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Hayek's Austrian Theory of the Business Cycle

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Abstract. The essay begins with Hayek's grappling with the equilibrium framework as the starting point for the analysis of cyclical fluctuations and the fundamental methodological challenge raised by Lowe's attack against the construction of business-cycle theory within the system of general economic equilibrium. It then shows that Hayek elaborated his Austrian theory of the business cycle on the innovative combination of five building blocks: (1) *Wicksell's theory of the cumulative process* where price changes are caused by the discrepancy between the market rate and the natural (equilibrium) rate of interest; (2) *Mises's theory of money and credit* in which banks artificially lowering the money (market) rate of interest are responsible for overinvestment and a misallocation of resources which necessarily has to be corrected; (3) *Böhm-Bawerk's theory of capital* with its emphasis on the time structure of the production process; (4) *Cantillon effects* of changes in the money supply on the price structure and hence on the structure of production (non-neutrality of money); (5) *Ricardo effects* of a shortage of consumption goods on the production of investment goods (disproportionality of circulating and fixed capital).

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HAYEK'S AUSTRIAN THEORY OF THE BUSINESS CYCLE

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I. Introduction

In his impressive and diverse scholarly work one focus of Richard Arena has been on Austrian economists, particularly Friedrich von Wieser, Joseph Alois Schumpeter, and Friedrich August Hayek.² Characteristically, emphasis has always been on theoretical analysis, combined with an excellent knowledge of the history of economic thought. A good example are his various interpretations of Hayek's Austrian theory of business cycles against the background of modern developments in business cycle theory. In the following I will investigate the main building blocks and characteristics of Hayek's Austrian theory of the business cycle.

Business-cycle theory was a dominant theme among German and Austrian economists in the interwar period which attracted the most brilliant and innovative minds among a new generation of more theory-minded economists. Together with L. Albert Hahn (born 1889), Adolf Löwe (1893), Wilhelm Röpke (1899) and Oskar Morgenstern (1902), Friedrich August Hayek (1899) was among the group of young economists who made major contributions to the preparatory volume of the 1928 conference of the Verein für Sozialpolitik in Zurich which focused on the theoretical and empirical analysis of business cycles. Hayek's essay "Some remarks on the relation of monetary theory to business-cycle theory" (Hayek 1928b) is the outline and core of his *Monetary Theory and the Trade Cycle* which he submitted as his habilitation thesis to the University of Vienna in the following year.

Since the beginning of 1927 Hayek had already acted as the first director of the Austrian Institute for Research on Business Cycles in Vienna which had been founded at the initiative of Ludwig von Mises.³ From the mid-1920s onwards more systematic empirical research on business cycles had become a major issue in Europe. The German Institute for Business-Cycle Research in Berlin, which had been founded in 1925, benefited in its empirical work from the strong institutional link with the *Statistisches Reichsamt*, with Ernst Wagemann heading both institutions. In their empirical work the two institutes in Berlin and Vienna were heavily influenced by the new methods of business-cycle research, as they had been developed in the

¹ Revised version of a paper first presented at the Conference *40 Years of Economics through the Lenses of Historians of Economic Thought* in Honour of Richard Arena, Université Côte d'Azur, Nice, 19-20 May 2022.

² See, e.g., Arena (2010), Arena and Dangel-Hagnauer (2002), and Arena (1994).

³ For the early history of the Vienna Institute see Klausinger (2022).

United States by the National Bureau of Economic Research (NBER) directed by Wesley C. Mitchell (from 1920 to 1945), who pictured the cycle as a complex of fluctuations in an imposing display of statistics of interrelated price and quantity variables and creating indexes of leading, coinciding and lagging indicators, and by the Harvard University Committee on Economic Research (led by Warren M. Persons and Charles Jesse Bullock) which published the three-curve barometer, an indicator of turning points in the business cycle in *The Review of Economic Statistics* (since 1947 the *Review of Economics and Statistics*). The journal soon became a leading forum for the statistical and historical inquiry of the timing and magnitude of cyclical fluctuations.

At the Berlin institute Wagemann adapted the techniques of the Harvard barometer to the German circumstances in which, for example, international trade was more important than in the US economy but there was no fully functioning capital market in the interwar period.⁴

Oskar Morgenstern (1928a), who succeeded Hayek as the director of the Vienna institute after the latter's move to the London School of Economics in 1931 (until March 1938 when the Vienna institute lost its independence after the "Anschluss" and became a branch office of Wagemann's Berlin institute), in his contributing essay "Tasks and limits of the institutes for research on business cycles" distinguished two types of institutes, namely those which provide regular information services and business forecasts for the subscribers of their publications and those with pronounced research intentions. Whereas he classified the two institutes in Berlin and Vienna together with the Harvard Economic Committee in the first category, he counted the Kiel institute together with the NBER to the second one. At the Kiel Institute of World Economics, which had been founded in 1914 by Bernhard Harms, a new department for statistical economics and international business-cycle research was built up by Adolf Löwe (since September 1939 Adolph Lowe) in 1926. Although Löwe had closely cooperated with Wagemann in the foundation process of the Berlin institute in the preceding year, the research work of the Kiel group differed remarkably from that in Berlin and had a far more theoretical flavour. Stimulated and challenged by Schumpeter's pathbreaking *The Theory of Economic Development* (1911)⁵, in which emphasis is put on the role of technical progress and the

⁴ For a detailed contrast between the Harvard barometer and that developed by the Wagemann crew in the Berlin institute and the Statistical Office see Tooze (2001: 124ff.). For a detailed analysis of the beginnings of empirical business-cycle research in Germany in the period 1925-1933 see Kulla (1996) who also informs on the more methodologically oriented work of the Frankfurt Society for Research on Business Cycles chaired by Eugen Altschul, and the business-cycle barometer constructed by Arthur Spiethoff and published in the economic periodical *Magazin der Wirtschaft* in 1926-27. In contrast to Wagemann's numerous figures, Spiethoff in his rivalling index focussed almost exclusively on the consumption of iron which he regarded as the best indicator for the changing state of the economy.

⁵ See, for example, Löwe's synthesis of the current state of research on business cycles in Germany in the Brentano Festschrift (Lowe 1925).

interaction between long-run growth and cyclical fluctuations, i. e. the wavelike character of economic development, the investigations went beyond a limited analysis of the trade cycle, and also explored the areas of long-run growth and structural change. The Kiel group included such distinguished scholars as Gerhard Colm, Hans Neisser, Wassily Leontief, Jacob Marschak and Fritz Burchardt. The work on cyclical growth being done in Kiel was financially supported by the Rockefeller Foundation as were the institutes in Berlin and Vienna. Until 1933 the research programme of the Kiel group was regarded as the most promising.⁶

The separation between the two types of institutes stressed by Morgenstern, however, is not an absolute one. Despite Wagemann's aversion against theory some important theoretical contributions were made at the Berlin institute, like Arthur Hanau's study on the cyclical fluctuations of supply and prices of pigs where prices were explained in the form of the cobweb theorem⁷, thus contributing to the overcoming of the static by a more dynamic analysis of the cycle. Even more so it held for the Vienna institute where the founding director made his most important contributions to business-cycle *theory* exactly in those years. In his retrospective view on the foundation of the Austrian Institute for Research on Business Cycles, today's WIFO, given at the occasion of the 50th anniversary, Hayek was very explicit in emphasizing that the study of the theory of economic fluctuations "actually had interested him much more than the regular reporting of the business cycle"⁸. From the outset he made his methodological position very clear that any appropriate explanation of the business cycle must employ a theory.

