

IS THE CRUCIAL PROBLEM OF ANY ECONOMY A KNOWLEDGE PROBLEM?

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Abstract: Is the crucial problem of any economy a knowledge problem? On what grounds the use of knowledge in society could be regarded as the fundamental problem of any economy? In a famous article published in 1945 in American Economic Review, F. A. Hayek asserted that the crucial problem of a rational economic order is to ensure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. According to F. A. Hayek (Hayek, Economics and Knowledge, 1958), "if we possess all the relevant information, if we can start out from a given system of preferences, and if we command complete knowledge of available means, the problem which remains is purely one of logic". Therefore, the crucial problem of any economy seems to be a knowledge problem. The purpose of the present paper is to briefly assess the Hayekian conception about the role of knowledge in society, emphasizing the importance of the hypotheses regarding knowledge in Hayek's theory of prices. The main objective of the paper is to analyse presuppositions and to disclose the difficulties implied by the conception that the economic problem is mainly a knowledge problem and that the role of market prices in and economic system is to communicate information which is dispersed among individuals in society.

Keywords: dispersed knowledge, tacit knowledge rational economic order, price system, equilibrium analysis

1. Introduction

The economics of information is one of the most widespread approaches in economic theory today. Since Hayek's 1945 article "The Use of Knowledge in Society" the idea that the role of market prices is to convey information become increasingly popular (Thomsen, 1992).

The present paper contains a concise analysis of the Hayekian conception about the role of knowledge in society, emphasizing the importance of the hypotheses regarding knowledge in Hayek's theory of prices. The main objective of the paper is to find out the presuppositions and to disclose the difficulties implied by the conception that economic problem is mainly a knowledge problem and that the role of market prices in and economic system is to communicate information which is dispersed among individuals in society.

2. Hayek conception about the use of knowledge in society

2.1. The rational economic order and the problem of knowledge in society

In emphasizing the role of knowledge in society, F. A. Hayek started from the premise that knowledge of the relevant circumstances belongs to the individuals acting in different situations. The individuals usually possess the information about their own preferences, about the means at their disposal for achieving their goals. But while at the individual level, one and the same mind possesses the relevant information and it is involved in the decision-making process, in the case of a society, it is not conceivable that one mind could have all the relevant information and reasonably decide how to coordinate the actions and plans of all individuals in society.

If the relevant knowledge is dispersed among individuals, how should a rational economic order look like so that the communication of the dispersed knowledge and the coordination of the actions and plans of the individuals to be possible? Hayek differentiates between three types of social orders depending on who is doing the planning in society: (a) central planning – direction of the whole economic system according to one unified plan; (b) competition – decentralized planning by many separate persons; (c) the mix system: halfway house between the two – the delegation of planning to organized industries, or in other words, monopolies. Hayek proposed as a criterion to decide which type of economic order is better, the degree to which the knowledge about circumstances of time and place is better used.

What is the knowledge of the circumstances of time and place in the Hayekian conception? Besides the knowledge of the special circumstances and of local conditions it includes the skills and, in general, the knowledge acquired by people performing various activities and practicing certain trades or professions – the so called tacit knowledge. Such knowledge can neither be the subject of statistics nor can it be obtained through research by a group of experts and it is difficult (if not impossible) to be centralized.

Therefore, starting from the following premises: (1) knowledge of the circumstances of time and place is crucial for a rational economic order, and (2) this type of knowledge is difficult to be centralized, Hayek rejects the system of central planning of the economy and concludes that the best type of society – the rational economic order – is based on competition (with decentralized planning by many separate persons). Only in such a society knowledge of the circumstances of time and place could be used promptly.

2.2. Knowledge and the concept of equilibrium

The main theses of the Hayekian theory of dispersed knowledge could be introduced without mentioning Hayek's conception regarding equilibrium in economic theory. Nevertheless, an assessment of the role of knowledge in the conceptual framework of equilibrium theory can elucidate better Hayek's emphasis on the issue of knowledge.

