problem under socialism cannot be solved by assuming perfect information. The perfect information assumption does not simplify the economic problem to be solved; it changes it into another problem.

To be sure, with a certain lack of clarity, Hayek distinguishes between information and knowledge. The former is a quantitative concept that is subject to measurement and, as such, can be complete or incomplete (Boettke, 2002; Zanotti, 2011). This is the target of the socialists' assumption of perfect information. However, knowledge is a qualitative concept and, therefore, can neither be complete nor incomplete. Riding a bicycle or running a firm is not a matter of information. It is a matter of experience and knowledge. This is not the type of input that can be used in a numerical calculation such as Leontief's input-output matrix. Kirzner's (1973) entrepreneurial alertness is overlooked by the socialists' answer to Mises. This is not a minor issue, because the same "perfect information" can be interpreted differently.<sup>6</sup> Specifically, perfect information cannot replace

5 For an account on the economic calculation under socialism debate, see Caldwell (1997), Coyne, Leeson and Boettke (2005), Kirzner (1988), Lavoie (1981) and White (2012, Chapter 2).

6 For example, the Great Depression is subject to different interpretations by Austrians, Monetarists, and Keynesians even when the same information is available

the knowledge and experience possessed by the individual. The driving force of the market remains unexplained under the perfect information assumption.<sup>7</sup>

However, Hayek proceeds with an additional step and argues that the information required to centrally manage the economy emerges as part of the market process. By doing away with private property, the information conveyed by market prices ceases to exist because the market disappears. It is not, then, simply that there is an excess of information to manage; rather, it is that the socialist project eliminates the source of information and knowledge that would be necessary. It follows that Hayek is in fact offering a similar argument to that of Mises, which is framed, however, from a different angle to address the new socialist argument.<sup>8</sup>

### *From Hayek to Kirzner*

Kirzner (1992, pp. 167–168) distinguishes between two types of knowledge problems, “Knowledge Problem A” and “Knowledge Problem B.” The former is the case of an error due to over-optimism on the part of entrepreneurs. Type-A problems are self-correcting. If the market is not willing to pay the price expected by the entrepreneur, the resulting economic losses signal to him and others the nature and size of the error. Either the entrepreneur corrects the errors or the project fails. By any number of means, Type-A error problems disappear from the market.

On the other hand, type-B problems are a matter of unperceived profit opportunities that can remain undiscovered. Therefore, such problems are not self-correcting. This means that we cannot assume that the market will self-correct in a similar way than it would when type-A problems emerge because it would require assuming perfect information and this is something Hayek objects to in the first place.<sup>9</sup> This is the reason for which Hayek and his followers regard market equilibrium as a dovetail coordination of economic agents’ plans and

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7 For a comparison of the evolution of “Austrian” and “non-Austrian (*mainstream*)” economics, see Boettke (1997) and Kohn (2004). For the epistemological role that knowledge plays in Hayek’s thought, a topic we address briefly below, see Caldwell (1992) and Zanotti and Cachanosky (forthcoming).

8 On the topic of Mises and Hayek offering different types of arguments, see Salerno (1993). On Mises and Hayek giving a similar line of reasoning, see Yeager (1994, 1997).

9 Note that assuming we are in equilibrium also implies assuming that type-B problems have been solved.

not as a state of rest of a general equilibrium style. This also explains the strong standing of Lachmann's (1973) argument that the market is a *kaleidic* (a term borrowed from Shackle (1972, p. 72)) process whereby a constellation of market forces and signals can suddenly change, as in a *kaleidoscope*, by a simple shake. In what could be interpreted in Hayekian terms, for Lachmann (1973, p. 32) it is *kaleidostatics* rather than *static equilibrium* that is the correct way to think about the market process.<sup>10</sup>