Thus, we find him arguing at the beginning of his habilitation thesis:

"Empirical studies, whether they are undertaken with such practical aims in view, or whether they are confined merely to the amplification, with the aid of special statistical devices, of our knowledge of the course of particular phases of trade fluctuations, can, at best, afford merely a verification of existing theories; they cannot, in themselves, provide new insight into the causes or the necessity of the Trade Cycle." (Hayek [1929] 1933: 27)

This statement is the more remarkable since Hayek in 1923/24, after making his Ph. D., had spent fourteen months in the United States to get a first-hand knowledge of the monetary policies of the new Federal Reserve System, which had been established in 1913, and of the new methods of business-cycle research at Harvard and at the NBER. He even attended Mitchell's classes at Columbia. The insights he gained during his stay in America are composed in his long essay on 'The Monetary Policy of the United States after the Recovery from the

⁶ See Craver (1986) and Hagemann (2021).

⁷ See Hanau (1927).

⁸ Hayek (1977: 19). Morgenstern's Vienna habilitation thesis on the difficulties and paradoxes inherent in economic prediction (Morgenstern 1928b), which was the fruit of a two years stay in the U.S., where he had attended Mitchell's seminars at Columbia in 1926 and spent the following academic year at Harvard, also reflects a deep uneasiness about methods which consisted of an ingenious collection of facts without theory such as in Wagemann's statistical and historical business cycle description in mathematical garment.

1920 Crisis' (Hayek 1925). It shows Hayek's aversion against statistical aggregates which hide important movements which are central to an Austrian theory of the business cycle. He argued against crude quantity theories which focus almost exclusively on the general level of prices. Misallocation of resources due to credit expansion may even occur despite stability of the general price level, i. e. constant prices cannot automatically be regarded as an indicator of monetary stability. He emphasizes "[t]he fact that the phases of the business cycle manifest themselves much more clearly in the relative movement of the prices of different types of commodities than in fluctuations of the general price level"⁹. Thus, an important ingredient of his business-cycle theory is already there. Any adequate theory of cyclical fluctuations must consider the effects of changes in the money supply on the structure of *relative* prices (and the subsequent impact on the structure of production).

Hayek's business-cycle theory consists of integrating monetary theory and capital theory. It is a central characteristic of his approach that monetary factors cause the cycle, but real phenomena constitute it. While in *Prices and Production* (PP 1931) emphasis is on the real structure of production, in *Monetary Theory and the Trade Cycle* (MTTC 1933) Hayek stresses the monetary causes starting the cycle. Hayek's claims to originality were modest and he was always careful to acknowledge the sources of his influences by other economists. Thus, in his business-cycle theory Hayek combined five key elements already existing in an innovative way:

- (1) Wicksell's theory of the cumulative process where price changes are caused by the discrepancy between the market rate and the natural (equilibrium) rate of interest.
- (2) Mises's theory of money and credit in which banks artificially lowering the money (market) rate of interest are responsible for overinvestment and a misallocation of resources which necessarily must be corrected.
- (3) Böhm-Bawerk's theory of capital with its emphasis on the time structure of the production process.
- (4) Cantillon effects of changes in the money supply on the price structure and hence on the structure of production (non-neutrality of money).
- (5) Ricardo effects of a shortage of consumption goods on the production of investment goods.

For more than a decade Hayek worked with great intensity on these issues which form the constructive part of his business-cycle theory. The five components are further elaborated in his various publications and will be scrutinized in sections III to VII of this essay. However, first an important methodological issue needs to be discussed, namely the crucial question of

⁹ Hayek ([1925] 1999: 114).

an (in)compatibility of an explanation of the business cycle with the dominant equilibrium approach in economics, a question which had been raised in the contemporary German literature by Adolf Löwe (1926) and which had a deep impact on Hayek who was challenged by Löwe's contributions.¹⁰

II. Equilibrium and the business cycle: Löwe's methodological challenge

In his "brilliant article"¹¹ 'How is business cycle theory possible at all?' A. Löwe (1926) reflected on the nature of the business-cycle problem and the adequate theoretical framework for its analysis. He pointed out the fundamental conflict between the equilibrium concept as the dominant method of economic theory and the subject of inquiry, i.e., recurrent cyclical fluctuations of macroeconomic key variables, which are of a genuine out-of-equilibrium character. His critical inspection of the existing body of business-cycle theories came to the result that all serious approaches had either introduced exogenous factors or abandoned, fully or partly, the interdependency requirements of a system of general economic equilibrium. He therefore concluded:

"The business cycle problem is not a reproach *for*, but a reproach *against* the static system, because in it it is an antinomic problem. It is solvable only in a system in which the polarity of upswing and crisis arises analytically from the conditions of the system just as the undisturbed adjustment derives from the conditions of the static system. Those who wish to solve the business cycle problem must sacrifice the static system. Those who adhere to the static system must abandon the business cycle problem." (Löwe [1926]1997: 267).

Löwe, who perceived the interest problem in a similar antinomic position as the business-cycle problem, clearly associated himself with the first group and opted for a "transformation of our existing static system into a dynamic one. ...In such a system the polarity of upswing and crisis will acquire the same status as a data constellation which the equilibrium has in the static system"¹². Stimulated by the works of Marx and Schumpeter, Löwe identified technological change in the era of progressive industrialization as the decisive endogenous factor not only causing the cycle but also instrumental for long-run growth. He therefore aimed at a theory of cyclical growth in which no artificial separation is made between the cycle and the trend.

Chapter I on 'The Problem of the Trade Cycle' in Hayek's *Monetary Theory and the Trade Cycle* clearly shows the challenge arising from Löwe's attack against the construction of a

¹⁰ See Hagemann (1994, 2022), and Caldwell (2004, chpt. 7).

¹¹ Kuznets (1930b: 128). For an assessment of Löwe's article see also Kuznets (1930a) and Gehrke (1997).

¹² Löwe ([1926] 1997: 268).

business-cycle theory within the system of general economic equilibrium. Hayek's response to Löwe's challenge is characterized by important disagreements but also relevant points of conformity. He explicitly agreed with Löwe's statement that "to expect an immediate furtherance of *theory* from an increase in *empirical* insight is to misunderstand the logical relationship between theory and empirical research"¹³. There can be no doubt "that the practical value of statistical research depends primarily upon the soundness of the theoretical conceptions on which it is based. To decide upon the most important problems of the Trade Cycle remains the task of theory"¹⁴. Thus, Hayek shared Löwe's view on the relation between empirical observation and theoretical explanation. Both clearly repudiate the methodological position taken by Mitchell, the Harvard Committee, and Wagemann. According to Löwe and Hayek therefore any adequate explanation of business cycles must employ a theory.