Hayek explains the meaning of the concept of equilibrium firstly in relation to the actions of an individual and, secondly, in relation to the actions of several individuals who interact. The actions of an individual can be considered in equilibrium if they are part of one and the same plan. Moreover, only if all actions of an individual have been decided at a certain moment and in relation to the same circumstances and goals the respective actions may be considered in equilibrium. The first thing to note is that equilibrium is a relation between actions and, in this case, between the actions of an individual. If the actions of an individual occur in succession, they are in equilibrium (i.e. part of a plan and related to the same set of circumstances) only if circumstances do not change – but this is not imaginable – or, if the changes in circumstances are correctly anticipated by the individual and considered from the moment he/she conceived his plan. At this point, the problem of knowledge or anticipation comes into the equation.

What is the meaning of the concept of equilibrium when it is applied to the entire economy? In the case of many interacting individuals the actions and expectations of all actors become the circumstances of every other acting individual. Therefore, the compatibility or coordination of the plans of all individuals in a society would be ultimately possible to the extent that everyone anticipates accurately at least some of the plans and actions of all the other individuals. Therefore, this compatibility of plans and actions depends on the accuracy of certain type of knowledge and it is a knowledge problem. According to F. A. Hayek, correct foresight is the defining characteristic of the state of equilibrium and not just a precondition of it. However, as Hayek mentioned, equilibrium does not imply perfect knowledge or perfect foresight in all respects, but only on those

points that are necessary for the realization of the plans of the individuals in society. Equilibrium will last as long as the anticipations prove correct (and they need to be correct only on those aspects which are relevant for the decisions of the individuals). An example illustrating the state of equilibrium would be the following: manufacturers of building materials produce a certain quantity of materials for building houses, house builders acquire exactly that amount of materials and build several houses, and consumers save exactly the amount needed to purchase those houses. If all the conditions remain unchanged the equilibrium will last. If conditions change, a new state of equilibrium can occur only if all the changes are anticipated and taken into account by the individuals acting on the market. For example, some of the building materials could be destroyed in an accident or unfavorable weather could make it impossible to build houses, or a certain technological invention could lead to a change in the proportion of materials needed to build a house. If such changes are not anticipated, the equilibrium will not last.

Furthermore, the knowledge that individuals acquire, and use constitutes the empirical content in equilibrium analysis. Hayek do not disapprove the tendency toward formalism in economic theory implied usually by equilibrium analysis. He simply believes that once the formal propositions of economics (the Pure Logic of Choice, in Hayekian terms) are established and clearly isolated from any empirical content, formal economic theory can be used as a tool to investigate causal processes in the real-world economy in the same way as mathematics is used. According to Hayek, “the tautologies, of which formal equilibrium analysis in economics essentially consists, can be turned into propositions which tell us anything about causation in the real world only in so far as we are able to fill those formal propositions with definite statements about how knowledge is acquired and communicated [...] The empirical element in economic theory [...] consists of propositions about the acquisition of knowledge.” (Hayek, 1958, p. 33)

The interest economists have for the concept of equilibrium is justified by the idea that there is a tendency of the real economy toward a state of equilibrium – and Hayek also subscribes to this idea when he asserts that the state of equilibrium is not simply a fiction. This tendency towards equilibrium can be understood in the light of Hayek's explanation of the concept of equilibrium as a tendency towards the coordination of individual plans and actions, and more precisely, as a tendency towards increasingly accurate anticipations by entrepreneurs of future conditions.

Therefore, the knowledge is important in the conceptual framework of equilibrium theory from three points of view. Firstly, equilibrium is defined as a state where individuals possess knowledge about relevant circumstances and correctly anticipate the change of relevant circumstances. Secondly, formal equilibrium analysis is relevant in explaining and understanding real world economy if its formal propositions are filled with relevant empirical content, which, according to Hayek, consists of propositions about how knowledge is acquired and communicated. And thirdly, there is a tendency of the real economy toward a state of equilibrium, that is toward a state increasingly accurate anticipations by individuals of future conditions. All these considerations elucidate to some extent Hayek's emphasis on the problem of knowledge in his social theory.

2.3. Knowledge and the price system

The price system solves at least two important knowledge problems, according to Hayek: communication of knowledge of circumstances of time and place and coordination of actions of the individuals in a decentralized society.

