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KNOWLEDGE AND INDIVIDUAL BEHAVIOUR
IN THE AUSTRIAN TRADITION OF BUSINESS CYCLES:
VON MISES VS. HAYEK

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In this paper, we reconsider Ludwig von Mises and Friedrich Hayek's theories of business cycles in the light of their methodological approach. In the first part, we clarify Mises and Hayek's methodological frameworks in order to provide a better understanding of their programmatic approach of business cycles. The second part is dedicated to their respective theoretical framework, as applied to capital, interest and monetary theory. Finally, in the last part, we investigate the mechanisms at work in Mises and Hayek's explanations of the different phases of the trade cycle, by underlying the role played by knowledge and individual behaviour within market adjustments.

I. INTRODUCTION

Ludwig von Mises and Friedrich Hayek both belong to the third generation of the Austrian School. The influence of the Austrian tradition in the field of economics, starting with Carl Menger, is manifest in the work of both authors. From the viewpoint of the history of economic ideas, the two authors are associated with methodological individualism and subjectivism, which are the strongly claimed foundations of the Austrian approach of social sciences.

In the more restricted field of history of economic analysis, Mises and Hayek are considered as the founders of the so-called Austrian tradition of business cycles. This approach, which the origin can be traced back to the Swedish economist Knut Wicksell, is characterised by an integration of the Austrian theory of interest and capital together with a non-quantitative monetary analysis.

The first section of the paper aims at clarifying and contrasting Mises and Hayek's methodological frameworks in order to provide a better understanding of their programmatic approach of business cycles. A second section will be dedicated to their respective theoretical framework, as applied to capital interest and monetary theory. Likewise, their views will be contrasted in the light of their methodological approach, with the aim of grasping the main distinctive features of their respective business cycle analyses. At last, we shall investigate Mises and Hayek's explanations of the successive stages of the trade cycle, by underlying the role played by knowledge

and individual behaviour within the mechanisms of market adjustment.

2. METHODOLOGICAL FRAMEWORK

It is unquestionable that Mises and Hayek's views of economics grew out of a methodological approach that is congenial to all Austrian economists, and that emphasises individualism and subjectivism as principles of analysis. However, as we shall develop, Mises and Hayek's views differ as regards the epistemological foundations of economic science.

2. 1. *Apriorism vs. cognitivism*

Mises' work is strongly associated with the apriorist method. According to him, economics constitutes one of the various branches, together with sociology, psychology or even history, that form the corpus of social sciences. He then emphasises the specificity of social science as compared to other scientific disciplines such as physics or natural sciences. Indeed, the distinctive feature of social sciences in general, and of economics in particular, is that they deal with *human action*. Mises' endeavour is therefore to build a 'general theory of human action', which he refers as *praxeology*. Now, the specificity of social sciences requires an appropriate method of investigation. As Mises indicates:

The science of human action that strives for universally valid knowledge is the theoretical system whose hitherto best elaborated branch is economics. In all of its branches this science is a priori, not empirical. Like logic and mathematics, it is not derived from experience; it is prior to experience. It is, as it were, the logic of action and deed.

(Mises, 1960 [1933], p. 37)

In other terms, Mises means that apriorism is the only available method that can provide the foundations for a 'universally valid science of human action'. Moreover, Mises' apriorism is radical since it excludes any *ex ante* reference to experience: it is, by nature, inherent to the human mind. As Mises writes:

Following in the wake of Kant's analyses, philosophers raised the question: How can the human mind, by aprioristic thinking, deal with the reality of the external world? As far as praxeology is concerned, the answer is obvious. Both, a priori thinking and reasoning on the one hand and human action on the other, are manifestations of the human mind. The logical structure of the human mind creates the reality of action.

(Mises, 1978 [1962], p. 42)

Such a position logically leads Mises to deny the issue of empirical refutation. In *The Ultimate Foundation of Economic Science*, he argues that the Popperian falsifiability criterion is not relevant to the theoretical sciences of human action, where there are no experimentally established facts. He adds that if apriorism makes praxeology 'unscientific', the same may be said of mathematics (Mises, 1978 [1962], pp. 69-70).

Let us now envisage Hayek's methodological framework.

In *The Counter-Revolution of Science*, Hayek also contrasts natural and social sciences from the viewpoints of both their *relict* and *method*¹. He writes:

While in (the social sciences) it is the attitudes of individuals which are the familiar elements and by combination of which we try to reproduce the complex phenomena, the result of individual actions, which are much less known – a procedure which often leads to the discovery of principles of structural coherence of the complex phenomena which had not (and perhaps could not) be established by direct observation – the physical sciences necessarily begin with the complex phenomena and work backwards to infer the elements from which they are composed [...] While the method of the natural sciences is in this sense analytic, the method of the social sciences is better described as compositive or synthetic. It is the so-called wholes, the groups of elements which are structurally connected, which we learn to single out from the totality of observed phenomena only as a result of our systematic fitting together of the elements with familiar properties, and which we build up or reconstruct from the known properties of the elements.

(Hayek 1952a, pp. 38-39)

This passage is worth quoting at length since it reveals a dimension that is absent in Mises' approach. Hayek methodological indeed argues that the facts studied by social sciences differ from those of physical sciences by being beliefs or opinions held by particular people beliefs; which as such are our data, irrespective of whether they are true or false, and which, moreover, we cannot directly observe in the minds of people but which we can recognise from what they say or do merely because we have ourselves a mind similar to theirs. As he indicates:

1. In this book, Hayek also reflects on 'scientism', a term which he originally used to outline the effort by scientists and economists to imitate a rather dubious (and most likely false) conception of the problems and explanatory strategies of the natural science. In his Nobel Memorial Lecture, when referring to his 1942 article: "Scientism and the Study of Society", Hayek tells us :

"It seems to me that this failure of the economists to guide policy more successfully is closely connected with their propensity to imitate as closely as possible the procedures of the brilliantly successful physical sciences – an attempt which in our field may lead to outright error. It is an approach which has come to be described as the 'scientistic' attitude – an attitude which, as I defined it some thirty years ago, 'is decidedly unscientific in the true sense of the word, since it involves a mechanical and uncritical application of habits of thought to fields different from those in which they have been formed'".

(Hayek, 1978 [1974], p. 23)

[M]ost of the objects of social or human action are not ‘objective facts’ in the special narrow sense in which the term is used in the Sciences and contrasted to ‘opinions’, and they cannot at all be defined in physical terms. So far as human actions are concerned, things are what the acting people think they are.

(*ibid.*, pp. 27-28)

In other terms, Hayek’s methodology of social sciences entails a cognitivist element which is absent in Mises. More precisely, Hayek agrees with Mises on the *a priori* validity of the “Pure Logic of Choice” applied to *individual* plans, but argues that praxeology cannot explain interactive *social* processes without empirical assumptions concerning the way according to which individuals acquire knowledge, form expectations, and learn from their social experience. For though, such empirical assumptions are to Hayek’s view necessary for the economist in order to show how market equilibrium occurs. It is only by asserting the existence of a tendency toward equilibrium “that economics ceases to be an exercise in pure logic and becomes an empirical science.” (Hayek 1949 [1937], p. 44).

Hayek’s standpoint implies a further distance from Mises’ apriorism concerning the issue of empirical refutation. Hayek indeed accepts according to which Karl Popper’s principle or the hallmark of any scientific theory is its openness to empirical falsification. However, as we shall argue, Hayek’s emphasis on the fallacies of scientism suggest in fact a deepening, rather than an erosion, of his recognition of the extent to which economic theory is independent of – in fact a prerequisite for – empirical economic observation.

2. 2. *Individual, behaviour and uncertainty*

As suggested above, Hayek and Mises diverge on methodology as regards the relationship between the ‘individual’ and the ‘social’. Although they both strongly support the individualistic approach, they however do not share the same conception of subjectivism. Let us investigate how the two authors deal with these issues.

To begin, Mises describes individualism as a principle of the philosophical, praxeological, and historical analysis of human action means the establishment of the facts that all actions can be traced back to individuals and that no scientific method can succeed in determining how definite external events, liable to a description by the methods of the natural sciences, produce within the human mind definite ideas, value judgments, and volitions. In this sense the individual that cannot be dissolved into components is both the starting point and the ultimate given of all endeavors to deal with human action” (Mises 1978 [1962], p. 81).

Mises’ conception of methodological individualism also implies a particular treatment of determinism. On the one hand, Mises cannot

conceive of any scientific method that permits to relate natural events to the values or ideas of human beings – i.e., their subjective dimension. This implies some ‘methodological dualism’:

[...] as long as we do not know how external facts – physical and physiological – produce in a human mind definite thoughts and volitions resulting in concrete acts, we have to face an insurmountable methodological dualism.

(Mises 1996 [1949], p. 20)

On the other hand, although it is reasonable to believe that the social environment affects the behaviour of individuals, it is not possible to describe rigorously the mechanisms by which this influence proceeds. Therefore, the only available procedure is to trace back the social environment to the action of the individuals that constitute it. In Mises terms:

If we scrutinize the meaning of the various actions performed by individuals we must necessarily learn everything about the actions of collective wholes. For a social collective has no existence and reality outside of the individual members' actions. The life of a collective is lived in the actions of the individuals constituting its body. There is no social collective conceivable, which is not operative in the actions of some individuals. The reality of a social integer consists in its directing and releasing definite actions on the part of individuals. Thus the way to a cognition of collective wholes is through an analysis of the individuals' actions.

(*ibid.*, p. 42)

By contrast, Hayek does not believe that the social reality can be grasped from the mere extrapolation from individual behaviour. First, the subjective element, which characterises social sciences, renders the comparison between two individuals behaviours and therefore, its extension to the whole society, impossible. Second, he cannot conceive of any general theory of human action regardless of its cognitive aspects. For him, any action entails a problem of interpretation, on the part of economic agents, of the information available to them. In other terms, Hayek's focus on social interaction processes that result from, but also produce individual actions implies a more complex approach of the relationship between the individual and the society.

