If anything like a change in direction can be distinguished in the development of the work of Friedrich August von Hayek, it does not lie in his supposed abandoning of the idea of equilibrium (which is based on a mistaken interpretation of his work). It is rather the transition of a radically systematic approach to problems and the elaboration of their solution that is characterized by a high level of analytic sophistication to a more associative approach. Examples of the former are Hayek’s theory of mind and his monetary, business cycle and capital theories; his theory of evolution and social and political philosophy are examples of the latter.

Hayek’s economics constitutes a research programme. One of the factors that influenced its further development was Sraffa’s criticism of Hayek’s Prices and Production. In reply to this, Hayek developed his highly sophisticated capital theory and his ideas on neutral money and the international monetary order. I intend to show that the development of Hayek’s economic research programme can only be understood if one takes into account his radically systematic and analytical approach.

Research programmes

The work of both Hayek and Popper have the characteristics of research programmes. I mean by this that the development of their work is guided by a series of systematic successive attempts to solve particular problems. That is particularly clear in the case of Hayek. Whenever Hayek starts working on a problem, he always gives an extensive historical account of the problem and the solutions that have been proposed for solving it (this, by the way, has turned Hayek into a formidable historian of ideas). He sketches the outlines of the theory that according to him should be capable of solving the problem (“necessary solution” in figure 1) – including the methodological constraints it has to satisfy. He analyzes the strengths and weaknesses of previous theories. This preliminary analysis allows Hayek to identify the gaps between the theory of the future and the useful elements of theories of the past that remain to be filled. Filling these gaps constitutes Hayek’s research agenda.

![Hayek’s systematic procedure](image)
Hayek’s business cycle theory provides an excellent illustration of this procedure. This will be shown in the following paragraphs.

**Hayek’s early economics: utility theory and imputation**

In 1923-4 Hayek spent a year and a half in the United States. During his stay he studied the latest statistical research on business cycles and wrote a draft for a PhD thesis (that was never submitted). After his return to Austria he published a series of articles in which he developed his theory of the business cycle. I have described elsewhere how he arrived at this theory, and how he developed it further, so I will here give a summary. In “Bemerkungen zum Zurechnungsproblem” of 1926, he first gives a historical analysis of the different versions of utility theory and their solutions to the problem of the determination of the value of factors of production or production goods. According to Hayek, the valuation of production goods and consumer goods both involve the imputation problem, *i.e.*, how to attribute value (and costs) to the goods that have gone into the making of a particular commodity. Hayek says that solving this problem is crucial because it would allow to unify the explanation of prices in terms of subjective values with the explanation of income distribution with the help of subjective-value theory. This logically precedes the explanation of exchange.

Hayek thinks Friedrich von Wieser was the first to see this clearly, even though he failed to solve the problem. That is because he derives the values of production goods from the values of consumer goods without taking into account that these can only be determined if we know the actually employed combinations of production goods.

“If, like Wieser, we assume as our basis that value can be calculated numerically - this can hardly be avoided if the problem is to be solved - then even a state of maximum utility cannot be calculated without the distribution to the factors of production of the level of utility realized by the products. It follows that the condition of maximum utility cannot be calculated without prior solution of the problem of imputation” (McCloughry 1984: 52).

In the next paragraph, Hayek continues his discussion with what is in effect a thorough application of the idea of opportunity costs:

“Any one-sided derivation of the value of producer goods from that of the product necessarily comes to grief on the fact that the value of the product cannot be ascertained without taking account of the resistance to the expansion of production to its physically possible limit, a resistance which differs for each individual factor used in the production of the value of the final goods. This restriction depends on the value which is to be imputed to the factor in question in its alternative use, in so far as it can be employed elsewhere, a proviso which is applicable in the majority of cases.” (McCloughry 1984: 52).

The value of products and of production goods cannot be obtained from the one independently from the other, as “[n]either producer goods nor products exhibit independently both the sets of data which are necessary for the determination of value. Rather, the one element, the utility level attained, makes its appearance only in the products, while the second element, the limit to the available supply, is determined “absolutely” only for producer goods” (McCloughry 1984: 52-3).