A decentralized society is preferable to a centralized society, in Hayek's view, because only thus it can be insured that the knowledge of the circumstances of time and place will be promptly used. In a society in which the knowledge of the relevant facts is dispersed among many people, the price system has the merit of giving individuals the possibility to use more knowledge than they

actually have: „Fundamentally, in a system in which the knowledge of the relevant facts is dispersed among many people, prices can act to coordinate the separate actions of different people in the same way as subjective values help the individual to coordinate the parts of his plan.” (Hayek, 1958, p. 85)

For instance, when the rarity of certain production factors increases – either by the appearance of a new use, or by the disappearance of a source by which that factor of production is obtained – there are significant fluctuations in their exchange rates. The economic agents do not need to know the concrete conditions that have led to changes in the exchange rates of the respective factors of production. They can find out all that is necessary to coordinate their actions by looking at variations of exchange rates. Therefore, according to Hayek, the real function of the price system is to communicate the information about the circumstances of time and place which is dispersed among the members of the entire economy (Hayek, 1958, p. 86).

In some of his writings, Hayek emphasizes the idea that market and price system provide mainly a sort of “discovery procedure which both makes the utilization of more facts possible than any other known system, and which provides the incentive for constant discovery of new facts which improve adaptation to the ever-changing circumstances of the world in which we live” (Hayek, 1990, p. 236). However, there is an important difference in stating that prices as such communicate or transmit knowledge of relevant circumstances and asserting that price mechanism provide a discovery procedure. In the first approach, entrepreneurs seem to be simply recipient of the relevant information transmitted through the price system, while in the second approach entrepreneurs actively participate in discovering the relevant information and price system is simply a tool in this process.

Some economists challenge the view that price-taking agents, guided only by market prices, would make correct decisions, pointing out that real market prices are inefficient conveyors of information, because they are disequilibrium prices, that is, prices that lead to losses and profits. E. Thomsen (1992, pg. 56-58) addresses this problem, suggesting that ultimately entrepreneurs are not simply price takers. Instead they critically assess market prices trying to find profit opportunities. Each entrepreneur exploits the price differences he has noticed, while accepting other prices unquestioningly, much in the same way scientists search for the truth, taking for granted some theories and questioning others. E. Thomsen suggests that even if market prices do not convey accurate information, they are still useful in the market adjustment process in the same manner that current scientific theories are useful for scientists in their pursuit of the truth. It is however questionable whether the essence of Hayek’s argument about the role of prices in conveying information is preserved, as E. Thomsen suggests, even if the information important for the coordination of individual plans and actions is a matter of entrepreneurial anticipation and it is not conveyed as such by market prices.

3. Philosophical underpinnings

Citing Whitehead who asserts that civilizations advance by extending the number of operations which we perform without thinking about them, Hayek (1958, p. 88) emphasizes that people constantly use unconsciously formulas, symbols, rules whose meanings they cannot understand, and through which they benefit of a kind of knowledge they do not possess individually. Hayek mentions that unconscious rules that govern individuals’ actions are often represented as customs and habits. According to Hayek (1958, p. 88), language and the price mechanism are two examples where symbols and rules, on the one hand, and practices and institutions, on the other hand, are used without being understood as such. For example, people can use language in accordance with the rules of grammar without necessarily having the analytical

ability to distinguish and understand all kinds of elements that form the subtle mechanism of language. The question is whether the price system can be considered a mechanism that people use without understanding it in all its aspects and without deliberating on the operations they are doing, as Hayek suggests.

According to Hayek, cognition relies on supra-conscious metarules. To understand something is to find the place of that thing in a given order. But what can we do if we want to explain that order itself? We can explain it by referring it to another more complex order, and so on. The problem of infinite regress is solved by Hayek assuming the existence of a system of supra-conscious metarules. Hayek defends the idea that it would be impossible for our mind to produce a complete explanation of the ways in which it itself classifies the elements of the patterns it perceives. In this sense, he refers to Cantor's theorem from the theory of sets that basically states that in any system of classification there are always more classes than things to be classified, which implies that no system of classes can contain itself (Hayek, 1980, p. 61).