This sharp difference between Mises and Hayek is also reflected in their respective conception of introspection. For both authors, the recognition of the subjective component of social sciences necessarily raises the question of their status. To put it differently, is it possible to build a general ‘theory’ of the society? Or, is this endeavour a dead end? For both authors, this difficulty can be overcome by introspection.

On one side, Mises writes:

What we know about our own actions and about those of other people is conditioned by our familiarity with the category of action that we owe to a process of self-examination and introspection as well as of understanding of other conduct.

To question this insight is no less impossible than to question the fact that we are alive.

(Mises 1978 [1962], pp. 72).

On the other, Hayek tells us that the nature of social phenomena is such that they

are accessible to us only because we can understand what other people tell us and can be understood only by interpreting other people's intentions and plans. They are not physical facts but the elements from which we may reproduce them are always familiar categories of our own mind.

(Hayek 1949 [1943], p. 75).

To summarise, for Mises, self-observation as well as the understanding of other people's actions are necessary for the theoretician. Besides, they do no conflict with one another since human action is confused with a priori thinking and reasoning. On the other hand, Hayek goes one step further by introducing the notions of perception and interpretation so that introspection can now help to explain the results of human action but not those of human design.

The aforementioned differences in Mises and Hayek lead us to comment on their respective views on knowledge and uncertainty.

The most accomplished work of Hayek about knowledge is found in *Sensory Order* (1952). In this book, Hayek deals with the problem of establishing the relation between 'two orders': the subjective, sensory, perceptual, phenomenal, on the one hand, and of the objective, scientific, physical, on the other. The main thesis consists in showing that all attributes of mental experience can be explained by the place in a system of connections of corresponding groups or patterns of nerve-excitations. In other words, he wants to show that those mental properties which we suppose ourselves to be acquainted with through introspection and the observation of other people's behaviour, define certain structural or relational properties of the nervous system. Therefore, the acquisition of knowledge through common mental patterns provides the bridge between heterogeneous individual agents and the kind of regularities we observe in the real world. These shared mental structures thus constitute what Hayek calls the "mind". As he writes it:

What we call 'mind' is thus a particular order or set of events taking place in some organism and in some manner related to, but not identical with, the [external] physical order of events in the environment. The problem which the existence of mental phenomena raises is therefore how in a part of the physical order (namely an organism) a sub-system can be formed which in some sense ... may be said to reflect some features of the physical order as a whole, and which thereby enables the organism which contains such a partial reproduction of the environmental order to behave appropriately towards its surroundings. The problem arises as much from the fact that the order of this sub-system is in some respects similar to, as from the fact that it

is in other respects different from the corresponding more comprehensive physical order”.

(Hayek 1952b, p. 16)

This ‘connectionist’ conception of knowledge implies a particular treatment of uncertainty. Far from being eliminated from Hayek’s framework, uncertainty (or ignorance) is a crucial problem, which is due to the deficiencies of the mechanisms transmitting new as well as previously accumulated information.

By contrast, we have seen that, for Mises, individual behaviour is the result of observation. There is no such process of classification in human mind that precedes action. Mises writes:

[The agent] satisfies what is of higher value, i.e., his more urgent wants, and leaves unsatisfied what is of lower value, i.e., what is a less urgent want [...] one must not forget that the scale of values or wants manifests itself only in the reality of action. These scales have no independent existence apart from the actual behavior of individuals. The only source from which our knowledge concerning these scales is derived is the observation of a man’s action. Every action is always in perfect agreement with the scale of values or wants because these scales are nothing but an instrument for the interpretation of a man’s acting.

(Mises 1996 [1949], pp. 94-95)

In other terms, it is as if Mises had removed, by assumption, the cognitive dimension of the knowledge acquisition process of individual agents. Under these circumstances, the compositional principle, i.e., the principle connecting individual behaviour together with its outcome at the market level, is rather postulated – or somehow implicitly contained in a ‘strict’ rationality assumption – than demonstrated².

But more fundamentally, the Misesian logic of ‘means and ends’ is not concerned about how the mind of an agent works – a question which Mises considers to be the concern of neurobiologists and not of economist; rather, it is an interpretation, by the economist, of the behaviour of agents, as it is observed, which is based on the nature of the situation they face.

Finally, Mises’ stance at the issue of uncertainty can be interpreted as follows: in compliance with the apriorist approach, uncertainty is inherent to human action. Every action indeed implies a choice process which would make no sense if the future, known by agents. In this sense, action is always a risky speculation and there is no scientific method that permits to treat uncertainty as such. One can illustrate this idea by an example given by Mises. When referring to entrepreneurial activity, he writes:

2. See LANGLOIS (1991 [1985]), p. 120.

Entrepreneurial judgment cannot be bought on the market. The entrepreneurial idea that carries on and brings profit is precisely that idea which did not occur to the majority. It is not correct foresight as such that yield profits, but foresight better than that of the rest. The prize goes only to the dissenters, who do not let themselves misled by the errors accepted by the multitude. What makes profits emerge is the provision for future needs for which others have neglected to make the adequate provision.

(Mises 1996 [1949], p. 871)

In this statement, once again, the apriorist dimension, of human action is obvious. To conclude, Mises's abstract apriorism is substituted for Hayek's analysis of all the intermediary stages of the process of cognition.

3. THEORETICAL FRAMEWORK

In the previous section we have contrasted Hayek and Mises' methodologies. Their respective methodological frameworks are not however to be considered separately from their theoretical contributions. As we shall develop now, the work of both Austrian authors is characterized by the interplay of methodological and theoretical elements, whether the latter apply to the theory of capital or to the theory of money and interest.

3. 1. *Capital theory*

Mises' contribution to the theory of capital is worth pointing out for two reasons. First, he developed a notion of capital that is truly subjectivist and fully consistent with the subjective theory of value and cost that was initiated by Menger. Second, while paying tribute to Bohm-Bawerk's seminal role in the development of the time-preference theory, he sharply criticized the epistemological perspective from which Bohm-Bawerk viewed time as entering the analysis³.

3. We shall wait until *Human Action* to find Mises' arguments against Bohm-Bawerk's view on time-preference. Before this, Mises adheres to the terminology of Bohm-Bawerk, albeit he is fully satisfied with it. In the second edition of the *Theory of Money and Credit*, there is indeed an intriguing footnote where Mises writes:

The fact that I have followed the terminology and method of attack of Böhm-Bawerk's theory of interest throughout this chapter does not imply that I am an adherent of that theory or am able to disregard it as a satisfactory solution of the problem. But the present work does not afford scope for the exposition of my own views on the problem of interest; that must be reserved for a special study, which I hope will appear in the not too distant future. In such circumstances, I have had no alternative but to develop my argument on the basis of Böhm-Bawerk's theory. Bohm-Bawerk's great achievement is the foundation of the work of those who will do so in the future. He was the first to make it possible systematically to relate the problem of interest to that of the value of money.

(Mises 1981 [1924], p. 378 fn.)

Mises' theoretical developments on capital are found in *Human Action*, except for one paper devoted to inconvertible capital in *Epistemological Problems of Economics*. In *Human Action*, like his Austrian predecessors, Mises points out that economists "erred in classifying 'capital' as an independent factor of production." (Mises 1996 [1949], p. 493). He indicates:

The modern theory of value and prices is not based on the classification of the factors of production as land, capital, and labor. Its fundamental distinction is between goods of higher and lower orders, between producers' goods and consumers' goods [...]. The law controlling the determination of the prices of the factors of production is the same with all classes and specimens of these factors.

(*ibid.*, p. 640)

However, Mises's notion of capital differs from the ones of Bohm-Bawerk and Hayek. Mises indeed views capital, as what modern accounting calls the net worth⁴. He first defines capital goods in order to distinguish them from the broader notion of capital. He writes:

[Capital goods] are tools and half-finished products, or goods ready for consumption that make it possible for man to substitute, without suffering want during the waiting period, a more time-absorbing process for another absorbing a shorter time [...]. From the notion of capital goods one must clearly distinguish the concept of capital. *The concept of capital is the fundamental concept of economic calculation, the foremost mental tool of the conduct of affairs in the market economy.* Its correlative is the concept of income [...]. The whole complex of goods destined for acquisition is evaluated in money terms, and this sum – the capital – is the starting point of economic calculation [...]. That amount which can be consumed within a definite period without lowering the capital is called income. If consumption exceeds the income available, the difference is called capital consumption. If the income available is greater than the amount consumed, the difference is called saving. Among the main tasks of economic calculation are those of establishing the magnitudes of income, saving and capital consumption.

(*ibid.*, pp. 260-261)

By this statement, we are to understand that Mises rejects Bohm-Bawerk's notion of capital as real capital in order "to rehabilitate the [Mengerian] abstract concept of capital as the money value of the property devoted to acquisitive purposes against the Smithian concept of the 'produced means of production'." (Hayek 1934a, p. 85). Furthermore, Mises defines capital, contrary to Bohm-Bawerk's conception in terms of an aggregate magnitude, as a purely private concept.

On the role of time, Mises disapprove of would be an Bohm-Bawerk's view that time preference empirical regularity observed through casual psychological observation. Instead, his methodological apriorist approach leads him to see time preference as a "categorical element

4. See GUNNING (1997).

[...] operative in every instance of action” (ibid., p. 488)⁵. In addition, Mises criticizes Bohm-Bawerk for not recognising that time should enter analysis only in the *ex ante* sense⁶.

The role that time “plays in action consists entirely in the choices acting man makes between periods of production of different length. The length of time expended in the past for the production of capital goods available today does not count at all [...] The ‘average period of production’ is an empty concept.” (ibid., pp. 488-489). In other words, Mises emphasises the teleological nature of time-preference as it is expressed by *forward-looking decision* made by producers and consumers.