The recognition of this mutual dependence has transformed the problem into a form that allows of a solution:

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2 In Birner 2000 and Birner 1997.
“The problem is not the derivation of the value of producer goods, assuming a given value of the product. Rather, it is the influence which the relative scarcity of a producer good exerts on the admissible level of expansion of each process of production, assuming given alternatives of employment and given complementary goods. The problem of imputation becomes identical with the question of how, on the assumption of given quantities of producer goods and given scales of needs and wants, the producer goods available are to be allocated among the different branches of production. Any answer to this question, and thus any solution to the problem of imputation, has therefore to take into account the totality of all the complementary goods utilized in an economic system and all the needs and wants which their products serve to satisfy.” (McCloughry 1984: 53, my emphasis)

What Hayek proposes is a general economic equilibrium theory. Consistent with this is the fact that he also takes over from Wieser the endogeneity of national income: the composition and size of income depends on the specific combinations of production factors. But he does not stop here. He extends or generalizes general-equilibrium theory into an intertemporal and dynamic general equilibrium theory. He does so with the objective of explaining the dynamic disequilibrium growth that constitutes the business cycle. The result is "Das intertemporale Gleichgewichtssystem der Preise und die Bewegungen des 'Geldwerte'" (Hayek 1928).  

In Hayek’s hands substitution and complementarity in the structure of production together with time become the elements for unifying the theories of value and imputation. Hayek achieves this by a consistent application of the principle of opportunity costs (as will be shown in more detail in the next paragraph). This in summary is the economic-theoretical background for the further development of Hayek’s research programme in economics.

The structure and development of Hayek’s research programme in economics

The instrument I will use for reconstructing Hayek’s economic research programme is the following scheme of Popper’s.

\[ P_1 \rightarrow T_1 \rightarrow EE \rightarrow P_2, \text{ etc.} \]

Theories (T_i) are formulated as solutions to problems (P_i). The adequacy of the solutions is examined and leads to the elimination of errors (EE). This almost invariably gives rise to new problems. Problems are always problems in the light or against the background of a particular set of accepted theories: the background knowledge. In terms of the scheme above: P_1 has arisen out of an attempt to eliminate the errors from a previous theory, and so on. So, in order to understand a research programme, we must identify the problem it addresses originally. In addition – and this is something on which Popper is not explicit but which is evident in all of Hayek’s work – research programmes are characterized by the methodological constraints that a solution to the problem must satisfy. That gives us the following elements:

Problem situation:  - background knowledge  - problem to be solved  - methodological principles.

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3 This and the contemporaneous article by Erik Lindahl were the first intertemporal general equilibrium theories in economics.

4 For the modelling of which he borrows from Böhm-Bawerk.

5 Cp., for instance, Popper 1976, c. 29.

6 In most of what follows I will simplify the scheme to a sequence of problems and theories and omit explicit mention of error elimination, as this would get us too deeply involved in technical details.
These instruments allow us to define a research programme and distinguish one research programme from another. If we apply this toolbox to Hayek’s economics, we obtain the following reconstruction. The global problem (or original problem situation) that defines the outlines of his programme is how to explain fluctuations in the level of production and employment, a dynamic disequilibrium phenomenon, by means of general equilibrium theory. General equilibrium theory is part of the background knowledge. At the time Hayek started working on this, however, this theory was static. Therefore, either the business cycle has to be modelled in a way that makes it amenable to analysis in terms of static general equilibrium theory, or that theory has to be made dynamic. From this global problem setting follow a number of more specific problems of a technical economic nature.