Furthermore, Hayek accepted Löwe's seminal argument that all existing theories of the business cycle suffer from the fundamental weakness that they rely on exogenous shocks or disturbances and adjustments to such shocks in an equilibrium framework. Such a procedure could hardly result in a satisfactory theory to explain economic fluctuations which occur in a somewhat regular fashion. The logic of equilibrium theory "properly followed through, can do no more than demonstrate that such disturbances of equilibrium can come only from outside – i.e., that they represent a change in the economic data – and that the economic system always reacts to such changes by its well-known methods of adaptation, i.e. by the formation of a new equilibrium"¹⁵. Trade cycle theory like any other economic theory, must fulfil two criteria of correctness to avoid the pitfalls of creating cyclical fluctuations via the introduction of exogenous shocks into a static system. "Firstly, it must be deduced with unexceptionable logic from the fundamental notions of the theoretical system; and secondly, it must explain by a purely deductive method those phenomena with all their peculiarities which we observe in the actual cycles. Such a theory could only be 'false' either through an inadequacy in its logic or because the phenomena which it explains do not correspond with the observed facts."¹⁶ Hayek explicitly points to the parallels of his argument with the views expressed by Löwe (1928).

Whereas Hayek shared Löwe's view that the incorporation of cyclical phenomena into equilibrium theory is the crucial problem of business-cycle theory and that, correspondingly, business cycles should be explained as *endogenous* outcomes of market processes, the two economists differ fundamentally in their conclusions drawn. Löwe, on the one hand, claimed

¹³ Ibid: 246 and Hayek ([1929] 1933: 28).

¹⁴ Hayek ([1929] 1933: 39).

¹⁵ Ibid: 42-43.

¹⁶ Ibid: 32-33.

that economic theory could become a realistic science, allowing conclusions of practical relevance, only by abandoning the use of the traditional equilibrium concept, i.e., "by dropping the classical misconception that objective equilibrium and states of rest are the true subjects of research"¹⁷. For Hayek, on the other hand, any adequate business-cycle theory must not only be consistent with the logic of equilibrium theory but require it as a condition. He strictly adhered to *equilibrium theory* by which he understood "the modern theory of the general interdependence of all economic quantities, which has been most perfectly expressed by the Lausanne School of theoretical economics"¹⁸. To start from the assumption of equilibrium in which all resources are fully utilized therefore is essential for Hayek's explanation of business cycles. Chapter II of *Prices and Production*, which mainly focuses on the comparative statics of steady states, is characterized by Hayek's "conviction that if we want to explain economic phenomena at all, we have no means available but to build on the foundations given by the concept of a tendency towards an equilibrium"¹⁹.

Hansjörg Klausinger (2012a, p. 12) in his fine Introduction to Hayek's *Business Cycles* has pointed out very clearly "their firm foundation on an equilibrium approach" and "Hayek's grappling with the equilibrium framework as the point of departure for the analysis of money and the cycle". Hayek's theory rests on the idea that prices determine the direction of production. The function of prices as an intertemporal coordination mechanism is to give entrepreneurs the required information for their investment and allocation decisions. Any adequate theory of the business cycle therefore must consider movements in relative prices and their impact on the structure of production. For the analysis of cyclical fluctuations, it is essential to incorporate the element of time into the concept of equilibrium. Interestingly, in the very same year in which he wrote his first article on business-cycle theory Hayek (1928b) published his article "Intertemporal Price Equilibrium and Movements in the Value of Money" (1928a) in which he pointed out the central role of the equilibrium concept even in a wider intertemporal context most clearly:

"Yet the *concept of equilibrium* is just as indispensable a tool for the analysis of temporal differences in prices as it is for any other investigation in economic theory. Strictly speaking, *its field of application is identical with that of economic theory*, since only with its assistance is it possible to give a summary depiction of the very great number of different tendencies of movement which are operative in every economic system at every point in time"²⁰.

¹⁷ Lowe (1935: 89).

¹⁸ Hayek ([1929] 1933: 42n.).

¹⁹ Hayek (1935: 34).

²⁰ Hayek ([1928a] 1984: 75). Emphasis added.

If, in an intertemporal equilibrium system, supply and demand are equilibrated via the price mechanism, how is it then possible that business cycles are a recurrent phenomenon since no change within the system can give rise to it? Hayek's answer to the methodological problem raised by Löwe is the introduction of money (and credit) as the endogenous causal factor which "does away with the rigid interdependence and self-sufficiency of the 'closed' system of equilibrium, and makes possible movements which would be excluded from the latter. Here we have a starting point which fulfils the essential conditions for any satisfactory theory of the Trade Cycle."²¹ Thus Hayek resorts to money and credit as the factor whose introduction breaks the equilibrium system and makes endogenous fluctuations both possible and necessary. Löwe, on the other hand, regarded monetary factors as neither necessary nor sufficient for the explanation of business cycles and as playing, at best, an intermediate causal role and as being likely to intensify any disequilibrium induced by non-monetary causes, in particular technological change. In his contribution to the 1928 Zurich meeting of the Verein für Sozialpolitik "On the influence of monetary factors on the business cycle", which before he had delivered as a lecture to the Economics Society in Vienna on 26 March 1928, where Hayek was present, Löwe was at pains to show that all monetary theories of the business cycle so far developed need to introduce other factors, such as technological changes or adjustment lags, in order to be capable of understanding cyclical fluctuations. These factors by themselves are sufficient to generate cyclical fluctuations without the necessity of falling back upon changes in the supply of money and credit, which, however, may be superimposed. Referring also to the "Doctrinal history of monetary business-cycle theory" by his closest research associate Burchardt (1928), which was distributed to the participants of the Zurich meeting²², Löwe came to the "astonishing result: *there is no monetary theory of the business cycle*"²³.

For Hayek, on the other hand, any adequate theory of the business cycle must have a monetary origin. This becomes already very clear in his contribution "Some remarks on the relation of monetary theory to business cycle theory" to the 1928 Zurich meeting, in which he points out the gap in the argument of all non-monetary theories but also the defects in the existing approaches to a monetary theory of the business cycle which he wants to overcome, most importantly the almost exclusive emphasis on the relationship between the quantity of money and the absolute level of prices. Instead, any adequate monetary theory of the business cycle must focus on the effects of monetary disturbances on the structure of *relative* prices and the

²¹ Hayek ([1929] 1933: 44-5).

²² Hayek was not unimpressed by Burchardt's article which he praised as "very valuable in its historical part" (Hayek 1929: 57 n. 3).