Hayek starts paying attention to capital theory as early as 1934 in his article: “On the Relationship Between Investment and Output” (1934b). But his work in this field culminates in *The Pure Theory of Capital*, in 1941, which as he himself indicates, is a systematic elaboration of the capital theoretical foundations of his theory of industrial fluctuations. His contribution to capital theory is also characteristic of his programmatic approach, which consists, in a first step, of a historical survey of previous relevant theories, with the objective of selecting the elements that may be incorporated in his analysis of the problem he wants to solve. He then proceeds by stating the methodological principles that his theory has to obey (Birner 1999, p. 805). As early as in 1928 in “Intertemporal Price Equilibrium and Movements in the Value of Money”, Hayek focuses on the problem of intertemporal coordination, which will provide the basis for his future work on capital as well as the source of inspiration for many contributions in this area, most notably for those of Hicks. He pursues this research programme in *Prices and Production*, where his famous triangles provide a convenient, albeit highly stylized, way of describing the modifications in the intertemporal structure of capital implied by a change in individuals’ preferences or by monetary injections. The synthesis of earlier formulations is contained in *The Pure Theory of Capital*, where Hayek establishes the centrality of the capital problem in questions about the market’s ability to coordinate economic activities over time.

Bohm-Bawerk’s influence is manifest in Hayek’s developments on capital theory concerning the role of time. But Hayek is not satisfied with Bohm-Bawerk treatment of capital as an aggregate of physical commodities. Hayek indeed claims that he has coupled the essential element of time in the production process of the economy with the inherent complexities of the capital structure. This implies that capital is indisputably heterogeneous, precisely because it incorporates historical time. In his *Pure Theory of Capital*, Hayek provides a detailed

5. See also MISES (1960 [1933]), p. 31.

6. See KIRZNER (1990), p. 55.

treatment of capital goods in terms of reproducibility, durability, specificity, substitutability and complementarity. The composite structure of production, i.e., the nature of the relationships between various capital goods, defines its degree of roundaboutness, i.e., the extent to which the production process ties up resources over time.

This gives special significance to the problem of intertemporal coordination. In the strict sense of the term, intertemporal coordination means that all production plans should be mutually compatible and that they should be jointly consistent with resource availabilities. The time component of capital involves some partial irreversibility in producers' choices, to the extent that the non-specific capital (i.e., raw material) is committed to a specific use (i.e., a particular machine). Discoordination may then arise, and usually does, when producers cannot secure the additional capital needed to complete their plans. The ensuing revision of their plans involves costs as well as capital destruction, the extent of which reveals the degree of discoordination of production processes.

To summarise, Hayek's view on capital only applies to an economy of production, where previous allocation of more and less specific capital goods constrains further accumulation of capital. By contrast, as we have seen, Mises clearly distinguishes capital, which he conceives as a monetary magnitude, from produced capital goods that reflect individuals' forward looking decisions.

3. 2. Monetary theory

Mises is one of the authors, together with Menger, who most contributed to the development of the Austrian theory of money. For instance, Rothbard is laudatory towards Mises, so much that he will write that "the Austrian theory of money virtually begins and ends with Ludwig von Mises' monumental *Theory of Money and Credit* published in 1912" (Rothbard 1976 [1946], p. 160). However, Mises' book received little attention from his contemporaries⁷.

The ambition of Mises in his *Theory* is to integrate monetary analysis with the Austrian theory of value. Mises tells us that the main task of monetary theory is to determine the 'objective exchange value of money', as seen in the market for commodities, i.e., in other words, its purchasing power: "by 'the objective exchange value of money' we are accordingly to understand the possibility of obtaining a certain

7. Hayek notes, with some irony, that Mises' book received a curious review by Keynes, "who could not suppress a somewhat envious expression of admiration for the erudition and philosophical breadth of the work, but who unfortunately, because, as he later explained, he could not understand in German only what he knew already, did not learn anything from it" (HAYEK 1992 [1956], p. 131).

quantity of other economic goods in exchange for a given quantity of money.” (Mises 1981 [1924], p. 122). It should be pointed out that Mises’ notion of ‘objective exchange value of money’, as he himself makes clear, “has nothing to do except its name in common with the old idea developed by the Classical School of a value in exchange inherent in things themselves.” (ibid., p. 121). On the contrary, Mises’s conception of money directly springs from his subjectivist approach. First, as he puts it, the essential function of money is to facilitate the interexchange of goods and services and that any other function of money (as a *general medium of payment* or as a *transmitter of value through time and space*) derives from the primary function as a medium of exchange (ibid., pp. 46-47). Second, Mises explains that the assumption that money has a certain objective exchange value is logically required if one wants to build a subjective theory of the value of money, otherwise the “gap between satisfaction and ‘useless’ money [cannot] be bridged.” (ibid., p. 120). He then proceeds to define the price of money, like any other price, as “determined in the last resort by the subjective valuations of buyers and sellers.” (ibid.). This means that the subjective exchange value of money is nothing but the anticipated use-value of the things that are to be bought with it⁸.

Such a conception of the price of money conflicts with the then prevailing quantity theory of money. Mises considers that the quantity theory is unsatisfactory not because it is theoretically false but rather because it is incomplete⁹. He writes:

[...] the only valid objection to [the quantity theory] is that it does not go back to the ultimate determinants of prices. It is correct or incorrect, according to the content given to the words *demand* and *supply*. It is correct, if account is taken of all the factors that motivate people in buying and selling. It is incorrect, if supply and demand are interpreted and compared in a merely quantitative sense.

(ibid., p. 151)

On the other hand, Mises finds weightier objection with regard to the practical importance of the quantity theory:

It is said that the fluctuating velocity of circulation of money, and the elasticity of methods of payment made possible by the credit system and the progressive improvement of banking organization and technique, that is, the facility with which methods of payment can be adjusted to expanded or contracted business, have made the movement of prices as far as is possible independent of variations in the quantity

8. In this Mises anticipated Patinkin’s concept of ‘real balances’. See Moss (1976), who however notes that this idea is not consistent with Mises’ focus on forward-looking decisions by heterogeneous individuals. The agents indeed cannot decide the extent of their monetary needs (i.e., the size of their cash balances) without knowing the whole array of market prices (Moss 1976, p. 22).

9. In fact, he does not develop a positive theoretical critique of the quantity theory. He rather finds objections to its opponents who fail to account for the connection between the quantity of money and the rate of interest (Mises 1981 [1924], p. 171).

of money, especially since there exists no quantitative relation between money and its substitutes, that is, between the stock of money and the volume of transactions and payments.

(*ibid.*, p. 173)

In other words, the elastic supply of money substitutes makes the quantity theory irrelevant for monetary policy. Building on Menger, Mises indeed developed an elaborate theory of money and credit that can be described as an 'inverted pyramid', as Hayek will later name it (Hayek 1935, p. 99). Beginning with commodity money, Mises goes on by showing how banks can substitute claims to commodities (e.g., gold certificates) for the commodities themselves. He calls these claims "money substitutes" (Mises 1981 [1924], p. 50). Then, since banks provide what he calls "circulation credit" through their savings-deposit-lending activities (*ibid.*, p. 270), they can create a new kind of money based on this credit, which he calls "credit money" or "fiduciary media" (*ibid.*, p. 61, p. 268). Fiduciary media on money based on circulating credit that have the same appearance as money substitutes¹⁰. It is indeed because of their identical appearance that people accept them in exchange, in the same way that they do with money substitutes. The difference between a money substitute and the same denomination in credit money is entirely analytical. It is an invention of the economist. From the user's point of view there is no difference.

As we shall see, the modifications in the quantity of money substitutes give special significance to the problem of time-preference in Mises' business cycle analysis. More precisely, variations of the quantity of money (in the broad sense) provokes a redistribution of real income and wealth: on the one hand, because people are apt to overlook the variability of the exchange value of money; on the other hand, because variations in the value of money do not affect all economic

10. The issue of "fiduciary media" corresponds to the creation by banks of money substitutes that are not covered by an equivalent and simultaneous quantity of goods or money proper. Mises indeed distinguishes between money in the broader sense and money in the narrower sense. The latter corresponds to money proper in the usual sense (including fiat money), while the former comprises also money substitutes. These substitutes are either *money certificates* or *fiduciary media* depending on whether or not they are wholly covered by money in the narrower sense and serve the same purpose as money proper since they are convertible and secure claims to payments. They then add to the total quantity of money in circulation (Mises 1981 [1924], p. 155). In the following, interest is focused on fiduciary media, that is, banknotes and current accounts which are not wholly covered by money in the narrower sense. This distinction echoes the opposition made by Mises between the *commodity credit* and the *circulation credit*. The former corresponds to "those credit transactions which are characterized by the fact that they impose a sacrifice on that party who performs his part of the bargain before the other does – the foregoing of immediate power of disposal over the exchanged good, or, if this version is preferred, the foregoing of immediate power of disposal over the surrendered good until the receipt of that for which it is exchanged" (*ibid.*, p. 297). By contrast, the second kind of credit transaction is "characterized by the fact that in them the gain of the party who receives before he pays is balanced by no sacrifice on the part of the other party" (*ibid.*).

goods uniformly and simultaneously. The agents who, indeed, come first to the market to buy goods make the relatively largest gains in a sequence scale the later they exercise the declining purchasing power of their money.

Let us now envisage Hayek's monetary theory.

Hayek's monetary and trade-cycle theories are intertwined, a circumstance that reflects the nature of his contribution to both fields. In summary terms, Hayek's monetary theory consists in integrating money as a medium of exchange with the idea in price system arrived as a communication network. His trade-cycle theory consists in integrating monetary theory with capital theory, which emphasizing a particular aspect of the price system, namely, its intertemporal character. This programmatic approach leads him to reject Mises' stance at monetary theory as regards the concept of 'objective exchange value of money'. He writes:

The Wicksell-Mises theory [...] has only to be freed from any direct reference to a purely imaginary 'general money value' in order to form the basis of a Trade Cycle theory sufficing for a deductive explanation of all elements in the Trade Cycle.