An integral part of Hayek’s research programme in economics (as in all other domains that he dealt with) is a methodological analysis. Geldtheorie und Konjunkturtheorie devotes an entire chapter to methodology, and the first chapter of Prices and Production is explicitly methodological when it explains the reasons for the stagnation in the development of business cycle theory: economists have adopted the wrong method. He holds Irving Fisher responsible for the revival of the mechanistic form of the quantity theory of money. This has led to “the present isolation of the theory of money from the main body of general economic theory” (PP: 4), because of the use of “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 of money on prices (...)” (ibid.). Economists make the methodological mistake that they

“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 decision of individuals; yet it is on the assumption of a knowledge of the decisions of individuals that we owe whatever understanding of economic phenomena that 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.” (PP: 4)

Instead of this, Hayek proposes methodological subjectivism and individualism:

“from the very nature of economic theory, averages can never form a link in its reasoning; but to prove this contention would go far beyond the subject of these lectures. I shall here confine myself to an attempt to show in a special field the differences between explanations which do and explanations which do not have recourse to such concepts.” (PP, p. 5)

So, not only does Hayek sketch a research programme in economics, he also proposes a methodological research programme. It is elaborated in “Economics and Knowledge”, “The Facts of the Social Sciences, and the publications that were collected in The Counterrevolution of Science.

Hayek’s methodology comprises subjectivism, the principle that social science explanations must take account of what individuals perceive. He also adopts methodological individualism, which is a logical consequence of subjectivism. In the case of Hayek’s business cycle theory it takes the form of applying marginal value theory (the “pure logic of choice” of the individual, or the principle of opportunity costs) to hypothetical disaggregated investment processes. Hayek does this very systematically in the Pure Theory of Capital. This is consistent with a third methodological

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7 The impression that Prices and Production is an exercise in the application of a particular method, and not just an economic theory, is reinforced by the remark: “it is the method of approach more than the details of the results which is of importance in what follows.” (p. 31)
principle of Hayek’s research programme, *theoretical unification*. Finally, he uses the method of *decreasing abstraction*. Hayek typically starts with the construction of a simplified or idealized model. This is then “complicated” or “factualized” in a number of successive steps. This allows him to separate the main causal elements and explanatory factors from secondary ones. It also makes the exposition of the complex arguments clearer – provided the procedure is understood.

Now we have all the elements to reconstruct Hayek’s research programme in economics. In his work on the imputation problem Hayek came to the conclusion that only a general equilibrium framework would be appropriate. So he chooses that as his background knowledge. The only available general equilibrium theory, however, was the static general equilibrium theory of Walras and Pareto. This immediately creates a follow-up problem: in order for a static theory of equilibrium conditions to explain an inherently dynamic disequilibrium phenomenon such as the business cycle, two problems have to be solved. One is the incorporation of time, the other the introduction of a factor or mechanism that causes the disturbances of equilibrium. These two basic or global problems give rise to two sub-programmes. One deals with the systematic reduction of business cycle theory to marginal value theory, in accordance with methodological individualism (MI). It amounts to a systematic application of the opportunity-cost concept to investment, capital and production. The other branch concentrates on the causes of the disturbances that are inherent to our economic system. Hayek explains these, in accordance with the methodological principle of subjectivism, from the misperception of real scarcities by individuals that is caused by the fact that, due to the money multiplier, changes in money prices do not necessarily reflect changes in real relative prices.

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8 This procedure is described in great detail in Birner 2001.
9 This is an important proviso. Some examples of the confusion to which the failure to recognize this leads are given in Birner 1995.
10 Marina Colonna distinguishes two problems. Besides the “contradiction” between general equilibrium theory and disequilibrium growth, she draws the attention to Hayek’s opposition to the primitive quantity theory: according to Hayek, a change in the money supply affects relative prices and the distribution of income. Cp. Colonna 1990: XXV. Notice also that according to Colonna 1990: XXXV, & n. 51, MTTC still assumes the endogeneity of monetary disturbances, whereas PP attributes them to the intervention of monetary authorities. While this does not change the mechanism, it probably reflects Hayek’s reaction to the events of 1929.
Hayek introduces time by a stroke of genius: he makes the planning individual the basis of his analysis in Hayek 1928. Since the concept of a plan logically implies time (timeless planning is a contradiction in terms), this turns static general equilibrium theory into an intertemporal general equilibrium theory that may describe a growing, stationary or shrinking economy – so deal with dynamics – according to the (time) preferences of individuals to increase their income, keep it constant, or plan for its reduction. Hayek can now give a very straightforward definition of the equilibrium of the individual; it is the situation in which an individual’s expectations are realized. And the realization of expectations (or the consistency of the information that reaches the individual with that on which his plan is based) means that the individual has no incentive to adapt his behaviour. The model Hayek has in mind in “Das intertemporale Gleichgewichtssystem” of 1928 is as follows.