Hayek admits that it could be possible at some point to explain these supra-conscious rules, but this fact would already imply the emergence of another set of supra-conscious metarules. The process of thought consists in the gradual emergence of new supra-conscious metarules in terms of which rules that could not be explained previously can now be explained, because they passed in the field of conscious thinking. In this way Hayek also explains the mysterious process of scientific creativity, which involves "a restructuring of the supra-conscious matrix in which our conscious thoughts move." (Hayek, 1980, p. 62) Therefore, even if certain practices, rules and institutions could be explained and understood, at least in the first instance they were used without being understood, i.e. without reflecting on their place in a complex order. Here it is the underlying argument on which Hayek base the idea that people constantly use unconsciously formulas, symbols, rules and even institutions whose meanings they cannot understand. According to Hayek, market prices are an example of such system of rules and symbols that people use it without fully understanding it and which is not designed by anyone in particular.

4. Is the crucial problem of any economy a knowledge problem?

F. A. Hayek (1958, p. 77) asserts in a famous article written in 1945 that "if we possess all the relevant information, if we can start out from a given system of preferences, and if we command complete knowledge of available means, the problem which remains is purely one of logic. That is, the answer to the question of what is the best use of the available means is implicit in our assumptions." In other words, Hayek states that the real economic problem is one of knowledge of consumer preferences and available means of production. In another well-known article Hayek formulate the economic problem as follows: "The economic problem of society is thus not merely a problem of how to allocate "given" resources-if "given" is taken to mean given to a single mind which deliberately solves the problem set by these "data." It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of the utilization of knowledge which is not given to anyone in its totality." (Hayek, 1958, p. 78)

The idea that the problem for a rational economic order is essentially a knowledge problem presupposes a definite subjacent model of economy and society. The underlying model is that of an economy in which all possible courses of actions and all possible problems and their solutions are ascertainable *ex ante* so that the only remaining problem would be the problem of knowing circumstances of time and place. In such an economic model it would be possible to classify exhaustively all types of actions and events. No entirely new problem and no entirely new and

impossible to classify event could ever occur otherwise it would be necessary to admit that knowledge problem is of secondary importance.

The only unknown element would be the frequency or probability that an event would be likely to occur. For example: I know that it's possible to rain but I do not know exactly if it will rain tomorrow or in a week; or I know that the demand for building materials could increase, but I do not know exactly the circumstances in which this increase could occur. The knowledge of the conditions that caused the increase in the demand for building materials is in a dispersed form, it belongs to the individuals who act in concrete situations. It may be an increase in the demand for housebuilding, or it may be some projects to renovate monuments or to build shopping centers. The information regarding the increase in the demand for building materials is transmitted through the pricing system, according to the Hayekian theory of dispersed knowledge.

To create a suggestive image of the Hayekian conception, let us imagine that each person must solve the same puzzle - in the sense that and that each individual has some pieces of the puzzle and should contribute with the pieces that he/she possesses. The entire puzzle cannot be solved by a certain individual (because no one holds all the pieces of the puzzle) but only if everyone contributes with the pieces that he/she owns. Debugging the analogy, it is obvious that the pieces of the puzzle are the fragments of knowledge that individuals possess, and the puzzle solution is basically the final state in which individuals' anticipations of relevant conditions are correct and the plans and actions of everyone are coordinated. The puzzle is solved to the extent that all pieces are put at their place, that is to the extent that relevant knowledge is communicated and acquired by individuals.

This underlying model is consistent with Hayek's conception about formal analysis in economics – "Pure Logic of Choice", in Hayekian terms – and its application to real world situations. Hayek's view about the role of economic theory reflects how he conceives real world economy, which ultimately is the object of study of economic theory. According to Hayek, formal analysis in economics could (in principle) and should be developed to cover all conceivable situations: "...in the field of the Pure Logic of Choice our analysis can be made exhaustive, that is, while we can here develop a formal apparatus which covers all conceivable situations, the supplementary hypotheses must of necessity be selective, that is, we must select from the infinite variety of possible situations such ideal types as for some reason we regard as specially relevant to conditions in the real world." (Hayek, 1958, p. 47)