Kirzner draws another important implication from type-B problems. The market process takes place *within* a specific institutional framework that can be divided between *basic* rights and *created* rights.<sup>11</sup> *Basic* rights are the skeleton upon which the market emerges, such as private property, security, and freedom. *Created rights* are rights that economic agents purposefully design among each other (through contracts) *given* the *basic* rights. *Basic* rights are, therefore, outside the market process and are not subject to the same development that arises out of entrepreneurial *alertness*. This means that an "invisible hand" short-cut explanation is not a valid argument to explain why *basic* rights should evolve from less to more efficient ones. In fact, Kirzner (1992, Chapter 10) argues, because these types of institutions are outside the market process, we cannot rely (solely) on economic analysis to argue that good institutions will replace bad institutions. Casual events (such as the first person to walk through a snow-covered field unintentionally creating the beginnings of a snow-path), path dependency (a second pedestrian making use of the nascent path in the snow), culture, and so on, are what determine which institutions survive the passing of time. This is a problem that cannot be solved by mere calculation; experience is needed. It proves to be the case that type-B problems apply to market processes and institutions, and because of this, there can be unperceived institutional improvements. In addition, if an institutional improvement is discovered, we cannot rely on the market process to make the institutional change. This requires a different type of solution.<sup>12</sup> Like Hayek, the

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10 For a more detailed discussion, see Wagner (2011). The reaction against Lachmann's position is not so much to the *kaleidic* aspect of the market process as it is to his assertion that the "equilibrium rate of profit is [...] a contradiction in terms" (Lachmann, 1973, p. 32). It is not the same to maintain that the market aims at a moving target as to say that the equilibrium (target) is a meaningless concept.

11 This is not the terminology Kirzner uses.

12 Interestingly, one of Kirzner's examples of a type B problem in the realm of institutions is money. Even if money is considered to be an institution, it is also a

spontaneous order process (discussed below) cannot guarantee an optimal outcome. Complex Phenomena and the Limits of the Mind

### *The Relevance of Complex Phenomena for Economics*

Spontaneous orders are defined as phenomena that are the result of human action but not of human design (Hayek, 1967, Chapter 6).<sup>13</sup> It is possible to have a spontaneous order as an unintended consequence of human interaction. Language is an illustrative analogy. No one invented English or Spanish, but these languages do have orthographic and grammatical rules. There is a spontaneous order and evolution to language.<sup>14</sup> Hayek's spontaneous order is analogous to Smith's invisible hand.<sup>15</sup>

For Hayek (1967, Chapter 2), complex phenomena are too complex to be completely designed by the human mind and, therefore, too complex to be purposefully designed.<sup>16</sup> Markets and the law, like language, are a complex phenomenon. We can understand the grammatical rules of any given language as we can understand the laws of demand and supply *once* this phenomenon exists. However, we cannot design ex-ante a language or a market.

The implications of Hayek's knowledge problem can be illustrated with two examples. Spontaneous orders can be divided into two levels: markets and institutions. The market but also the law (*basic* rights, not contracts or *created* rights) emerge spontaneously (Hayek, 1973; Leoni, 1961; Smith, 1759, 1978).

The other illustrative case relates to the rational expectations theory. The main assumption of rational expectations theory maintains that economic agents don't systematically commit the same errors (Sargent, 2008). Two important problems arise. First, rational expec-

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good in the economy, and as such it is subject to the entrepreneurial calculation of profit and loss. See White's (2002) reaction to Kirzner's example.

13 Hayek is not the only one to define spontaneous orders in this fashion. Gallo (1987) argues that the same concept is already present in the Scottish Enlightenment.

14 Surely, some relevant distinctions between the market and language as a spontaneous order exist. In the case of language, for instance, there is an incentive in each individual to adhere to the language, whereas in a market transaction, one of the parties may choose to ignore the contract if he faces no consequences. This is why one can reasonably argue that one of the roles of the government is to enforce contracts.