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11 With characteristic modesty Hayek attributes the introduction of the planning individual to Hans Mayer and Leo Schönfeld.

12 Hayek models a simple feed-back or control system.

13 And which is clearly present in “Economics and Knowledge”. The schedule is my reconstruction of this article.
Fig. 3 Scheme of the basis of Hayek’s intertemporal general equilibrium theory of 1928:
The planning individual

In a subsequent step, in “Economics and Knowledge” of 1937, Hayek defines the equilibrium of the economic system as the mutual compatibility of all individual plans. This is a straightforward application and extension of the concept of the equilibrium of the individual as he had defined it in his intertemporal general equilibrium theory of 1928. It shows the power and fruitfulness of the concept of the planning individual.

It takes little effort to apply Popper’s scheme of the sequence of problems, error elimination, theories and further problems to Hayek’s economics. That is because long before Popper formulated it, the organization of Hayek’s work is so exemplary of the scheme that one might be tempted to conjecture that Popper was inspired by Hayek’s economics. But that would be philosophy fiction.

Hayek’s research programme
I have shown the origin and structure of Hayek’s economic research programme as an illustration of the systematic character of the whole of his work. Before he dealt with economics at all, he had already applied the same systematic procedure to his theory of mind in 1920. And later, whenever he starts working in a new domain of intellectual endeavour, he continues to plan and develop his work in the same manner though never again with the same degree of analytical rigour that characterizes his theory of mind and his economics. This gives rise to a series of “partial research

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14 Hence, far from abandoning equilibrium analysis, he takes it a step forward. In 1988 Bruce Caldwell has introduced a red herring by failing to recognize this, which in turn is due to his failure to see that Hayek’s economics constitutes a research programme.

15 In the context of Hayek 1928 it is clear that the interaction between individuals is supposed to take place on markets. Desai 1994 and Birner (for instance 1999, which argues that “Economics and Knowledge” is a forerunner of a network model) point out that the argument in Hayek 1937 involves more than the interaction on markets, and that Hayek 1945 is a step backward from this more complex picture precisely because Hayek refers only to the price system as the mechanism that resolves the coordination problem.

16 Nothing indicates that Popper had such detailed knowledge not only of Hayek’s economic theory but also of the way it was developed. Hayek also states his methodology explicitly, something that is missing from Popper’s scheme.
programmes”. These have engendered subsequent partial research programmes. Notice that I am not saying that Hayek, right from the beginning of his scientific career, had clear ideas of where he wanted to arrive at; 17 Hayek never planned the whole of his work right from his first contribution to science in 1920. Nevertheless, hindsight allows us to observe that it constitutes a “grand research programme”. 18 As the list of similarities between Hayek and Popper indicates, Hayek is much more than an economist; his work also covers, roughly in chronological order, the philosophy of mind and the psychology of perception (already referred to), the history of economics, the history of ideas, the philosophy of social science, political and social philosophy, and the philosophy of law. In a very simplified picture this may be shown as a sequence of research programmes, each of which evolved out of previous ones.

![Fig. 4: Hayek’s grand research programme](image)

A full reconstruction of Hayek’s entire research programme cannot be given here. 19 I will limit myself to sketching the development of some of his main ideas.