Furthermore, the empirical content in economics consists of propositions about acquisition of knowledge, while economic theory could be used as a tool of analysis much in the same way mathematics is used: "...the empirical element in economic theory – the only part which is concerned not merely with implications but with causes and effects and which leads therefore to conclusions which, at any rate in principle, are capable of verification – consists of propositions about the acquisition of knowledge [...] My criticism of the recent tendencies to make economic theory more and more formal is not that they have gone too far but that they have not yet been carried far enough to complete the isolation of this branch of logic and to restore to its rightful place the investigation of causal processes, using formal economic theory as a tool in the same way as mathematics. (Hayek, 1958, pp. 33, 35)

Therefore, the thesis that economic problem in any society is basically a knowledge problem relies, at least in Hayek's theory, on the doubtful presupposition that all possible problems and their solutions are *ex ante* ascertainable, so that formal analysis in economic could and should cover in principle all conceivable situation.

Another possible way to appraise the idea that the main economic problem in society is a knowledge problem is to use an imaginary construction. For instance, to assume, for the sake of the

argument, that we possess all the relevant information about preferences and command complete knowledge of available means. Is the remaining problem simply one of logic, as Hayek suggested?

An answer to this question is implied in Ludwig von Mises writings on the impossibility of economic calculation in a socialist society. Ludwig von Mises emphasizes that even if a central planner has miraculously at his disposal all the relevant information about preferences, means of production and technologies, the problem of rationally choosing between the “embarrassing multitude of producers’ goods and the infinite variety of procedures that can be resorted to for manufacturing definite consumers’ goods” (Mises, 1998, p. 698) still remain to be solved. This would not be possible without some sort of economic calculation: „It will be evident, even in the socialist society, that 1,000 hectolitres of wine are better than 800, and it is not difficult to decide whether it desires 1,000 hectolitres of wine rather than 500 of oil. There is no need for any system of calculation to establish this fact: the deciding element is the will of the economic subjects involved. But once this decision has been taken, the real task of rational economic direction only commences, i.e. economically, to place the means at the service of the end. That can only be done with some kind of economic calculation. The human mind cannot orientate itself properly among the bewildering mass of intermediate products and potentialities of production without such aid. It would simply stand perplexed before the problems of management and location” (Mises, 2012, p. 16)

Mises insight is that economic calculation is not possible without a system of private ownership over the means of production and without monetary prices. Calculation *in natura* could be enough only for the level of consumption, but not for goods of higher order: „Calculation *in natura*, in an economy without exchange, can embrace consumption goods only; it completely fails when it comes to dealing with goods of a higher order. And as soon as one gives up the conception of a freely established monetary price for goods of a higher order, rational production becomes completely impossible. Every step that takes us away from private ownership of the means of production and from the use of money also takes us away from rational economics.” (Mises, 2012, p. 17)

From Ludwig von Mises perspective, private ownership over the means of production and monetary prices are necessary conditions for economic calculation, that is for a rational economic order. Therefore, according to Mises the crucial problem for any economy is the problem of economic calculation, independently of information and knowledge (Salerno, 1990). If someone would miraculously possess all the information regarding the individual preferences, the means and technologies available, as Hayek suggested, the problem of calculating the most economical course of action given the multitude of factors of production and the infinite variety of procedure remains. From this perspective the knowledge problem, although important in any society, is only of secondary importance.

5. A short assessment

To better assess Hayek’s conception about the use of knowledge in society it is important to emphasize the meaning of knowledge in his theory once again. Knowledge of circumstances is in Hayekian theory a kind of tacit knowledge, which can be acquired by experience, in practice and cannot be expressed and transmitted in a discursive form. But is this type of knowledge essential in the coordination between house builders and the providers of factors of production necessary to build houses, for instance? Is tacit knowledge essential for the functioning of market economy? Do prices as such communicate this type of knowledge?

It seems that the main problem with the knowledge of circumstances necessary for the coordination of actions of the individual in a market economy is not that it cannot be verbalized or written down in a conventional form. Rather the conventional ways of transmitting knowledge (i.e. statistics about individuals’ preferences) is not so efficient in a dynamic world where the

circumstances and the preferences of the individuals constantly change. The knowledge about the circumstances of time and place is of temporary or ephemeral relevance.