²³ Löwe ([1928] 2002: 205).

consequential disproportionalities in the structure of production, which arise because the price system communicates false information about consumer preferences and resource availabilities.

When business-cycle theory, after dominance of growth theory for more than two decades, entered centre stage again in the mid-1970s, the assumption of continuous market clearing (as a methodological device) in the New Classical paradigm and real business cycle models became an issue of heated controversies. That paradigm describes economic fluctuations as a purely equilibrium phenomenon in which fluctuations become optimal since they are no more than the agents' optimal reaction to exogenous shocks. Since Lucas casually presented the new classical approach as the natural, from a technical point of view much more advanced development of Hayek's business-cycle theory, the issue of an Austrian revival came up as becomes clear in the following statement by Scheide (1986:595):

"The discussions of both approaches showed that it would not be appropriate to claim that Austrians have developed the *only* theory of business cycles which refers to individual behavior and choice. New classicals have rediscovered this approach and used many of the tenets for their explanation. This is not to say that new classical theory completely follows Austrian traditions. But many of the differences appear to be small or are only semantic in character."

In the opening passage to 'Understanding Business Cycles', one of his most-read contributions, Lucas had asked the question "Why is it that, in capitalist economies, aggregate variables undergo repeated fluctuations about trend, all of essentially the same character?" (Lucas 1977, 7).²⁴ He continues to quote with approval Hayek's statement in *Monetary Theory and the Trade Cycle* "that the incorporation of cyclical phenomena into the system of economic equilibrium theory, with which they are in apparent contradiction, remains the crucial problem of Trade Cycle theory"²⁵. This clearly refers to the central question of an (in)compatibility of an explanation of the business cycle with the dominant general equilibrium approach in economics. Lucas, like Hayek, adheres to the concept of equilibrium as an indispensable tool for economic theory. It is tempting then to identify the research programme of equilibrium business cycle theory launched by Lucas as another attempt to escape the fundamental methodological dilemma which had been so clearly stated by Löwe half-a-century before.

However, such a view is not straightforward. Lucas was repeatedly criticized for the skewed comparison to Hayek as, for example, by Kevin Hoover (1988) and Richard Arena (1994) who

²⁴ Lucas first presented his paper at the summer conference 1976 of the Kiel Institute of World Economics. He was obviously not aware that this was exactly the place where, half- a -century earlier, the then head of the department for the research on business cycles, Adolf Löwe, had raised the fundamental methodological question to which Hayek (who explicitly refers to Löwe in the passage in question) responded.

²⁵ Hayek ([1929] 1933: 33n).

emphasized the differences between Lucas's contributions and Hayek's initial project.²⁶ As a reaction Lucas himself (1994) minimizes the Austrian aspects of his contribution saying that "I once thought of myself as a kind of Austrian, but Kevin Hoover's book persuaded me that this was just a result of my misreading of Hayek and others"²⁷. In his *Nobel Lecture* (Lucas 1996), all references to Hayek have disappeared, and Lucas instead refers to David Hume.

In terms of content, the crucial fundamental difference is that Hayek was well aware that in a monetary economy things can go damn wrong, whereas in Lucas's New Classical Macroeconomics this is excluded by the market-clearing postulate as a methodological principle. In other words, in Lucas's ECBT the economy is in equilibrium throughout the cyclical fluctuations, whereas in Hayek's Austrian theory of the business cycle the economy is in disequilibrium throughout the course of the cycle. Lucas's approach is more in line with the concept of neutral money as a fictitious reference point, which Hayek derives from an ideal-typical barter economy, and which therefore cannot be called (neo-) "Austrian". David Laidler (1982, chpt. 3) and Hansjörg Klausinger (1985) early on had referred to this decisive difference.

However, there is one economist in the contemporary debate on business-cycle theory who, more than Hayek, would have deserved to be cited by Lucas as a precursor of modern equilibrium business-cycle theory, namely Friedrich Lutz.²⁸ In his Freiburg habilitation thesis *The Problem of Business Cycles in Economics* (1932) Lutz defended the prevailing equilibrium approach and denied Löwe's claim for a new dynamic theory. According to Lutz there cannot be a general theory of the business cycle that goes beyond the accomplishments of modern equilibrium theory. It is therefore decisive for him to deny the regularity postulate. Every business cycle is seen as a historical event which constitutes an individual case. It is the task of business-cycle theory to explain individual trajectories by applying all the findings of static equilibrium analysis, in particular those of the effects of various data changes. While conceding that the Lausanne school did not pay sufficient attention to the time dimension and therefore to adjustment processes, Lutz emphasized that technical progress, as favoured by Schumpeter and Löwe, would be nothing more than a data change whose effects can be studied within the existing framework of equilibrium theory by applying the variation method. Lutz considered capital formation, technical progress, and changes in the quantity of money only as data changes, a view that excludes their endogeneity and is highly doubtful as a general statement. Shortly afterwards, Jan Tinbergen (1935: 241) pointed out the opposite view: "Business cycle

²⁶ See Hoover (1988: chpt. 10). For a comparison of New Classical and Old Austrian economics see also Garrison (1991).

²⁷ Lucas (1994: 222).

²⁸ See Lutz ([1932] 2002), Rühl (1994), Dal Pont Legrand and Hagemann (2013), Grudev (2019), and Hagemann (2022, pp.30-35).

research shows that a dynamic theory is necessary to explain facts and so business cycle theory is not possible within the field of static theory.”

III. Wicksell’s theory of the cumulative process: price changes caused by a disequilibrium between the market rate and the natural rate of interest

Hayek's systematic elaboration of the monetary explanation of business cycles owes a considerable debt to Wicksell's analysis of cumulative processes caused by discrepancies between the money (market) rate of interest and the natural (equilibrium) rate of interest, and to Mises's theory of money and credit. Gunnar Myrdal observed that, in contrast to English economists who only slowly recognized Wicksell's monetary theory, "certain theorists of the Austrian School, particularly Mises and Hayek first saw the importance of Wicksell's ingenious ideas. It is not surprising that it was the Austrians who found the connexions with Wicksell: Wicksell himself was a pupil of Böhm-Bawerk and he put his thoughts into forms and constructions based directly on Austrian habits of thought."²⁹ The ideas which Wicksell had taken from Böhm-Bawerk mainly lay in the area of interest and capital theory, as comes out best in chapter 9 of his *Interest and Prices* where Wicksell (1898) uses Böhm-Bawerk's theory in his analysis of the causes which determine the natural rate of interest on capital and the interaction of the monetary system with the real side of the economy. It was Wicksell's main achievement to have elaborated an analysis in which time and money are subjected to the marginal principle. The market rate of interest serves the double function of coordinating the supply and demand for all loanable funds and at the same time the supply and demand for real capital in terms of saving and investment. An increase (decrease) in savings due to a change in individuals' intertemporal preferences would lead to a lower (higher) rate of interest and a lengthening (shortening) or more (less) roundabout method of production. The natural rate of interest acts as the centre of gravitation for the market rate of interest which in monetary equilibrium also equals the marginal physical productivity of real capital.