(Hayek 1966 [1933], pp. 47-48)

Although in the above ??????? Hayek is unfair to Mises, what he wants to underline is that his main concern is the determination of *individual prices*¹¹. Both in *his Monetary Theory and the Trade Cycle* and in *Prices and Production*, he argues against the then dominant focus, in the field of monetary theory, i.e., the relationship between the quantity of money and the general level of prices. In this critical task, Hayek follows Mises, but in quite different terms. Hayek indeed rejects the quantity theory for being unable to deal analytically with the modifications that the passage from a barter economy to a monetary one implies regarding the determination of prices. As he writes:

Much theoretical work will have to be done before such a theoretical system can be worked out in such detail that all the empirically observed characteristics of the Trade Cycle can find their explanation within its framework. Up to now, the monetary theories have unduly narrowed the field of phenomena to be explained, by limiting research to those monetary changes which find their expression in changes in the general value of money. Thus they are prevented from showing the deviations of a money economy from a static economy in all their multiplicity.

(*ibid.*, p. 131)

11. In *Monetary Theory and the Trade Cycle*, Hayek consents that "Professor Mises' conception of the intrinsic value of money extends the notion of 'fluctuations in money value' far beyond the limits of what this term is commonly understood to mean; and so he is in a position to describe within the framework, or rather under the same name, of a theory of fluctuations in the value of money, all monetary influences on price formation." (Hayek [1933], 1966, pp. 116-117).

This idea was already present in his 1928 article, where he discusses the modification implied by different systems of exchange – from direct to indirect exchange systems – on the determinations of equilibrium prices. Hayek indeed writes:

It has already been shown that there must exist a definite ratio at which two goods available at separate instants are exchanged. But is the existence of such a ratio necessary if the exchange does not take place directly, but is split up into two steps: the acquisition of the means of exchange by surrendering one good at the first point in time, and the acquisition of another good by surrendering the means of exchange at a later point?

(Hayek 1984 [1928], p. 82)

Hayek then proceeds to comment on the concept of 'general value of money'. According to him, this concept is inaccurate. But more importantly, its use implies the inaccurate denial of the fact that, "within an equilibrium system extended through time, temporal differences in the value of money may exist, in the same way that Mises disputes the possibility of spatial differences in the value of money." (Hayek 1984 [1928], p. 90). Now, indirect exchange induces *successive* money prices, because when the quantity of money is increased, the new money is injected *in some particular way*, which temporarily distorts relative prices and therefore, communicate false information about consumer preferences and resource availability.

The main objection Hayek this makes to the quantity theory relates to its inability to account for the local and temporal changes in *relative individual* prices, which are the only ones on which agents base their economic decisions¹². In this perspective, the following passage from *Prices and Production* is worth quoting at length:

What I complain of is not only that [the quantity] theory in its various forms has unduly usurped the central place in monetary theory, but that the point of view from which it springs is a positive hindrance to further progress. Not the least harmful effect of this particular theory is the present isolation of the theory of money from the main body of general economic theory.

For so long as we use different methods for the explanation of values as they are supposed to exist irrespective of any influence of money, and for the explanation of that influence on prices, it can never be otherwise. Yet we are doing less than this if we try to establish *direct* causal connections between the *total* quantity of money, the *general level* of all prices and, perhaps, also the *total* amount of production. For none of these magnitudes *as such* ever exerts an influence on the decisions of individuals; yet it is on the assumption of a knowledge of the decisions of individuals that the main proposition of non-monetary economic theory are based. It is to this 'individualistic' method that we owe whatever understanding of economic phenomena we possess; that the modern 'subjective' theory has advanced beyond the classical school in its consistent use is probably its main advantage over their teaching.

(Hayek 1935 [1931], pp. 3-4)

12. For a systematic presentation of Hayek's opposition to the quantity theory, see ARENA (1999).

To sum up, Mises and Hayek both reject the quantity theory on the ground of their scepticism toward aggregates. But Mises insists on its practical uselessness owing to the impossibility to establish statistical regularities between the volume of money substitutes and the money base. By contrast, Hayek focuses on the inadequacies of the methodological foundations of the quantity theory for dialing with individual prices' determination.

3. 3. *The rates of interest*

Mises' conception of the rate of interest has changed over time along with his treatment of capital. In his early *Theory of Money and Credit*, Mises' stance at the rate of interest directly originates from Wicksell. He likewise distinguishes between the monetary (loan) rate of interest and the natural rate of interest. The former is determined on the loan market. But the quasi-infinite elasticity of the supply of fiduciary media by banks makes it possible even an extremely low loan rate of interest (Mises 1981 [1924], p. 346). As for the natural rate of interest it is defined in Böhm-Bawerkian terms as:

[T]he level of productivity of that lengthening of the period of production which is just justifiable economically and of that additional lengthening of the period of production which is just not justifiable; for the interest on the unit of capital upon whose aid the lengthening depends must always amount to less than the marginal return of the justifiable lengthening. The period of production which is thus defined must be of such a length that exactly the whole available subsistence fund is necessary on the one hand and sufficient on the other for paying the wages of the laborers throughout the duration of the productive process.

(*ibid.*, p. 399)

Mises' monetary analysis however implies that variations in the ratio of exchange between present goods and goods of higher orders are not different phenomena from the variations in the objective exchange value of money (*ibid.*, p. 388). Now, the phenomenon of interest is derived from the variations in the ratio of exchange between present and future goods. Under these circumstances, any modification in the supply of fiduciary media translates into a change in the rate of interest. Mises' analysis of the connection between variations in the objective exchange value of money and variations in the rate of interest is to be interpreted in the following manner: with given demand, an increase in the supply of money in the broader sense brings out excess cash balances, which implies a market pressure towards higher goods' prices. But money does not flow into the economic circuit uniformly and instantaneously. It goes in the first place towards intermediate goods. Hence, the ?????? rise in the price of consumption goods, i.e., the fall in the objective exchange

value of money, is at first all of a piece with the rise in the *relative* price of production goods over consumption goods, i.e., a diminution of the rate of interest. The rate of interest Mises refers to is in fact the 'interest on capital': since there is neither fixed capital nor explicit account of the bond market, the capital market is included, and confused with the money market¹³. In his later *Human Action*, Mises uses the term 'originary' rate of interest, defined as the discount of future as against present goods. Now, the phenomenon of interest directly relates to time preference, with no more reference to Bohm-Bawerk's natural rate of interest. As he writes:

Time preference is a category inherent in every human action. Time preference manifests itself in the phenomenon of originary interest, i.e., the discount of future as against present goods [...] Originary interest is the ratio of the value assigned to want-satisfaction in the immediate future and the value assigned to want-satisfaction in remote periods of the future. It manifests itself in the market economy in the discount of future goods as against present goods. It is a ratio of commodity prices, not a price in itself. There prevails a tendency toward the equalization of this ratio for all commodities. In the imaginary construction of the evenly rotating economy the rate of originary interest is the same for all commodities.

(Mises 1996 [1949], pp. 524-526)

By this statement, we are to understand that interest would emerge even in a pure exchange economy without production.

Thus, since production takes time, the market prices of the factors of production (which tend to reflect the market prices of the consumer goods they produce) are themselves subjected to time preference. Thus, in a production economy, the market generates the interest defined as the excess value of produced goods over the appropriately discounted values of the relevant factors of production¹⁴.

Hayek's position with respect to interest also grew out of the work of Wicksell. As is well known, in *Monetary Theory and the Trade Cycle* and in *Prices and Production*, Hayek distinguishes between two rates, the monetary rate of interest on one hand, and the equilibrium rate on the other.

In some contrast to Mises, Hayek considers that the level of the monetary rate of interest, which is determined in the loan market, is limited by banking liquidity considerations. As he puts it:

The lifetime of [the] pyramid of credit is limited to that of the first credit granted, save in the case (which can be assumed as long as there are no withdrawals from deposits) where it is immediately replaced by a fresh credit. If, however, deposits unexpectedly diminish at any part of the banking system, the process will be reversed, and the original diminution of deposits will occasion a contraction of credit correspondingly exceeding the amount withdrawn.

(Hayek 1966 [1933], p. 161)

13. See BELLOFIORE (1998), p. 542.

14. See KIRZNER (1990 [1976]), p. 95.

On the other hand, the equilibrium rate of interest is the level of the market rate of interest that would be such as to make the *in natura* demand for capital, i.e., investment, coincide with the *in natura* supply of capital, i.e., savings. Now, in a monetary economy, the current rate of interest has no reason to coincide with the ‘imaginary’ equilibrium rate of a static direct exchange economy. As Hayek notes:

In the economic system of to-day, interest does not exist in the form in which it is presented by pure economic theory [...] The process of interest fixation, which is at the basis of pure theory, never in fact follows the same source in a modern credit economy; for in such an economy the supply of, and the demand for, savings never directly confront each other.

(*ibid.*, p. 200)

In other terms, in a money economy, the monetary rate may differ from the equilibrium one, because demand and supply do not meet in their natural form, but in the form of money “the quantity of which available for capital purposes may be arbitrarily changed by the banks” (Hayek 1935 [1931], p. 23).

Having the time consuming process of production in mind, the equilibrium rate of interest is therefore that particular rate which corresponds to the difference between the set of the prices of finished goods and the set of the prices of means of production *and* which permits to save from current consumption and make available for investment, as much as is needed for the maintenance of that structure of production (Hayek 1966 [1933], pp. 212-213).