Even if prices convey knowledge about circumstances of time and place, this knowledge is about past circumstances and reflects the past anticipations of the entrepreneurs. Although entrepreneurs rely on past prices in assessing what are the relevant market conditions for their business, they still need to genuinely appraise and anticipate future circumstances regardless the past prices of goods and production factors. Therefore, it seems that the relevant knowledge for entrepreneurial decisions cannot be communicated at all by market prices of the past. The view according to which price mechanism provides mainly a sort of discovery procedure for entrepreneurs to better assess market conditions, which Hayek himself express in some of his writings, is more accurate, from this perspective. Entrepreneurs assess the market conditions using past market prices, but they have an active role in this assessment, according to their experience in trade and field of activity.

Entrepreneurial activity seems to involve a type of tacit knowledge, but it is not conceivable how market prices could literally convey such type of knowledge. Rather, the existence of markets and of market prices represent a necessary condition or an indispensable instrument for entrepreneurs to use their own knowledge, skills and experience and to organize their own activity so that they could avoid losses and obtain profit. Ludwig von Mises emphasizes that market prices and especially monetary prices are an indispensable tool of action. Without market prices economic calculation would not be possible. According to Ludwig von Mises, monetary calculation “affords us a guide through the oppressive plenitude of economic potentialities. It enables us to extend to all goods of a higher order the judgment of value, which is bound up with and clearly evident in, the case of goods ready for consumption, or at best of production goods of the lowest order. It renders their value capable of computation and thereby gives us the primary basis for all economic operations with goods of a higher order. Without it, all production involving processes stretching well back in time and all the longer roundabout processes of capitalistic production would be groping in the dark.” From this perspective the crucial problem for a rational economic order is not one of (dispersed) knowledge as it is one of using monetary calculation to discern which plan is profitable and which is not.

The idea that knowledge has a crucial role in a rational economic order is based in the case of Hayekian theory on a definite vision regarding the role of price mechanism in economy and on a specific method of analysis in economics – equilibrium analysis. Although Hayek did not define equilibrium in terms of perfect knowledge, in his view, equilibrium is a sort of ideal state where individual possess all relevant knowledge to fulfil their plans. According to Hayek there is a discernible tendency of real economy toward equilibrium, that is toward a state where entrepreneurs correctly anticipates the relevant circumstances of time and place and all individual plans and actions are coordinated one with each other. It may be true that individuals that practice a certain kind of trade or activity tends to become more skilful and to know better what they need and what comes next in the context they act. But the idea that individuals come to anticipate relevant circumstances increasingly correct is problematic because it ultimately means that either there is no genuine uncertainty, or that the actions of the individuals are determined according to a presumed final state where all individual plans are coordinated.

The importance of knowledge seems to be derived from such a view regarding the ideal state of equilibrium. In this general picture the price mechanism is a tool for individuals to coordinate their actions and fulfil their plans, which in Hayek terms means that they provide a discovery procedure for individuals to acquire the relevant knowledge using their experience and skills. However, the idea that prices convey the relevant knowledge necessary for individuals to fulfil their plans cannot be defended without adding a lot of conditions that ultimately change completely the

meaning of the original statement. For instance, prices of the past are used by entrepreneurs along with their own knowledge and experience to make their assessment of market conditions and to anticipate which courses of actions bring profit. Prices of the past are only an accessory of appraisal. It is true that they reflect the appraisal of all the other entrepreneurs, but these appraisals could be either right or wrong. Market prices need to be interpreted using additional information and knowledge well beyond what prices alone could provide. This observation is reconcilable with F. A. Hayek mention that he has in view not only knowledge of past prices or price expectation: "... price expectations and even the knowledge of current prices are only a very small section of the problem of knowledge as I see it. The wider aspect of the problem of knowledge with which I am concerned is the knowledge of the basic fact of how the different commodities can be obtained and used, [...] and under what conditions they are actually obtained and used...." (Hayek, 1958, pp. 51-52)

Entrepreneurial activity, the knowledge that entrepreneurs possess – which is a type of tacit knowledge – and their ability to assess market conditions and to identify profit opportunities are important in a functional economic system. However, this type of knowledge is not likely to be conveyed by market prices, rather it is generated on spot by entrepreneurs using their experience and assessing market conditions. Therefore, it should be concluded that the thesis that market prices convey all relevant knowledge in economy is an overstatement.

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