Wicksell's ideas on the dis- and re-equilibrating mechanism of divergences between the money and the natural rate of interest provided an important building block for Austrian business-cycle theory as it was developed by Mises and particularly Hayek³⁰, who combined

²⁹ Myrdal (1939: 7).

³⁰ In many respects Wicksell's analysis of cumulative processes was a revitalization of ideas put forward by Henry Thornton (1802) in *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain*. No wonder that Hayek introduced a new edition of Thornton's classic which had opened a "new era" of monetary theory (Hayek in Thornton 1939, p.36).

Wicksell's analysis of the cumulative processes with the doctrine of "forced saving"³¹ to generate a monetary theory of the business cycle in which injections of money or bank credit lead to overinvestment and thereby to a distortion in the time structure of production which is unsustainable. In principle two major impulses which can cause a divergence between the two rates of interest have to be distinguished:

1. an improvement in profit expectations due to technical progress which causes an increase in the natural rate of interest and investment demand.
2. a generous granting of credit by the banking system which leads to a fall of the money rate of interest below the natural rate.

Whereas the first impulse is real and a "natural" one, the second impulse is a monetary one and, in the view of Mises and Hayek, "artificial". Although Wicksell mainly elaborated his cumulative process analysis for a better understanding of changes in the general level of prices, and his business-cycle theory remained a fragment or an "enigma"³², we have to note that "Wicksell was, in short, so impressed by the real elements in cyclical fluctuations, and in particular those involving investments activity that he treated monetary aspects of the cycle as peripheral."³³ Recent publications have not only shown the importance Wicksell attributed to the business-cycle phenomenon but also clearly document his identification of (the unsteady stream of) inventions as the "*deepest* cause of changes in economic conditions"³⁴. Thus, Wicksell emphasized technology shocks and perceived in real factors which lead to an increase in the natural rate of interest the essential reason for business cycles.

With the emphasis on technical progress Wicksell stood in the German tradition of such diverse authors as Marx and Schumpeter. In the contemporary debate with Hayek and Mises this argument was made by Löwe and Burchardt who, with explicit reference to Wicksell, pointed out that, although changes in the market rate of interest are important for movements of the price level, the real impulse for the disturbance of equilibrium is given by technical progress which increases the natural rate.³⁵

What was Hayek's initial position? From the beginning he made it clear that "deviations of the money rate of interest from the equilibrium rate" – a term he preferred to the "natural rate" – "must be regarded as the cause of the periodically recurring disproportionalities in the

³¹ See his 1932 "A Note on the development of the doctrine of 'forced saving'", reprinted as chapter VII in Hayek (1939).

³² See Wicksell ([1907] 1951).

³³ Laidler (1991: 146).

³⁴ Wicksell (2001: 339). See also Boianovsky (1995), Leijonhufvud (1997), and Boianovsky and Trautwein (2001).

³⁵ See Burchardt (1928: 119 and 140).

structure of production"³⁶. He dedicated the whole chapter IV of *Monetary Theory and the Trade Cycle* to the issue raised by Löwe to show that the fundamental cause of cyclical fluctuations is of an endogenous nature. Although, in contrast to Löwe, he left no doubt that changes in the volume of money must be recognized as the ultimate cause of cyclical fluctuations³⁷, he nevertheless accepted that a discrepancy between the two rates of interest does not necessitate any deliberate action by the monetary authorities but may be the result of technical progress causing an increase in the equilibrium rate of interest which is not matched by an immediate adjustment of the money rate.

"The situation in which the money rate of interest is below the natural rate need not, by any means, originate in a *deliberate lowering* of the rate of interest by the banks. 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. The decisive significance of the case quoted is not, in my view, due to the fact that it is probably the commonest in practice, but to the fact that it *must inevitably recur* under the existing credit organization."³⁸

Regarding the decisive endogenous factor causing cyclical fluctuations, it is revealing to look at John Hicks for whom the economics of Hayek were a lifelong challenge. Hicks repeatedly pointed out how much he had been influenced by Hayek in whose seminar at the London School of Economics he had participated as a young lecturer between 1931 and 1935.³⁹ He acknowledged that Hayek had introduced him to the works of Wicksell, shifting the question to what happens to quantities instead of the general price level in a Wicksellian cumulative process, and of Böhm-Bawerk, whose analytical framework, which made Hicks think of the productive process as a process in time, was quite unfamiliar in contemporary English economics. Although he took over from Hayek the idea that the impact of an impulse on the real structure of production is most important, however, from the beginning Hicks always had been sceptical about Hayek's claim that the economy would be in equilibrium if there were no monetary disturbances. This becomes already manifest in Hicks's early 1933 essay 'Equilibrium and the Cycle', which was the result of his grappling with Hayek's *Prices and Production*

³⁶ Hayek ([1929] 1933: 139).

³⁷ For a critique of Hayek's position that only a constant quantity of money allows intertemporal price equilibrium, see White (1999).

³⁸ Hayek ([1929] 1933: 147-8).

³⁹ See 'The Hayek Story' (Hicks 1967) to which Hayek (1969) reacted with his 'Three Elucidations of the Ricardo Effect'.

lectures at the LSE and Hayek's 1928 concept of intertemporal equilibrium. Here we find Hicks arguing against Hayek's statement "that a change in the effective volume of monetary circulation is to be regarded as an independent cause of disequilibrium. I cannot accept this in its literal sense, though I am prepared to agree that in a world of imperfect foresight monetary changes are very likely to lead to acute disequilibrium."⁴⁰ Hicks recognized that to analyze money one must consider uncertainty and expectations which were absent in Hayek's early business-cycle theory.⁴¹

Although Hicks himself made important contributions to monetary theory, he never became too tired to emphasize "the *real* (non-monetary) character of the cyclical process"⁴². Whereas for Hayek cyclical fluctuations are caused by monetary factors, particularly credit expansion which distorts the system of relative prices, for Hicks, like for Löwe, technological change is the decisive factor causing traverse processes.⁴³ This was so important for him that in *Capital and Time* (1973) with the characteristic subtitle *A Neo-Austrian Theory* we still find Hicks arguing against Hayek in a long passage.

"Where ... I do not go along with him (or with what he said in 1931) is in the view that the disturbances in question have a monetary origin. He had not emancipated himself from the delusion ... that with money removed 'in a state of barter' everything would somehow fit. One of my objects in writing this book has been to kill that delusion. ... It is not true that by getting rid of money, one is automatically in 'equilibrium'. ... Monetary disorders may indeed be superimposed upon other disorders; but the other disorders are more fundamental."⁴⁴

However, when Hicks, the monetary theorist, stresses that "[m]oney is not the cause of fluctuations; it is a complication, but no more than that"⁴⁵, the statement is overemphasized due to the factual exclusion of money in the barter-type economy of his neo-Austrian model where money is at best the medium of exchange.⁴⁶

⁴⁰ Hicks ([1933] 1982: 32 n. 11). In a similar way as Lucas first had referred to Hayek as an important precursor, one of the leading representatives of Real Business Cycle theories focusing on technological impulses as the decisive factor causing cyclical fluctuations, pointed to Hicks in an influential article (Plosser 1989: 53-54).