By the same then, Hayek’s exercises in *Prices and Production* consist in determining the degree of roundaboutness of the structure of production that is consistent with consumers’ time preferences. So, a fall in the market rate of interest reflecting an increased willingness to forego present goods for future goods creates incentives for engaging in production processes of greater degree of roundaboutness (Hayek 1935 [1931], pp. 50-53). In other terms, Hayek assumes that the equilibrium rate of interest reflects consumers’ time preferences. If the latter are modified in such a way that consumers make the decision to forgo present for future consumption, i.e., to save more, the average period is lengthened to such an extent that the increased amount of capital can remain invested until the output of the single consumption good is obtained.

To conclude, for Mises interest is connected to changes in both the aggregate price level and the exchange ratio between present and future goods. In fact, as we have seen, modifications in the objective exchange value of money necessarily translate in a variation of interest, to the extent that money does not flow uniformly and instantaneously within the economic circuit. However, in *Human Action*, when Mises switches from Böhm-Bawerk’s notion of natural rate of interest to the concept

of ordinary rate of interest reflecting time preference, it is not clear whether there should exist a definite equilibrium level of the market rate of interest. We shall return to this point later on.

On the other hand, Hayek focuses on the variations in the exchange ratio between consumption goods and production goods that systematically arises from a change in the volume of money. In other words, a change in the total quantity of money in circulation implies the formation of prices or rates of interest which differ from those one would find associated with a barter economy. Moreover, the new intertemporal price structure (including the rates of interest) which follows a change in the volume of money conveys *wrong* information.

Now that we have set out the methodological and theoretical frameworks of Mises and Hayek, we can proceed to the examination of their respective approaches of business cycles.

4. ORIGIN, PROPAGATION AND REVERSAL OF THE CYCLE

4. 1. *Origin*

We have seen, in his *Theory* that Mises provides an analysis of the connection between variations in the objective exchange value of money and variations in the rate of interest. He then comes on by distinguishing between two kinds of influence on the rate of interest that may result from an increase of the issue of fiduciary media by banks. The first one is indirect and permanent because it operates through the displacements in the social distribution of income and wealth, which occur as a consequence of variations in the objective exchange value of money¹⁵. But whether the increase of the stock of money in the broader sense causes the interest rate to fall (or to raise) depends on whether the new distribution of income and property is more (or less) favourable to the accumulation of capital. In certain circumstances, for instance, when the redistribution of wealth following an increase of fiduciary media leads to increased saving and to a reduction of the standard of living, i.e., to an increase in the national subsistence fund, it is possible for even the natural rate of interest to diminish (Mises 1981 [1924], p. 400). The second kind of influence is directly related to the business of banking. More exactly, when issuing new fiduciary media, commercial banks cause the interest rate to fall. Let us quote Mises on this point:

15. In fact, the effect on the rate of interest is as permanent as the fluctuations in the objective exchange value of money (Mises 1981 [1924], p. 384).

The new fiduciary media coming on the loan market have also a direct effect on the rate of interest. They are an additional supply of present goods and consequently they tend to cause the rate of interest to fall.

(*ibid.*, p. 391)

But, although Mises recognises that both the direction and the intensity of the indirect effect *following the displacements in the social distribution of income and property*, are not easy to determine, he nevertheless assumes that “the increase in the supply of fiduciary media in the market in which present goods are exchanged for future goods at first exerts a stronger influence than the displacement of the social distribution which occurs as a consequence of it.” (*ibid.*, p. 391).

Starting from an equilibrium position where the loan rate of interest is identical to the natural rate of interest, the cycle is therefore initiated by an *exogenous* shock: the issuing by banks of new fiduciary media, which causes the loan rate of interest to fall below the natural rate.

In *Monetary Stabilization and Cyclical Policy* (1928) as well as in *Human Action*, Mises describes the origin of expansion in similar terms. Now, the cycle starts with the release of an additional supply credit permitted by the issue of fiduciary media, i.e., bank notes without gold backing or current accounts, which are not entirely backed by gold reserves. This produces a decrease in the rate of interest, and hence, stimulates economic activity. Some new projects, which would not have been considered as profitable if the rate of interest had not been influenced by the manipulation of banks, are now initiated.

In *Monetary Theory and the Trade Cycle*, Hayek argues against exogenous explanations such as Mises’ one, stating that:

A theory which has to call upon the *deus ex machina* of a false step by bankers, in order to reach its conclusions is, perhaps, inevitably suspect. Yet Professor Mises himself – who is certainly to be regarded as the most respected and consistent exponent of the monetary theory of the Trade Cycle in Germany – has, in his latest work, afforded ample justification for this view of his theory by attributing the periodic recurrence of the Trade Cycle to the general tendency of Central Banks to depress the money rate of interest below the natural rate.

(Hayek 1966 [1933], p. 145)

By contrast, Hayek calls for an endogenous theory of business cycles that would permit a consistent explanation of the periodic recurrence of cycles. He writes:

By disregarding those divergences between the natural and monetary rate of interest which arise automatically in the course of economic development, and by emphasizing those caused by an artificial lowering of the money rate, the Monetary Theory of the Trade Cycle deprives itself of one of its strongest arguments; namely, the fact that the process which it describes *must* always recur under the existing credit organization, and that it thus represents a tendency inherent in the economic system, and is in the fullest sense of the word an endogenous theory.

(*ibid.*, pp. 146-147)

Therefore, for Hayek, the origin of the cycle lies in a divergence between the money rate of interest and the 'equilibrium' one. Whether the initial disequilibrium is caused by a monetary or by a real change ????? not really matter. Hayek indeed consents that the level of the rate of interest on loans needs not to be lowered by deliberate intervention from the monetary authorities. As he indicates:

The same effect can be obviously produced by an improvement in the expectations of profit or by a diminution in the rate of saving, which may drive the 'natural rate' (at which the demand for and the supply of savings are equal) above its previous level; while the banks refrain from raising their rate of interest to a proportionate extent, but continue to lend at the previous rate, and thus enable a greater demand for loans to be satisfied than would be possible by the exclusive use of the available supply of 'savings'.

(*ibid.*, p. 147)

Various circumstances causing a divergence between the two rates are indeed envisaged by Hayek. For instance, he refers to "changes in the relations of costs and selling prices" (*ibid.*, p. 129) or to "shifts in the distribution of incomes" (*ibid.*), which he considers as phenomena resulting indirectly from "monetary influences." (*ibid.*, p. 128).

By contrast, in *Prices and Production*, Hayek's focus has shifted to the "successive changes in the real structure of production which constitutes those fluctuations"¹⁶. He now regards the "case of an increase of money in the form of credits granted to producers." (Hayek 1935 [1931], p. 54) as the starting point of the analysis and sees in the 'deliberate' decision-making by the monetary authorities the ultimate cause of the cycle (*ibid.*, p. 85).

Let us now investigate how the expansion in the cycle ?????? Mises and Hayek's explanations.

4. 2. Propagation

In Mises' analysis of the trade cycle, as described in his *Theory*, the reduction of the interest on loans initiated by banks enables and obliges entrepreneurs to enter upon longer processes of production. Assuming decreasing returns on capital, the additional funds provided by banks are invested in longer roundabout processes of production as long as they still pay the entrepreneurs. Thus, the decrease of the rate of interest on capital is necessarily followed by a lengthening of

16. See his Introduction to the English translation of *Monetary Theory and the Trade Cycle*, 1966, p. 17.

the 'average' period of production¹⁷. However, this lengthening of the 'average' period of production is only practicable when the means of subsistence have increased sufficiently to support the workers and entrepreneurs during the whole period of production. If this is not the case, then, the trend towards increased productive activity will prove to be unsustainable. Mises writes that "a time must necessarily come when the means of subsistence available for consumption are all used up although the capital goods employed in production have not yet been transformed into consumption goods." (Mises 1981 [1924], p. 400). Assuming as a starting-point a situation of general stationary equilibrium where all factors of production are already fully employed, the implementation of more roundabout processes of production will cause the price of production goods (including labor) to rise since there has been no increase of intermediate products. However, Mises supposes that the pressure on production goods is greater than that on consumption goods, since the prices of the latter, although they rise, do it in a moderate degree, namely, "only insofar as they are raised by the rise in wages"¹⁸. (ibid., p. 401). Therefore, it turns out that the tendency toward a fall in the rate of interest on loans that originates in the policy of banks is at first strengthened. In other words, the objective exchange value of money does not fall enough so as to induce the adequate adjustment (increase) of the loan rate of interest.

In *Monetary Stabilization and Cyclical Policy* (1928), whose analysis is all contained in *Human Action* (1940), as we shall develop, Mises switches his emphasis on the divergence between the loan rate of interest and the natural rate for the analysis of the mechanism of the price premium. This change also reveals his endeavour to account for individuals' price expectations.

In the *Theory of Money and Credit*, Mises indeed implicitly assumes that the loan rate of interest determines the rate of interest, i.e., in his own terms, the rate of exchange between present goods and future goods. Conversely, every change in the price ratio between production goods and consumption goods impinges on the loan market, which automatically adjusts, with some lag, to monetary changes.

In *Human Action*, things become different. First, Mises focused on the rate of ordinary interest, which he defines as the ratio between the prices of present and future goods. But this rate can coincide with

17. As we have seen, in his *Theory of Money and Credit*, Mises follows Bohm-Bawerk's terminology, although he is not fully satisfied with it.