15 For Hayek's research as a continuation of the Scottish Enlightenment "paradigm", see Gallo (1987) and Horwitz (2001).

16 Although Mises (1933) already referred to economics as a complex phenomenon, he follows a different path than Hayek's, although they are still related.

tations do not fall from the sky nor are they given to economic agents. Economic agents use prices and market information as inputs to produce outputs (expectations.) This means that if the input is distorted expectations will not be accurate, therefore producing systematic errors (the unperceived losses halt the self-correction mechanism.) To argue the contrary would imply that the economic agents, in fact, do have perfect information about the equilibrium conditions. This relates to the Austrian School of Economics' traditional position that making errors is not irrational because not to know what is unknown (i.e., radical or sheer ignorance) is neither rational nor irrational. Therefore, Hayek's solution to the knowledge problem can be understood as how coordination is possible not only when the required information is unavailable but also when economic agents are rational but fallible. Because expectations are subjectively produced with objective data from the market, there is an arational dimension to expectations that the rational expectation assumption fails to capture (Garrison, 1986).

The second problem is that if the market process is a complex phenomenon and, by definition, this indicates that it is too complex to be created and completely understood by the human mind, the rational expectations model raises the question as to from where the information and knowledge in the model originates. The rational expectation assumption cannot avoid relying on a variant of the perfect information assumption. This is an illustration of why it is not the same to first assume perfect information and then to relax the assumption than to begin by acknowledging the knowledge problem. However, this does not imply that we should reject completely the core insights of the rational expectations model. It means that a *weak* rational expectations position such as Lincoln's law (arguably a position held by Mises and Hayek) is more realistic than a *strong* rational expectations position. The role of economic assumptions is not to make the models similar, but to depict real human beings.

### *Human Action and the Mind as a Complex Phenomenon*

There is one more implication of Hayek's work that is worth discussing. Hayek's work (1967, Chapter 3) offers a parallel between the structure of the mind and Gödel's theorem with implications for the conception of *homo economicus* and rationality that may not have received the attention it deserves in the literature.<sup>17</sup> Succinctly, Hayek

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17 For an account on Gödel's theorem in the history of mathematics, see Kline (1982)

argues that the mind is constructed of rules and because of this, the mind cannot explain itself. Consider the case of a newborn that learns to speak the language of his parents. To learn a language for the first time is a different process than learning a second language. In the latter case, the professor can use a common language (i.e., English) with her student to teach him another language. In the case of the newborn that learns a language for the first time, there is no common language of communication between him and his parents. How is it possible for him to learn the language of his parents if there is no means of communication between them? It should be noted that this is a different learning process than simply imitating sounds. Grammatical rules and the meaning of the words have to be learned properly as well. This implies that the mind has a set of meta-rules that make possible learning the language (rule). Consider again the language analogy. A dictionary that intends to define all of the words that belong to a language can either be complete (all of the words are defined) or consistent (there is no circular reference in the definitions), but it cannot be complete and consistent at the same time. If the dictionary defines all words, it has to be the case that there is a circular reference somewhere. If the dictionary is consistent, it has to be the case that at least one word is without definition. Nevertheless, it is the case that all words, including those undefined, can be understood by the individual even if they cannot be stated.

Hayek relates this problem to the role of conception (*begreifen*) and understanding (*verstehen*) (Mises, 1933, Chapter 3). There is something in the human mind that cannot be stated and that transcends the rules. That undefined quality contributes to the understanding of the behavior and meaning of actions performed by others. This is why Schütz and Wagner's (1970) distinction between subjective and objective meaning is important for economics. As they note, a courtroom, a lecture hall, and a church would appear identical to a visitor from Mars. Because we all share the same mental tools (i.e., Weberian ideal types), we are capable of understanding the different meanings inherent in the same objective representations.

As far as we can determine, Hayek's insights into the implications of the limits of the mind were not followed with respect to the further implications with regard to the link he offers to Gödel's theorem.<sup>18</sup>

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and Mankiewics (2001). Hayek's (1952) *Sensory Order* has been the focus of attention.