**The development of Hayek’s research programme: from the criticism of central economic planning to the rejection of socialism as a form of social organization**

When we go beyond Hayek’s economics, we can see his research programme in action in all its fruitfulness. Thus, *RS* is a generalization from his criticism on central economic planning as a method of organizing the economy to his criticism of central planning as a principle for the

17 Hayek’s “Two types of mind” (1975) may be read as a description of his way of proceeding. Hayek distinguishes between the “puzzlers” or “muddlers”, who “know many things” on the one hand, and the “masters of the subject” or “the memory type”, who “know one big thing”, on the other. He reckons himself to belong to the first type. The distinction is practically identical to Isaiah Berlin’s in “The Hedgehog and the Fox” of the same year. Hayek’s muddler corresponds to Berlin’s fox.

18 As I have called it in the Introduction to Birner & Van Zijp 1994. In the sequel I will drop the adjective.

19 Some of the transformations and generalizations that drive the development of Hayek’s work as a whole are described in Birner 2006.
organization of society as a whole. And just as Hayek makes this transition from his economic
criticism to the philosophical criticism of socialism, in RS he already “announces” (as we can say
with the benefit of hindsight) his future work on the legal framework of a competitive economy:
Constitution of Liberty and Law, Legislation and Liberty: “The systematic study of the forms of
legal institutions which will make the competitive system work has been sadly neglected …” (RS:
28). In later years, Hayek rolls up his sleeves, so to speak, and starts working out the features of the
legal framework of a liberal society.

**Hayek’s radicalism**
The example of Hayek’s taking Wieser’s theory of imputation to its logical consequences is
indictive of a feature of his thought that has been little noticed: its radicalism. Once Hayek has
defined an area of research, or, as I prefer to call it, one of his partial research programmes, he
carries it out rigorously, to its ultimate logical consequences. Other examples are his radical anti-
socialism, which goes so far as to reject all non-liberal political ideologies, including social
democracy, and his rejection of social justice as a concept deprived of meaning. But the first
instance of Hayek’s radicalism is his theory of mind, in which he derives logical consequences from
Schlick’s epistemology that go beyond Schlick’s own. As I have argued above, all its main features
are contained in the ms. of 1920, and they were elaborated into SO, to which I will refer in what
follows.

**Radical empiricism**
Though Hayek adopted Schlick’s empiricism, he felt it failed to solve the problem posed by Kant,
viz. that we need a pre-existing mental framework that makes consciousness and knowledge about
the world possible:

“There is … a part of our knowledge which, although it is the result of experience, cannot be
controlled by experience, because it constitutes the ordering principle of that universe by
which we distinguish the different kinds of objects of which it consists and to which our
statements refer.” (The Sensory Order: 8.18)

But rather than criticizing empiricism from the outside, Hayek says that he has led it to its logical
conclusion:

“in so far as we have been led into opposition to some of the theses traditionally associated
with empiricism, we have been led to their rejection not from an opposite point of view, but
on the contrary, by a more consistent and radical [sic] application of its basic idea. Precisely
because all our knowledge, including the initial order of our different sensory experiences of
the world, is due to experience, it must contain elements which cannot be contradicted by
experience.” (The Sensory Order: 8.27)

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20 Keynes was probably the first to draw attention to this. In his reply to Hayek’s review of Treatise on Money he writes about Prices and Production: “The book, as it stands, seems to me to be one of the most frightful muddles I have ever read with scarcely a sound proposition in it. (...) It is an extraordinary example of how, starting with a mistake, a remorseless logician can end up in Bedlam. Dr. Hayek has seen a vision, and though when he woke up he has made nonsense of his story by giving the wrong names to the objects which occur in it, his Kubla Khan is not without inspiration and must set the reader thinking with the germs of an idea in his head.” (Keynes 1931: 394).

21 In correspondence Popper criticized Hayek for this. Cp. for example Popper’s letter of 28 April 1977 (Hayek Archives, Hoover Institution, box 44/2): “I understand your feeling that “social justice” is a meaningless pseudo concept. But I think this feeling ought to be resisted: the people who speak of “social justice” may want to support the demand for, simply, an equalitarian society; and such a society may exist … even though it may be imposed upon us only by loss of freedom.”