18. Hayek gives a similar account of the movement of relative prices during the cycle. As stressed by Hicks (1967), some delay (of consumption relative to wages, or in the wage rise) must be supposed for the Hayek story to make sense. As for Mises, see BELLOFIORE (1998, note 53), who supports Mises' claim, i.e., a delay in wages.

the rate of interest on loans only in the imaginary construction of the evenly rotating economy. In this case, "we may call this rate the neutral rate of interest." (Mises 1996 [1949], p. 538). In every situation where the 'money relation' i.e., the ratio between the demand for and the supply of money for cash holdings is changed, the resulting modifications in the wealth and the income of individuals alter the height of originary interest. Thus, the driving force of money has the power to bring about lasting changes in the final rate of originary interest (ibid.). By this, we are to understand that 1. there cannot be any conceivable uniform rate of originary interest in a changing economy; 2. there is no more permanence in the rate of originary interest than in prices and wage rates:

In the changing economy, the rate of interest can never be neutral. In the changing economy, there is no uniform rate of originary interest; there only prevails a tendency toward the establishment of such uniformity. Before the final state of originary interest is attained, new changes in the data emerge which divert anew the movement of interest rates toward a new final state. Where everything is unceasingly in flux, no neutral rate of interest can be established.

(ibid., p. 542)

Furthermore, the loan rate of interest is not any longer considered as determining the current rate of interest as it is manifested in the ratio of the prices of present over future goods Mises indicates that:

the loan rate does not determine the rate of interest. It adjusts the rate of interest on loans to the rate of originary interest as manifested in the discount of future goods.

(ibid., p. 527)

What now plays the same role as the loan rate of interest in the *Theory* is the 'gross rate of interest', as it already appeared in his 1936 article: "The 'Austrian' Theory of the Trade Cycle". This rate should not be confused with the originary rate of interest or the rate of interest on capital. There are, indeed, as many gross rate of interest as there are individual debt contracts, so that gross market rates are not pure interest rates (ibid., p. 539). In other terms, the gross rate of interest incorporates the uncertainty component of both parts on the contract. On one hand, the lender is always faced with the possibility of losing part or the whole of the principal lent. On the other hand, the owner lodges part of his fortune as collateral (ibid., p. 540). Their initial appraisal of both these dangers determines their conduct in the bargaining about the terms of the contract.

Moreover, the gross market rate of interest also incorporates a price premium, i.e., a negative or positive addendum to the net rate of interest in order to account for individuals' price expectations. However, as Mises points out, the price premium can never offset the changes in the money relation because its appearance always occur after those changes and can never precede them (ibid., p. 544). Furthermore, the

price premium always lags behind the initial change in the supply of money since it can only react to “the necessary later occurring effects of these changes upon the price structure.” (ibid., p. 545). This point is worth emphasising since it permits a better understanding of the sequence of the cycle.

The unfolding of the cycle can then be summed up as follows. Similarly to Mises’ description in the *Theory*, the movement begins with a credit expansion by banks, which induces the gross rate of interest to fall. At this stage, assuming as a starting-point a fictitious position of equilibrium, no positive price premium arises. The price premium can indeed appear only after the additional supply of money (in the broader sense) has run its effects on the prices of commodities and services. Mises writes :

[...] if such changes in the money relation affect first the loan market, they bring about just the opposite changes in the configuration of the gross market rates of interest. While a positive or negative price premium would be required to adjust the market rates of interest to the changes in the money relation, gross interest rates are in fact dropping or rising[...] [The operation of the instrumentality of the price premium] begins too late, it lags behind the changes in purchasing power [...].

(Mises 1996 [1949], p. 548)

Then about the investment ????????, the drop in the gross market rate of interest affects the entrepreneur’s calculation the probability of success of projects considered: “along with the prices of the material of productions, wages rates, and the anticipated future prices of the products, the gross rates of interest show him what investments can be made under the given state of the ratio in the public’s valuation of future goods as against present goods” (ibid., p. 552). But now that the decrease in the gross rate of interest has altered the entrepreneurs’ calculations, now some projects appear to be profitable. They then embark upon their realisation. A boom begins. Then, the problem arises as to how the gross market rate can adjust the originary rate of interest, notwithstanding that the latter, although being independent of the supply of money, can however be indirectly affected by the changes in the money relation. As credit expansion continues on the loan market, a pressure is felt on the gross market rate of interest, which now would have to rise so as to take into account the positive price premium. This process goes on as long as the expansionist movement runs its course since the unceasing rise of the gross market rate is unable to catch up with the originary interest augmented by the positive price premium. This inevitably induces further economic expansion, whose unfolding is similar to the one described in the *Theory*: the vertical expansion of the structure of production first favors the prices of producers’ goods, thus bringing a tendency towards a fall in the originary rate of interest.

Let us now consider how Hayek describes the expansion stage.

As we have seen, the origin of the expansion lies in a negative difference between the monetary rate and the equilibrium rate of interest, which is due to the existence of the banking system. In other words, as soon as credit is allowed for, supply and demand no longer adjust automatically and prices determine a path towards economic disequilibrium: “these prices may elicit movements which not only do not lead to a new equilibrium position but which actually create new disturbances of equilibrium.” (Hayek 1966 [1933], p. 94). In *Prices and Production* Hayek describes how the initial disequilibrium propagates within the economic system. As is well known, Hayek's theory of the upswing of a cycle is characterised by an increase in the demand for capital emanating from producers' awareness of new investment opportunities and their access to bank credit. Newly raised capital is then employed in the implementation of more roundabout processes of production. However, since full-employment prevails, the increase of capital goods can only be achieved through the withdrawing productive resources from already existing shorter lines of production. Therefore, the growth in the production of capital goods is accompanied by a decline in the output of consumption goods. Assuming that wages only rise with some delay, the prices of capital goods increase faster than those of consumption goods, thus intensifying the expansionary movement. There are, besides, additional reinforcing factors linked to the 'organization of credit'.

Let us consider Hayek's conception of the banking system in more detail. Hayek assumes a 'mixed' monetary system with both exogenous and endogenous money. Commercial banks take their decisions on the basis of their profit expectations, which depend on the risk characteristics of ????? would be borrowers, as well as on the behaviour of competitors in the ?????????? system. Risk aversion of banks grows as expansion goes on and is not independent of their pricing policy: at a given risk level, the decision not to satisfy demand (by imposing too high a loan rate) implies a greater opportunity cost for the banker. This raises the winner's curse problem: banks will still expand credit in the upswing, even at the cost of depleting their resources, so as not to lose clients and encounter additional risks. In the terms, there is an 'elastic' deposit multiplier, which sustains the growing productive activity.

To sum up, Mises and Hayek's explanations of the upswing of the cycle reveal similarities as regards to the movement of relative prices: for both authors, the expansion is due to a disproportionate increase of the prices of producers' goods as compared to the ones of consumers' goods. But they do not agree concerning the forces that sustain the boom. While for Mises the lagged adjustment in the objective exchange value of money – and hence, the lagged alignment of the loan rate (or the systematic lagging of the gross market rate of interest

in Mises' latest version) – at first reinforces the tendency towards higher goods' prices for Hayek it is the organization of credit that provides the incentive for further expansion. This divergence already augurs what their respective explanation of the reversal of the cycle will be.

4. 3. *Reversal*

In his *Theory of Money and Credit*, Mises describes the reversal in the following terms: at a certain point, a counter-movement will set in, i.e., the prices of consumption goods will rise while those of production goods will fall. In other terms, the rate of interest on capital will rise, thus approaching the natural rate (Mises 1981 [1924], p. 401). Mises' explanation runs as follows. The implementation of more roundabout processes of production implies the transfer of intermediate goods as well as labor from their previous employment in shorter processes of production, i.e., those producing consumption goods, which are now activated at a reduced scale. Since no change in the consumption needs of the wage earners is involved, this implies an increase in consumption goods' prices¹⁹. This tendency is now strengthened by the decrease in the objective exchanged value of money that result from the increase of the volume of fiduciary media issued by banks. This reinforcing effect on the rate of interest on capital is due to transitory movements in the objective exchange value of money that are to be explained by the fact that "variations in the exchange value of money do not appear everywhere simultaneously and uniformly, but start from a particular point and only spread out gradually throughout the market." (ibid., p. 387). More precisely, Mises writes that it is the entrepreneurs who generally benefit from the increase of the issue of fiduciary media: if the objective exchange value falls, the entrepreneur gains in the short run since "he will be able to meet part of his expenses of production at prices that do not correspond to the higher level, while, on the other hand, he will be able to dispose of his product at a price that is in accordance with the variation that has meanwhile occurred." (ibid.). This circumstance cannot fail to have an effect on the interest rate on loans: those entrepreneurs who benefit from inflation, i.e., those that are up the scale of goods, are prepared if necessary to pay a higher rate of interest, and the competition of other would-be borrowers, who are attracted by the same prospects of profits, will accept the higher rate. This induces the rate of interest on loans to rise. Thus, the structure of relative prices, which is determined by the state of the

19. Insofar as they experience rising wages, workers would rather increase their demand for consumption goods.

capital market and which has been disturbed by the intervention of the banks, will be approximately re-established, provided, as we shall develop, that entrepreneurs use static expectations²⁰.

As may be presumed from his description of the upswing, Mises does not directly invoke the behaviour of banks in his explanation of the reversal. On one hand, Mises makes it clear that any action from the banks in order to offset the automatic rise in the loan rate of interest will be useless. He writes:

At first, the banks may try to oppose these two tendencies [due to the insufficient supply of consumption goods and reinforced by the fall in the objective exchange value of money] by continually reducing the interest rate on loans and forcing fresh quantities of fiduciary media into circulation. But the more they thus increase the stock of money in the broader sense, the more quickly does the value of money fall, and the stronger is its countereffect on the rate of interest.