⁴¹ See, however, Hayek (1939: 16-18) for a discussion of the role of expectations.

⁴² Hicks (1950: 136).

⁴³ For a more detailed comparison of the different views of Hicks and Hayek concerning the major cause of cyclical fluctuations see Hagemann (1998).

⁴⁴ Hicks (1973: 133-4).

⁴⁵ Ibid: 55.

⁴⁶ For a deeper analysis of the questions when, why and how money matters in a more developed Hicksian-type neo-Austrian model see chapter 2 of Amendola and Gaffard (1998).

IV. Mises's theory of money and credit: banks lowering the money (market) rate of interest

It is important to notice that *Monetary Theory and the Trade Cycle* was published in German as early as 1929, two years before the *Prices and Production* lectures were given at the London School of Economics. The historical order matters for significant shifts of emphasis, because of different theoretical traditions in the United Kingdom and in the German language area, but also because of the outbreak of the Great Depression and Hayek's anti-Keynesian position. For example, regarding the role of technical progress we find a significant change in Hayek's writings over time. In *Monetary Theory and the Trade Cycle*, Hayek supported Wicksell's argument that monetary expansion is frequently induced by changes in the 'capital rate', i.e., from improvements in profit expectations. Hayek mentioned technical progress as a major factor behind such changes. Thus, he recognized the importance of technical progress as part of the impulses and implicitly also of the propagation mechanism for cyclical fluctuations. In later writings he paid little attention, if any, to technical progress. Apparently, he did not want to modify his insistence on the inevitability of crisis and the return to the original equilibrium position. The switch in the assumptions about the cause of monetary expansion, from technological change to an autonomous lowering of interest rates, brought Hayek back to Mises's villains in the piece: the banks who arbitrarily lower the money rate of interest.

Ludwig von Mises had established himself as the first leading representative of a monetary theory or credit view of the business cycle in the German language area with the publication of his *The Theory of Money and Credit* (1912). Mises can be recognized as the pioneer of a typically "Austrian" theory of the business cycle. It is a central element of his "circulation credit theory" that the banking system grants a volume of credit which transcends the level of voluntary savings, thereby causing a misallocation of resources. The boom thus contains the seed of its later correction. In shaping his ideas Mises got major inspiration from three sources. His views for the operation of the banking system were strongly influenced by the doctrines of the Currency School, in particular their explanation of the boom by the expansion of credit resulting from the issue of bank notes without gold or silver backing. However, he criticized them for certain defects such as the overlooking that checks and current accounts play a similar role as bank notes in the extension of credit. As a former student of Böhm-Bawerk, in whose seminar at the University of Vienna he had participated with Joseph Schumpeter among his fellow students in summer 1905, Mises also drew on Böhm-Bawerk's capital theory which regards the production process of the economy as a sequence of stages in which original inputs

as labour are transformed into a single output of consumption goods, with capital goods appearing only as intermediate products or working capital. Finally, Mises took over the theorem of the two interest rates from Wicksell. However, he criticised the latter for concentrating too narrowly on the effects of this divergence on the absolute level of prices, thereby overlooking the impact of additional credit for the structure of production. The expansion of credit and the lowering of the money rate of interest below the natural rate creates an artificial or "unhealthy boom"⁴⁷ in which entrepreneurs are forced to enter upon longer processes of production. However, despite the initial increase in productive activities the consequences finally are negative ones because the gratuitous nature of credit contains the seeds of its own destruction.

"But there cannot be the slightest doubt as to where this will lead. 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. This time must come all the more quickly inasmuch as the fall in the rate of interest weakens the motive for saving and so slows up the rate of accumulation of capital."⁴⁸

Thus, the excess investment generated by credit creation and the artificial lowering of the money rate of interest below the natural rate are stopped by a shortage of savings before the lengthening of the production processes is coming to fruition. A further injection of credit could prolong the process but would make things even worse since inflation would accelerate and the corrective crisis is aggravating.

Hayek from the beginning followed Mises's view that discrepancies between the money and the natural rates of interest cause discrepancies in the structure of production, i.e., a deviation of the allocation of productive resources to capital goods and consumptions goods which differs from the allocation in equilibrium. He criticizes Wicksell for focusing on changes in the purchasing power of money in his cumulative process analysis, as well as Löwe and Burchardt for only identifying general price changes as monetary effects. According to Hayek *"monetary theory has by no means finished its work when it has explained the absolute level of prices."* Furthermore, *"general price changes are no essential feature of a monetary theory of the Trade Cycle; they are not only unessential, but they would be completely irrelevant if only they were completely 'general' – that is, if they affected all prices at the same time and in the same proportion"*⁴⁹. Consequently, a stabilization of the price level would not eliminate cyclical fluctuations. Wicksell had introduced the important distinction between the stability of the

⁴⁷ Mises ([1936] 1983: 4).

⁴⁸ Mises ([1924] 1981: 401).

⁴⁹ Hayek ([1929] 1933: 117 n. and 123).

equilibrium of relative prices and the (in)stability of monetary (general price level) equilibrium.⁵⁰ In contrast to Wicksell's monetary equilibrium and old and new monetarist views of the "neutrality" of money, Hayek's monetary equilibrium was not associated with the price level but with the system of relative prices.

Bertil Ohlin has pointed out in his introduction to the English translation of *Interest and Prices* that Wicksell "explicitly rejected the idea that his theory provided an explanation of the business cycle. He was critical of Mises's idea that mistaken credit policy is the origin of the tendencies towards booms and depressions."⁵¹ A closer look at Mises's writings reveals that there has been a remarkable change of emphasis between the first and second edition of *The Theory of Money and Credit*. Whereas in 1912 Mises located only one of several possible causes for economic fluctuations in the credit sector⁵² and still emphasized that a primary impulse for a boom does not arise from excessive credit creation, he came to change his views under the impression of the disastrous hyperinflationary processes from which Austria and Germany suffered after World War I. The banks now became the main culprits being responsible for an unsustainable credit-induced boom making inevitable the subsequent bust in which the reallocation to excessively roundabout methods of production is corrected. It is a characterising element of the Austrian theory of the business cycle that it thus attributes a recession or depression to a preceding expansion of money and credit. Although Hayek early on took the influences arising from money and credit as the focal point of his business-cycle theory, we nevertheless can observe in his writings, as in those of Mises, that a catastrophic economic reality – in Hayek's case the outbreak of the Great Depression – shifted his economic views in a more orthodox direction away from Wicksell towards Mises.