22 This idea already clearly stated in the ms.: “Gewiss ist es ein auf die Spitze Treiben des Empirismus wenn wir auch das Verhältnis der Empfindungen untereinander durch die Erfahrung entstehen lassen; aber gerade dadurch werden viele seiner
This made Hayek adopt structuralism and naturalism.

Radical epistemological structuralism, naturalism and functionalism
Hayek’s theory of mind led him to a radical epistemological structuralism, naturalism and functionalism. To see this, let us examine what Hayek says about scientific explanation in CRS, which was directly influenced by his work in the philosophy of mind. According to Hayek to explain means to reclassify our sense impressions until we are left with an abstract system of relationships without any sensory qualities. We are left with “pure structure” without content, for the description of which we need mathematics. The process of scientific explanation as Hayek describes it is the same as the process by which the human mind forms classifications of the world. (CRS: 20). Moreover, the functions of the mind could be realized in any physical substrate that has the characteristics of a classifier system and is not necessarily restricted to the brain’s physical multi-layered neural networks.23

He hints at how we can use the theories of physics to make predictions: “their significance is due to the fact that we possess rules, a “key”, which enables us to translate them into statements about perceptible phenomena.” (CRS: 21). Presumably, Hayek has in mind the correspondence rules that were discussed in philosophy of science texts of the 1960s.24 What Hayek writes about explanation is an elaboration of some of the ideas with which he concluded his ms. of 1920, and which found their way into the last chapter of SO: when the mind has completed its work, we are left with a system of definitions or tautologies. Since tautologies are necessarily true, we must accept them. That leads Hayek to another radical conclusion (one that I have already mentioned).

Radical realism
Hayek seems to argue that he tautological nature of our “finalized” knowledge of the physical world makes its acceptance compulsory:

“Its concern [i.e., of “Science”] is not what men think about the world and how they consequently behave, but what they ought to think. The concepts which men actually employ, the way in which they see nature, is to the scientist necessarily a provisional affair and his task is to change that picture, to change the concepts in use so as to be able to make more definite and more certain our statements about the new classes of events.” (CRS: 22; already quoted on p. Error! Bookmark not defined.Error! Reference source not found. above; emphasis added).

Apparently, “Science” will produce the only valid classification possible, which therefore ought to be accepted. As I have argued above, this only applies to the explanation (or rather, classification) of the physical order; the explanation of the social order: the domain of the “moral sciences” must always remain incomplete to us, who with our minds and subjective ideas constitute this order: they are both explananda and explanantia, the “data on which the explanation of human action guided by those phenomena must be based.” (CRS: 24).

Radical economics
I intend by Hayek’s radical economics the rigourous way in which he elaborated the original ideas, some of which are indicated in the outline for a PhD-thesis he sketched but never wrote when he was in the United States in the early 1920s, partly as a reaction to criticism, the most important of

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23 For a clear exposition of these three aspects of Hayek’s theory of the mind, see Feser 2006.
24 Cp. for example Nagel 1961.
which was Sraffa’s in his reaction to the first part of Hayek’s review of Keynes’ *Treatise on Money*. Here is the outline:

[Beginning of transcript.]
F.A. HAYEK: Outline of the thesis: [(for N.Y. University Ph.D., 1923)]

“Is the function of money consistent with an artificial stabilization of its purchasing power?”

[“Money’s one function is to serve as a medium of exchange’, J.F. Johnson, Money and bus. Rev. Ed. p. 14]^[25^]

INTRODUCTION:
1. The need for stabilization.
   b. Methods of exchange underwent a change while its medium remained unchanged in its essentials.
   c. Evils of instability.
   a. Mere elimination of the monetary causes of the fluctuations in prices.
   b. Stabilization of value.
   c. Stabilization of purchasing power.
3. “Artificial Stabilization” (stabilization of purchasing power contrasted with mere elimination of the monetary means (“means” has been crossed out and replaced by: “causes”) of prices {the “s” has been crossed out, and the word has been completed so as to read “price fluctuations”})
4. Sources of possible doubts in its possibility. (Are not sometimes changes in the price level necessary to reestablish the equilibrium between demand and supply?).
5. Plan of the investigation.