18 It should be noted that Gödel's theorem applies to formal axiomatic structures,

One of the questions arising from Gödel's theorem is whether the human mind can be replicated by a set of rules (a machine) or is there something purely *human* in the mind? This is a different question than saying that there is a *non-human* rule that cannot be stated by the mind; this is a question about the nature of those *rules* that cannot be stated. Lucas (1961) is the classic argument against mechanisms that builds on Gödel's theorem. Within a short time, the human mind can understand why a statement is true even if such a statement cannot be proven to be true by its own system (for example, Euclidean theorems), but this comprehension is beyond the capabilities of a machine (this is Gödel's point, a consistent system can prove some, but not all, of the statements derived from the system.) In other words, the mind has a set of metarules that allows for comprehension that is beyond the rules. This allows the mind to "program itself" (a newborn learning a language for the first time). A machine, on the contrary, cannot program itself because it does not have a "mind" with metarules (Popper, 1963, Chapter 12).

In what might be a connection worthy of exploration, the Löwenheim-Skolem theorem argues that a set of axioms (rules) intended to define a set of objects fails in its objective. If Gödel's theorem concludes that a set of axioms cannot be complete and consistent, the Löwenheim-Skolem theorem concludes that a set of axioms allows for different interpretations than the ones intended by the system.<sup>19</sup> If, however, there is a common interpretation by the mind of the social and economic reality, as it were, there is something *human* in the mind that allows for this convergence to happen.

This short philosophical detour is important because it offers the more profound argument that there is something *human* in human action, not just a mechanical optimization as characterized by the *homo economicus*.<sup>20</sup> If the underlying differences in the arguments of Austrian and non-Austrian economics rely on the concepts of rationality and subjective *verstehen*, Hayek's work may have the unin-

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and that as Hayek himself explains, he is offering an analogy and a potential extention of Gödel's theorem (as long as the mind is composed of rules) and not necessarily a straightforward application.

19 For instance, a set of rules intended to define the "consumer" can categorize as a consumer an agent behavior that we know is not intended to belong to such a classification.

20 This is not the exact same distinction that Kirzner (1960, Chapter 6) draws between "economics" and "economizing." The latter is the optimization problem to be solved given the starting and ending point. Economics is also about choosing the ends.

tended consequence of offering a bridge to an ongoing philosophical debate about the nature of the mind that supports his case.<sup>21</sup> The subjective emphasis that Hayek and the Austrians put forward with respect to *mainstream* theorizing follows from Hayek's knowledge problem. Embracing Hayek's work has implications that go beyond having a more complete theory; it touches the foundations of the schools of thought.

## Concluding Remarks

Even though Hayek's knowledge problem is recognized in the literature, it is doubtful that his positions are fairly represented and that the implications of his work are fully examined even by some of his followers. It is not the same to recognize the implications of Hayek's work as to build a *mainstream* version of Hayek that would better fit the *mainstream* models. As interesting as such work can be, it leaves out what is more distinctive in Hayek's work.

Hayek's knowledge problem creates the beginnings for the study of the foundational problems of economics and for the resolution of the deep differences among the schools of thought. What began as a reply to the socialists' reaction to Mises' challenge became a distinctive aspect of Hayek and the Austrian school that is still to be fairly represented and understood by the alternative schools of thought.

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21 For Austrian and non-Austrian economics as two different paradigms, see Zanotti and Cachanosky (2015). Other authors offer a different separation of the economic paradigms, identifying Keynesian economics as a paradigmatic shift (Bronfenbrenner, 1971). This, however, can be interpreted as a sub-paradigm within another paradigm (i.e., non-Austrian economics). Similarly, sub-paradigms can be identified within the Austrian paradigm (e.g., classical liberals vs anarcho-capitalists or free bankers vs 100-percent reserve requirement bankers.)

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