Mises's argument of excessive credit creation by the banking sector as the decisive cause of cyclical fluctuations is most clearly stated in his *Monetary Stabilization and Cyclical Policy* (1928), in which he not only distances himself from views still held by Schumpeter but even from his own earlier views. No wonder that a few years later Howard Ellis (1934) in his well-known survey of *German Monetary Theory: 1905-1933* points out the difference between "The Mises-Hayek Analysis of Cycles" and "The Schumpeter-Hahn Type of Cycle Theory". Schumpeter's view on the importance of bank credit for the financing of innovative investment activities and new enterprises found the strongest resonance in L. Albert Hahn's *Economic Theory of Bank Credit* (1920). The Frankfurt banker shared Schumpeter's opinion that the main function of credit is the financing of economic development. Hahn wanted to overcome the

⁵⁰ See Trautwein (1996).

⁵¹ Ohlin in Wicksell (1936: VIII).

⁵² See Mises (1912: 434).

classical view – shared by Mises and Hayek – that every credit has to be financed by means of savings deposited with banks, which he regarded as inadequate for a modern monetary and credit economy. In agreement with Henry Dunning Macleod, Hahn saw the essential role of banks in being manufactories of credit, which became the 'leitmotiv' of his views which condensed in the famous statement that "capital formation is not the result of saving but of credit"⁵³. No wonder that Schumpeter in his *The Theory of Economic Development* (1934) refers the reader to Hahn's "original and meritorious book, which has essentially advanced our knowledge of the problem"⁵⁴. However, in the second 1926 German edition of his book Schumpeter distances himself from Hahn's apotheosis of credit creation by making the qualifying statement: "The potential quantity of new purchasing power to be created, although not by *existing* goods, is nevertheless supported and limited by *future* goods."⁵⁵ In his pre-*General Theory* statement Schumpeter came already close to Keynes's later view that, if saving depends on real income, there can be a certain ex post-financing due to multiplier effects of credit-financed investments, i.e. higher voluntary savings due to a growing income which thus become an integral part of a re-equilibrating mechanism.

In contrast to Schumpeter, for whom innovations are the decisive cause of business cycles whereas the credit system plays a more passive role adapting itself to the demand which comes from entrepreneurs, Hahn identified in the credit system the decisive active producer of business cycles. For that reason, Hayek, despite his opposition to Hahn's apotheosis of credit, recognized that Hahn's "views regarding trade cycle theory ... are in some respects similar to those of Professor Mises"⁵⁶. Whereas this argument is developed in the context of the strong opposition by Löwe and Burchardt against monetary theories of the business cycle, against which Hayek held the view that a business-cycle theory other than monetary is hardly conceivable, he accepted Löwe's criticism against the *exogenous* character of the theories of Mises and Hahn who rely on "arbitrary interferences on the part of the banks. This is, perhaps, one of the main reasons for the prevailing scepticism concerning the value of such theories: A theory which has to call upon the *deus ex machina* [Neisser 1928, p.161] of a false step by bankers, in order to reach its conclusions is, perhaps, inevitably suspect"⁵⁷. In the German original of *Monetary Theory and the Trade Cycle* Hayek ascribes to Hahn's extreme views the main responsibility

⁵³ Hahn (1920: 120). For a more detailed analysis of Hahn's theory of bank credit and his later toning down see Hagemann (2014).

⁵⁴ Schumpeter (1934: 95 n. 1).

⁵⁵ Schumpeter (1926: 165 n.18). Interestingly, Hahn who often had been accused to be an inflationist, moderated his former radicalism in the 3rd edition of his book (1930).

⁵⁶ Hayek ([1929] 1933: 111n.).

⁵⁷ Ibid: 144-5.

for the existing confusion on the issue of the increase of deposits due to credit creation by the banks.⁵⁸ No doubt that the "rather vague views on the relation between credit and capital"⁵⁹ which Hayek attested to Macleod also held for Hahn whose proposition that capital formation proceeds from credit creation and not from saving was equally suspicious for Hayek and Mises alike.

V. Böhm-Bawerk's theory of capital: the time structure of production and the Hayekian triangles

It was one of Hayek's major achievements to have shown the importance of the temporal structure of production processes for cyclical fluctuations. Thus, Gottfried Haberler rightly regards "vertical maladjustments in the structure of production" as "Hayek's key concept"⁶⁰. Changes in the structure of production are the crucial cyclical mechanism. In MTTC and PP Hayek assumes full employment of resources the starting point of his analysis, and emphasizes that any adequate theory of the business cycle must take into account movements of relative prices. "Every disturbance of the equilibrium of prices leads *necessarily* to shifts in the structure of production" (Hayek [1929] 1933, p.123). The effect of inflationary credit creation is an excess of investment over voluntary savings, which causes maladjustments in the structure of production and is therefore the root cause of the later crisis.

Hayek considered Böhm-Bawerk's approach as the only satisfying capital theory suited to investigate disproportionalities and maladjustments in the structure of production caused by non-neutral money. The changes in the real structure of production over time which constitute the industrial fluctuations are elaborated in chapter II "The conditions of equilibrium between the production of consumers' goods and the production of producers' goods" of PP. In the Austrian representation of the structure of production, as it was devised by Böhm-Bawerk and applied by Hayek, a sequence of original inputs is transformed into a single output of consumable commodities. The production process is treated as *unidirectional*. Each stage represents intermediate products (or 'working capital'), with the highest stage, where original means of production (labour and natural resources) continuously produce the first intermediate products of the synchronized production process without the aid of intermediate products (capital goods), and the lowest stage passing each year into consumption.

⁵⁸ Hayek (1929: 83-4).

⁵⁹ Hayek (1933: 30).

⁶⁰ Haberler (1986: 422).

The relevant characteristics of the structure of production are shown by Hayek in his famous *triangles*. While the ordinate represents the time dimension (which is treated as a discrete variable), i.e., the degree of roundaboutness, the abscissa measures the money value of the output of consumption goods. In PP Hayek stays firmly in the Austrian tradition to regard capital goods as incapable of serving human wants directly and thus have no intrinsic utility. Furthermore, in applying a simple *flow input – point output model*, he adopts Böhm-Bawerk's concepts of the average period of production and the greater productivity of more roundabout processes of production. The equilibrium concept applied by Hayek in MTTC and PP thus corresponds to that of traditional marginal theory. Changes in the rate of interest have a systematic effect on the structure of relative prices and thereby the intertemporal structure of production allocating resources among the different stages. The lower (higher) the interest rate the longer (shorter) are the production processes that a rational capitalist entrepreneur would adopt, thus drawing more resources into the earlier (later) stages of production. Consequently, a lengthening (shortening) of the production period takes place. This is the Austrian version of traditional marginal capital theory, that corresponds to a higher (lower) capital-labour ratio in relation to a higher (lower) ratio between the wage rate and the interest rate, as expressed in the concept of the elasticity of substitution elaborated by Hicks (1932).