CHAPTER I.
Plans for stabilization and how they are supposed to work.
1. Direct regulations of the volume of circulation (Snyder, Foster and Catching etc.)
2. Indirect regulations of the volume of circulation:
   a. Changing the weight of the metallic unit (Fisher, Williams).
   b. Through discount policy. (Wicksell, Genoa Conference, Keynes)

CHAPTER II.
Possibility of maintaining the medium of exchange at par with an extraneous standard of value.
1. With actual redemption: the old exchange standard
   Without actual redemption:
   2. With a single commodity as the standard of value (B.M. Anderson’s illustration of a gold standard of value, represented in circulation by paper, redeemable in silver at the gold value).
   3. With a tabular standard.

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^[25^] The book referred to is Joseph French Johnson, *Money and Currency in Relation to Industry, Prices, and the Rate of Interest*, Revised edition, no year (but probably 1914), Ginn and Company. Although the abbreviated title is not correct, the quotation is. As is the case with other hand-written notes on type-written manuscripts by Hayek, this comment may have been added later, perhaps even decades after the outline was written, when Hayek ordered his papers. The reference here is interesting for several reasons. In Hayek's published work of the first half of the 1920s the book is not mentioned. Despite the fact that Johnson does not refer to Carl Menger or any other Austrian economist, his monetary theory has a distinctly “Austrian” flavour. Thus, he compares the way in which money evolved with language (“Money, like speech, is doubtless a product of unconscious evolution.”, p. 2). He also does not believe in the neutrality of money. Johnson explains that the disturbing effects of a change in the value of money is due to four circumstances: “(1) the use of credit, (2) the fact that production involves a period of time, (3) the fact that prices do not change uniformly, and (4) the psychology of confidence and depression.” (p. 163). As we shall see below, these are elements that recur prominently in Hayek's theory of the business cycle. Regarding point (3), Johnson extends the analogy with language. If additional money does not enter the economy in all sectors at the same time, it will have the same disturbing effects on economic life as when every year part of the population of a country all of a sudden starts to change part of the English vocabulary. “Just as language is a medium of exchange of ideas, so is money a medium of exchange of goods and services.” (p. 172). Johnson's book also contains a detailed account of the monetary reform in the U.S. at the beginning of this century, and much statistical material.
Appendix on the proposals to use an independent stable accounting unit as a remedy against an unstable circulating medium.

CHAPTER III.
Effects of an artificial stabilization. Money and the distribution of income.

CHAPTER IV.
Effects of an artificial stabilization, continued: Relation to price movements of non-monetary origin.

CHAPTER V.
Effects of an artificial stabilization, continued: Stabilization and the business cycles.

CHAPTER VI.
International aspects of stabilization.
1. Stabilization attempted by one country only.
2. Several or all important countries accept a stabilization scheme but work it according to their individual index numbers.
3. The same, but worked on the basis of one uniform international index number of prices.

The thesis was never submitted. However, it is a very important document for understanding the development of Hayek’s economic thought. As we can observe with hindsight, it sketches the research agenda that Hayek set himself. Here is what he says about it himself:

“The thesis on which I started work while I was registered as a Ph.D. student in New York University (I believe I proposed to call it: “Is a stabilization of the value of money compatible with its function?”), although neither it nor the German work into which I turned it during the following years in Vienna were ever completed was in many ways the beginning of a continuous development of which most of my publications during the next two years are rather by-products or statements of partial results suggested by a particular occasion. One of the first conclusions at which I remember I had arrived toward the end of 1923 was that stabilization of national price levels and stabilization of foreign exchange were conflicting aims. But before I could anywhere submit for publication the short article I had written on the subject I found that Keynes had just stated the same contention in his Tract on Monetary Reform [1923]. Lest anybody should think that this disappointment in my hope of having made an original discovery is responsible for my later persistent opposition to Keynes I should add that Keynes was then, and remained for a good deal longer, one of my heroes and that I greatly admired this particular work of his.” (Hayek on Hayek, p. 97)