(ibid., p. 402)

This point is strengthened in *Human Action*, where Mises now takes into account the possibility of hyperinflation. Under these circumstances, things are even worse since, now expectations do not only reflect previous inflation rate but anticipate the future state of the market (Mises 1996 [1949], p. 545). This leads to an even more drastic fall in the objective exchange value of money. In this case, prices rise at a greater rate than the growth of money and the loan rate of interest can then rise without bounds²¹. As we have seen, the unceasing rise of the gross market is unable to catch up with the original interest augmented by the positive price premium. During periods of hyperinflation, this can even lead to the destruction of money. As Mises notes:

The emergence of the price premium is not the product of an arithmetical operation which could provide reliable knowledge and eliminate the uncertainty concerning the future [...] It comes into existence step by step as soon as first a few and then successively more and more actors become aware of the fact the market is faced with cash-induced changes in the money relation and consequently with a trend orientated in a definite direction. Only when people begin to buy or to sell in order to take advantage of this trend, does the price premium come into existence.

It is necessary to realize that the price premium is the outgrowth of speculations anticipating changes in the money relation. What induces it, in the case of the expectation that an inflationary trend will keep on going, is already the first sign of the

20. Mises believes that a precise re-establishment of the old price ratio between goods of the first order and goods of higher orders is not possible. On one hand, the intervention of banks has brought about a redistribution of income and property. On the other hand, the automatic recovery of the loan market involves some of the phenomena of a crisis (a certain degree of irreversibility, social losses of value, etc.), which are the signs of the loss of some of the capital invested in the excessively lengthened roundabout processes of production. According to Mises, the remaining trace of all these disturbances will be a general increase of the objective exchange value of money (Mises 1981 [1924], p. 402).

21. For more details, see BELLOFIORE (1998), p. 568, note 44.

phenomenon which later, when it becomes general, is called 'flight into real values' and finally produces the crack-up boom and the crash of the monetary system concerned.

(*ibid.*, p. 544)

In other words, although increasing, the gross market rate is still too low for bringing about the required adjustments in the 'money relation'. As Mises indicates: "the banks believe that they have done all that is needed to stop 'unsound' speculation when they lend on more onerous terms [...] [But] they fail to see that in injecting more and more fiduciary media into the market they are in fact kindling the boom." (*ibid.*, p. 558).

Mises' description of the reversal does not however exclude the possibility of some accumulation of capital. On one hand, given his emphasis on the indirect effects of variations of the value of money in the distribution of real income and wealth, he cannot rule out the fact that "such changes can under certain circumstances really alter the rate of originary interest in a way which would be favourable to capital accumulation." (*ibid.*, pp. 548-549). On the other hand, he points out that "it would be a serious blunder to neglect the fact that inflation also generates forces toward capital consumption." (*ibid.*, p. 549). In particular, it may well be the case that people are inclined to spend illusory gains.

Let us now turn to Hayek's explanation of the end of the boom. Similarly to Mises, Hayek indicates that a point will be reached at which consumers will face an insufficient supply of consumption goods. This situation is aggravated by the fact that additional income has been generated during the upswing. This induces a counter-movement of relative prices: consumption good prices will rise while capital good prices will fall, and the original price ratio will be re-established. Contrary to Mises, Hayek argues that these are technical limits to the creation of credit, so that it is the specific behaviour of banks that determines the upper turning point of the cycle²². In other words, the flexible deposit multiplier described above appears to be bounded. Hayek explains that, when the price of consumer goods begins to rise faster than the price of capital goods, the ratio between cash payments and payments by cheque is altered in favour of the former. Consequently, in the course of a boom, the need for cash will increase along with prices and induce a cash drain that will force banks to restrict credit supply. Let us quote Hayek on this point:

Concerted action in this direction, which for competitive reasons is the only action possible, will ensue only when the increased cash requirements of business compel the banks to protect their cash balances by checking further credit expansion, or when the Central Bank has preceded them. This, again, will only happen, as a rule,

22. See HANSEN and TOUT (1933), pp. 133-135, and COLONNA (1994), pp. 41-44.

when the banks have been induced by the growing drain on their cash to increase their re-discount. Experience shows, moreover, that the relation between cheque-payments and cash payments alters in favour of the latter as the boom proceeds, so that an increased proportion of the cash is finally withdrawn from the banks.

(Hayek 1966 [1933], pp. 174-175)

Therefore, even in the absence reserve restrictions, credit expansion must come to a halt before an accelerating rate of inflation undermines the monetary system. In *Prices and Production*, Hayek writes:

So long as the banks go on progressively increasing their loans it will, therefore, be possible to continue the prolonged methods of production or perhaps even to extend them still further. But for obvious reasons the banks cannot continue indefinitely to extend credits; and even if they could, the other effects of a rapid and continuous rise of prices would, after a while, make it necessary to stop this process of inflation.

(Hayek 1935 [1931], pp. 89-90)

This brings us to Hayek's view on forced saving and capital accumulation. In *Prices and Production*, when dealing with the case of *forced* – as opposed to *voluntary* – saving, Hayek assumes given preferences. Banks start the cycle. However, credit supply is an *unlimited* to the amount of *limited* by savings. This implies that, for Hayek in contrast to Mises, credit expansion can never lead to capital accumulation²³. However, there remains a puzzle in Hayek's treatment of the banking system. When describing the case of *voluntary savings*, Hayek indeed implicitly eliminates the assumption according to which bankers are unable to distinguish between “those deposits which find their origin in credit and those which arose through cash payments” that was at the root of the unsustainable cash drain in *Monetary Theory and the Trade Cycle* (Hayek 1966 [1933], p. 163). As stressed by Trautwein, this ‘dual’ treatment of the monetary system renders Hayek's distinction between the cases of *voluntary savings* and *forced savings* inconsistent. There is however no reason to assume that in the case of *forced savings* bankers are omniscient to the point that they know exactly

23. It should, however, be pointed out that, in his earlier writings, Hayek's views on forced saving were not all that different from Mises'. For example, Hayek writes, in 1925:

The losses which arise from the revelation that the capital outlay made is not yet economically justified are the price of an undesirably rapid progress, a rate of progress which exceeds that which people are ready to purchase for themselves by a corresponding voluntary sacrifice of current enjoyments. – There can be no doubt at all that the development of the capitalist economy over the last 100 years would not have been possible without the ‘forced saving’ effected by the extension of additional bank credit. Hence economic fluctuations must probably be regarded as a necessary accompaniment of the accelerated development experienced by countries of the Western world in the last 150 years. Such fluctuations, in turn, could be entirely eliminated only if the tempo of this development was substantially lessened ...

(Hayek 1984 [1925], p. 21)

what is the demand for funds emanating from entrepreneurs that is consistent with consumers' time preferences. More convincingly, an increase in voluntary savings should also imply an expansion of bank credit which would trigger exactly the kind of destabilising mechanisms, as some the direct creation of credit would do. Moreover, the question remains as to whether the case of *forced saving* would be less stable than the one of *voluntary saving* unanswered²⁴.

The aforementioned differences in Hayek and Mises' explanations of the successive stages of the cycle have revealed the specificity of each author's approach to business cycles: while Hayek's focuses on the problem of coordination between saving and investment in an indirect exchange economy, Mises emphasizes the time element in the adjustment of markets when money interferes with real exchanges. Their divergent perspective is also exemplified by their stance at the issue of price expectations: on one hand, Hayek concentrates on the problem of perception knowledge acquisition and by individual economic agents; on the other hand, Mises tries to convince the reader that the working of markets contains the seeds of the forces lead the economy to equilibrium, even if this equilibrium cannot be *a priori* defined. These differences should however be analyzed in the light of Mises and Hayek's respective methodological approaches. On this matter, there is some truth in saying that both authors are concerned with the problem of knowledge. In *Human Action*, Mises indeed emphasises the role of the time it takes for entrepreneurs to discover that they have been mistaken in allocating productive resources. However, he implicitly assumes that they can learn though the revision of their real balances' expectations. By contrast, Hayek discards this possibility which, according to him, is inconsistent with the subjectivist approach. From this viewpoint Hayek's case of *forced saving* provides a good ???????. In this case, it is assumed that agents are unable to realize that their purchasing power has declined. But this raises the following question: how is it pos-

24. See TRAUTWEIN (1994), p. 77 and (1996), pp. 45-46. These inconsistencies in Hayek's analysis were also taken up by Sraffa. Sraffa argues that Hayek's case of '*voluntary savings*' effectively describes a situation where there is no money at all (SRAFFA 1995 [1932], p. 47). See also HANSEN and TOUT (1933), pp. 139-140. Hayek's answer to this critique is found in his 1934 article: "Capital and Industrial Fluctuations". He writes:

It is true that in *Prices and Production* I have not only not discussed in detail what rate of credit expansion is required to maintain a given rate of forced saving, but have simply assumed that the rate – whatever it was – could not be permanently maintained for institutional reasons, such as traditional banking policies or the operation of the gold standard. But I think it can be shown without great difficulty that even if these obstacles to credit expansion were absent, such a policy would, sooner or later, inevitably lead to a rapid and progressive rise in prices which, in addition to its undesirable effects, would set movements which would counteract, and finally more than offset, the 'forced saving'.

(Hayek 1934c, p. 156)

sible for agents who can learn to make systematic errors? This conflict in Hayek's analysis of business cycles is also due to other inconsistencies in his approach. For instance, Hayek strongly supports methodological individualism, however relies on the aggregative theory of capital but developed by Böhm-Bawerk and does not, as pointed out by Sraffa, account for agents 'heterogeneity': "the essential contradiction is that Dr. Hayek must both assume that the 'consumers' are the same individuals as the 'entrepreneurs', and that they are distinct." (Sraffa 1995 [1932], p. 201 fn.). This schizophrenic treatment of economic agents and of the structure of production may thus explain why, in *Profits, Interest and Investment*, Hayek ultimately chose to focus on the problem of the determination, by individual ?????????? of the investment period²⁵.