26 Hayek’s recollection of the title is not accurate. This mistake is compounded by McCormick 1982, p. 40, who turns it into: “Is the stabilization of the value of money compatible with the functions of money?” Both the original title and the title as Hayek remembered it speak of the function of money. Added to the quotation from Johnson, this seems to justify the conclusion that Hayek agreed that the only function of money is to be a medium of exchange, and that all other functions (store of value and unit of account) derive from this.

27 This means that policies aimed at achieving both are doomed. Notice that many decades later Hayek still cites this example when he discusses his “explanation of the principle”. Cp. “Degrees of Explanation”, in Hayek 1967: 17: “The practical value of such knowledge [i.e., theories that tell us that when we observe given patterns of phenomena, certain other patterns are to be expected but not some others] consists indeed largely in that it protects us from striving for incompatible aims.” “If economics tells us that we cannot at the same time maintain fixed rates of foreign exchange and at will control the internal price level of a country by changing the quantity of money, the character of such a ‘prediction’ is essentially the same as in the previous case [of the taxonomic scheme of zoology which excludes, for instance, winged vertebrates with more than two legs].”)
Hayek does not give any details about what German work he turned the thesis into,\textsuperscript{28} so we can only conjecture. The first two chapters look as if they were intended as a report on the state of affairs in economics. Perhaps, the material Hayek collected for these chapters went into his „Das Stabilisierungsproblem in Goldwährungsländern“ of 1924 and „Die Währungspolitik der Vereinigten Staaten seit der Überwindung der Krise von 1920“, which was published in 1925. Chapter III may have been intended to contain, \textit{inter alia}, a discussion of Ludwig von Mises’ theory of money and the business cycle, in which distribution, or Cantillon effects, play a central part. Chapters IV and V look like an announcement of Hayek’s own theory of the business cycle which was published in his \textit{Geldtheorie und Konjunkturtheorie} of 1929, and \textit{Prices and Production} of 1931. Despite the fact that according to Hayek, Keynes’ \textit{Tract} made publication of what was to have gone into chapter VI superfluous, he kept international monetary matters on his agenda. In 1937 he wrote on the international monetary framework in his \textit{Monetary Nationalism and International Stability}. As the thesis outline makes clear, Hayek considered himself a monetary theorist. But the crux of his theoretical position was that one could not be a good monetary theorist without analyzing the influence money has on the decisions to consume, save, invest and produce. On this, at least, he agreed with Keynes’ \textit{Treatise on Money}.\textsuperscript{29}

Hayek’s self-imposed systematicity and thoroughly (“gediegen”) analytical approach led him to reply to Sraffa’s criticism in a series of articles and books on capital theory and monetary theory (for example, Hayek 1934, 1935a, 1936, 1936a, 1937a, 1939, 1941). Few if any commentators have understood this. An unfortunate consequence is that the importance of Hayek’s contributions in these fields has been underestimated, neglected, or simply misinterpreted. To give just two examples, if Hayek 1934 had been known by the participants at the Cambridges debates in capital theory, the debate would never have taken place (cp. Birner 1999). In addition, the widely diffused opinion that Sraffa had got the better of Hayek may reflect some of the reactions to Sraffa’s criticism during the 1930s, but it does not stand up to a more detailed scrutiny of Hayek’s research programme in economics.

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\textsuperscript{28} Thanks to the work of Hansjörg Klausinger in editing the last two volumes of Hayek’s \textit{Collected Works}, the two volumes on business cycle theory, we now know that Hayek refers to a largely unpublished ms. in German (“Geldtheoretische Untersuchungen”. The part that has been published is Hayek 1928.

\textsuperscript{29} He was openly critical of Keynes' book. For a discussion of the ensuing controversy and its context, see Birner 1992 and 1993a, and for a fuller discussion Birner 1997a.


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