5. CONCLUSION

The re-examination of Hayek and Mises' business cycle analysis in the light of their respective methodological background has allowed us to clarify some of the controversial aspect of their analytical work. The rather distinct perspectives taken up by Hayek and Mises in their ?????????? approaches raise the problem of prejudgment in economic discipline. To give one problem, Hayek is often presented as Mises' student, while, in fact, he attended only one of Mises' private seminar lectures²⁶. This does not mean, however, that Mises had no influence on Hayek. In a 1945 article, Hayek refers to Mises as the foremost exponent of the Austrian position on capital and interest see Hayek, 1995b. In *Monetary Theory and the Trade Cycle*, he pays a true tribute to Mises, writing that he "has succeeded in transforming the Wicksellian theory into an explanation of the credit cycle which is logically satisfactory" (Hayek 1966 [1933], p. 22). However, he had never been convinced by Mises' apriorist 'Kantian' approach of knowledge. Hayek's ?????????? of knowledge was in fact more congenial to the one of his cousin, Ludwig Wittgenstein, who taught us that all formal knowledge tells us nothing about the world, and who identified all knowledge that tells us something as contingent knowledge.

25. See LONGUET (1998), p. 96, and (1999).

26. We are grateful to RANSOM (1996) for having clarified this point. Hayek indeed tells an amusing story of his first meeting with Mises, which came during a job interview set up by Hayek's true teacher Friedrich Wieser, just after Hayek's graduation from the University of Vienna. As Hayek tells it, "I was sent to [Mises] by an introduction from Wieser, in which I was described as a promising young economist. Mises, [after] reading this, [said], 'Promising young economist? I've never seen you at my lectures'".

REFERENCES

- ARENA, R. (1999), "Monetary Policy and Business Cycles; Hayek as an opponent to the quantity theory tradition", paper delivered to the Conference *Economic Analysis and Doctrine in Hayekian Thought*, organised by the AHAET, Paris, May 27-29 1999.
- BELLOFIORE, R. (1998), "Between Wicksell and Hayek: Mises' Theory of Money and Credit Revisited", *American Journal of Economics and Sociology*, 57 (4), pp. 531-578.
- BIRNER, J. (1999), "The place of the Ricardo Effect in Hayek's Economic Research Programme", *Revue d'Economie Politique*, 109 (6), pp. 203-816.
- COLONNA, M. (1994), "Hayek's trade cycle theory and its contemporary critics", in: *Money and Business Cycles. The Economics of F. A. Hayek*, ed. by M. Colonna and H. Hagemann, vol. I, Aldershot: Edward Elgar, pp. 27-53.
- GUNNING, J. P. (1997), "Ludwig von Mises' transformation of the Austrian Theory of Value and Cost", *History of Economics Review*, Summer 11, pp. 11-20.
- HANSEN, A.H. and TOUT, H. (1933), "Annual survey of business cycle theory: investment and saving in business cycle theory", *Econometrica*, 1, pp. 119-147.
- HAYEK, F.A. (1925), "The Monetary Policy of the United States after the recovery from the 1920 crisis", in: HAYEK (1984).
- (1928), "Intertemporal Price Equilibrium and Movement in the Value of Money", in: HAYEK (1984).
- (1935 [1931]), *Prices and Production*, London: Routledge.
- (1966 [1933]), *Monetary Theory and the Trade Cycle*, New York: A.M. Kelley Publishers.
- (1934a), "Carl Menger (1840-1921)", *Econometrica*, November, 1, pp. 393-420. Reprinted in: HAYEK (1992).
- (1934b), "On the Relationship between Investment and Output", *The Economic Journal*, 44, pp. 207-231.
- (1934c), "Capital and Industrial Fluctuations", *Econometrica*, April, 2, pp. 152-167. Reprinted in *F. A. Hayek: Critical Assessments*, ed. by J. Cunningham Wood and R.N. Woods, vol. I, Routledge, 1991, pp. 148-163.
- (1939), *Profits, Interest and Investment and other essays on the theory of industrial fluctuations*, London: Routledge and Sons.
- (1941), *The Pure Theory of Capital*, Routledge & Kegan Paul.
- (1942), "Scientism and the study of society", *Economica*, August IX (35). Reprinted in: HAYEK (1952a).
- (1943), "The Facts of the Social Sciences", in: HAYEK (1949).
- (1945a), "The Use of Knowledge in Society", *American Economic Review*, XXXV (5), pp. 519-530, in: HAYEK (1949).
- (1945b), "Time-Preference and Productivity: A reconsideration", *Economica*, 12 (45), pp. 22-25.
- (1946), "Individualism: True and False", in: HAYEK (1949).
- (1949) [1937], "Economics and knowledge", in: F.A. Hayek, *Individualism and Economic order*, London: Routledge & Kegan Paul, pp. 33-56.
- (1949), *Individualism and Economic Order*, Chicago: University Press.
- (1952a), *The Counter-Revolution of Science: Studies on the Abuse of Reason*, Glencoe, Illinois: The Free Press.
- (1952b), *The Sensory Order*, Chicago: The University of Chicago Press.
- (1956), "In Honour of Professor Mises", in: HAYEK (1992).

- (1973), "Tribute to von Mises, Vienna Years", *National Review*, November, 9, pp. 1244-1246 and p. 1260. Reprinted in: HAYEK (1992).
- (1978), *New Studies in Philosophy, Politics, Economics, and the History of Ideas*, London: Routledge & Kegan Paul, pp. 23-34.
- (1978a [1974]), "The Pretence of Knowledge", Nobel Memorial Lecture, delivered at Stockholm, 11 December 1974. Reprinted in: HAYEK (1978).
- (1984), *F.A. Hayek: Money Capital and Fluctuations, Early Essays*, ed. by R. McCloughry, London: Routledge & Kegan Paul.
- (1992), *The Collected Works of F.A. Hayek*, vol. IV: *The Fortunes of Liberalism*, ed. by P. G. Klein, London: Routledge.
- HICKS, J.R. (1967), "The Hayek Story", in: J.R. Hicks, *Critical Essays in Monetary Theory*, Oxford: Clarendon Press, 1967, pp. 205-215.
- KIRZNER, I.M. (1990 [1976]), "Ludwig von Mises and The Theory of Capital and Interest", in: *The Economics of Ludwig von Mises*, Kansas City: Sheed & Ward Inc., pp. 51-65. Reprinted in *Austrian Economics*, ed. by S. Littlechild, vol. II, Aldershot: Edward Elgar, pp. 51-65.
- KLEIN, P.G. (ed.) (1992), *The Collected Works of F.A. Hayek*, vol. IV, *The Fortunes of Liberalism*, London: Routledge.
- LANGLOIS, R.N. (1985), "Knowledge and Rationality in the Austrian School: An Analytical Survey", *Eastern Economic Journal*, 9, pp. 309-330. Reprinted in F.A. Hayek, *Critical Assessments*, ed. by J. Cunningham Wood and R.N. Woods, vol. IV, Routledge, 1991, pp. 118-140.
- LONGUET, S. (1998), *Hayek et l'école autrichienne*, Paris: Nathan, Economie Sciences sociales.
- (1999), «Cycles et normes de politique économique», paper delivered at the Conference *Economic Analysis and Doctrine in Hayekian Thought* organised by the AHA-ET, Paris, May 27-29 1999.
- VON MISES, L. (1912), *Theorie des Geldes und der Umlaufsmittel*, Vienna.
- (1934), *The Theory of Money and Credit*, trans. from German by H.E. Batson, London: Jonathan Cape Ltd.
- (1960 [1933]), *Epistemological Problems of Economics*, trans. by G. Reisman, Princeton: D. Van Nostrand.
- (1978 [1928]), *Monetary Stabilization and Cyclical Policy*, German edn., Yena. Reprinted in: *On the Manipulation of Money and Credit*, English trans., P. Greaves, Free Mkt. Books.
- (1978 [1962]), *The Ultimate Foundations of Economic Science*, 2nd edn., Kansas City: Sheed Andrews & Mc Meel.
- (1981 [1924]), *The Theory of Money and Credit*, Indianapolis: LibertyClassics.
- ([1990] 1936), "The 'Austrian' Theory of the Trade Cycle", in: *Austrian Economics*, ed. by S. Littlechild, vol. II, Aldershot: Edward Elgar, 1990, pp. 291-296.
- (1996 [1949]), *Human Action: A Treatise on Economics*, 4th edn. by Bettina Bien Greaves, Fox & Wilkes Publishers.
- MOSS, L.S. (1976), "The Monetary Economics of Ludwig von Mises", in: *The Economics of Ludwig von Mises. Toward a Critical Reappraisal*, ed. by L. Moss, Kansas City: Sheed & Ward, pp. 13-49.
- RANSOM, G. (1996), "The significance of Myth and Misunderstanding in Social Science Narrative: Opening access to Hayek's Copernician Revolution in Economics", paper presented at the 1996 Annual Meeting of the History of Economics Society, University of British Columbia, June 28-July 2.
- ROTHBARD, M.N. (1976), "The Austrian Theory of Money", in: *The Foundations of Modern Austrian Economics*, ed. by E.G. Dolan, Kansas City: Sheed & Ward.

- SRAFFA, P. (1995 [1932]), "Dr. Hayek on Money and Capital", *Economic Journal*, 42, pp. 42-53. Reprinted in *The Collected Works of F.A. Hayek*, vol. 9, *Contra Keynes and Cambridge: Essays, Correspondence*, ed. by B. Caldwell, London: Routledge.
- TRAUTWEIN, H.-M. (1994), "Hayek's double failure in business cycle theory: a note", in: *Money and Business Cycles. The Economics of F.A. Hayek*, ed. by M. Colonna and H. Hagemann, vol. I, Aldershot: Edward Elgar, pp. 74-81.
- (1996), "Money, Equilibrium, and the Business Cycle: Hayek's Wicksellian Dichotomy", *History of Political Economy*, 28 (1), pp. 27-55.
- WICKSELL, K. (1965 [1898]), *Interest and Prices*, New York: M. Kelley Publishers.
- (1967 [1906]), *Lectures II: Money*, New York: M. Kelley Publishers.