According to Hicks the evolution of disequilibrium over time is the central subject of macroeconomics. He repeatedly pointed out how much he had been influenced by Hayek in his early period at the LSE between 1931 and 1935.⁶¹ Hicks grappled with an adequate treatment of time in economic theory for almost six decades. In particular Hicks also emphasized the importance of the time dimension in the taking up of innovations and in the analysis of the compensation process of displaced workers who lost their jobs because of the introduction of new machinery.⁶²

Hicks took over from Hayek and the Austrians the idea that production is a process in time with strong intertemporal complementarities. However, in his “neo-Austrian” theory of *Capital and Time* Hicks (1973) tried to overcome the unsatisfactory treatment of fixed capital goods which had already been the main point of critique raised by Burchardt (1931-32) against Böhm-Bawerk's approach. Hicks's neo-Austrian model is of the flow input – *flow* output type, i.e., capital goods are considered to produce a whole stream of final consumption goods at different dates. Time is the essence of capital and enters production in a twofold way: as duration of the

⁶¹ See, e.g., Hicks (1967).

⁶² The neglect of the role of innovations in the business cycle was probably the main reason for Schumpeter's lukewarm reception of Hayek's business cycle theory.

process by which labour inputs are converted into consumption goods, *and* in the sequence of consumption goods generated by the fixed capital goods (and labour). Hicks thus overcame a decisive weakness of the old Austrian approach neglecting the important role of machine tools in industrial production. In contrast to Böhm-Bawerk and the early Hayek of MTTC and PP, Hicks also gave up the notion of the degree of roundaboutness and the concept of the average period of production.⁶³

VI. Cantillon effects of changes in the money supply on the price structure: the non-neutrality of money

As Klausinger (2012a, p.34) has emphasized clearly, it is “the injection, withdrawal, or redistribution of money that makes a money economy diverge from neutrality”. For Hayek (1935, p. 31) the concept of *neutral money* marks the equilibrium benchmark for his business cycle theory: “a *neutral* money must .. form the starting point for the theoretical analysis of monetary influences on production”. What is decisive for Hayek is not price stability, but that money is neutral in the sense that it leaves the relative values of goods undisturbed. Neutral money implies that the market rate of interest equates the natural rate, and investment demand with voluntary savings as determined by intertemporal consumer preferences.

Credit creation by the banks that lowers the money rate of interest evokes a deviation of the money economy from the benchmark of neutral money. The lower interest rate is perceived by the entrepreneurs as a signal for a profitable lengthening of production processes. Credit demand will rise, and additional money will be injected into the economy by a lengthening of the banks’ balance sheets. The prices of capital goods increase relatively to the prices of consumption goods. Under Hayek’s assumption that all resources are fully utilized in equilibrium, a credit expansion implies that producers of capital goods in the new processes of production bid away resources from older processes. The injection of additional money causes a redistribution of purchasing power which leads to a diversion of the production structure from neutrality, favouring those parts of the economy where the money arrives first.

The *Cantillon effect* begins to work.⁶⁴ Hayek had already presented a paper on Cantillon to the *Geistkreis* in Vienna in June 1930 and initiated a German edition of Cantillon’s classic

⁶³ After struggling with the complex problems of capital theory, and the critique raised by Knight, Morgenstern (1935), and others, for almost a decade, Hayek finally gave up the concept of the period of production in his *The Pure Theory of Capital* (1941).

⁶⁴ For a more detailed discussion of the role of Cantillon and Ricardo effects in Hayek’s business cycle theory see Hagemann and Trautwein (1998).

which was translated by his wife Hella.⁶⁵ In his introduction Hayek (1931, pp. XXXI f.) praised Cantillon for his “accurate description of the effects of a temporary reduction in the rate of interest caused by an increase in the quantity of money” (due to a discovery of gold and silver mines) and his emphasis on the structural effects of inflation on prices, incomes, and consumption. He referred to Richard Cantillon (1755) in the introduction of the first lecture of *Prices and Production* for providing “the first attempt known to me to trace the actual chain of cause and effect between the amount of money and prices” (Hayek ([1931] 2012a, p. 198).

The redirection of capital due to a lengthening of production processes causes a decline in the output of consumption goods, even though consumer preferences remain unchanged, and money incomes have risen with labour demand in the production of capital goods. Shortages of consumption goods make their prices rise faster than incomes. This process constitutes the mechanism of *forced saving* which will eventually make the redirection of resources into less roundabout methods of production profitable. Yet the boom prevails as long as the credit expansion favours investment in more roundabout processes. Artificial credit increases, not backed by changes in intertemporal preferences, induce forced saving. According to Hayek ([1929] 1933, p.226), “*it is probably more proper to regard forced saving as the cause of economic crises than to expect it to restore a balanced structure of production.*” An artificial lowering of the money rate of interest and additional credit induce an artificial capital accumulation and forced saving.

Hayek’s explanations of the setting in and inevitability of the crisis hinge upon some arbitrary assumptions which have been discussed controversially. He assumes that the great majority of the investments in more roundabout processes remain uncompleted and are destroyed (capital erosion) because of the banks’ denial to grant additional credit (frustrated traverse). He himself argues that the question “[w]hether capital can be created beyond the limits set by voluntary saving depends ... on whether the process of credit creation continues in a steadily increasing ratio” (Hayek [1929] 1933, pp. 222-3), but denies that continuous credit injection can happen, which would allow the economy to achieve and sustain a more roundabout structure of production. Thus, credit supply is restricted before the increase in productivity can counteract inflation by lowering the prices of consumption goods. “But surely a constant *proportional* rate of credit expansion would enable the new higher *relative* price of capital goods to be perpetuated. There seems to be nothing here to require that inflation must accelerate” (Laidler 1994, p.12).

⁶⁵ See Caldwell and Klausinger (2022, pp. 253-4).

The boom phase is characterized by an increase in profits and a relative decline in real wages, but Hayek excludes that the redistribution of income might stimulate voluntary savings. He assumes that voluntary savings are only influenced by the rate of interest, thereby neglecting other important variables. If, however, the credit expansion would be succeeded by an increase in voluntary saving, the restructuring of the economy to more roundabout processes need not prove futile, an argument which Hayek (1939, p.180) rudimentarily concedes for high-saving economies and a moderate credit expansion. With a Kaldorian saving function, in which the savings ratio out of profits is higher than the savings ratio out of wages, a redistribution of income in favour of profits would increase the overall level of voluntary savings. This might allow the possibility that the change in the structure of production would remain permanent and needs not be corrected by a crisis as a cure.

VII. Ricardo effects of a shortage of consumption goods on the production of investment goods: disproportionalities and the turning point of the cycle

The Ricardo effect, as the Cantillon effect, is associated with a *structural* approach to business cycle theory. Whereas the Cantillon effect represents erroneous expectations of permanent changes in relative prices, or “justified errors, caused by the price system” (Hayek 1939, p. 141), the Ricardo effect has the basic function to give a theoretical explanation for the upper turning point, i.e., to show that an inflation-fed boom due to credit expansion must sooner or later be reversed by a decline in investment. The Ricardo effect thus represents the tendency to restore the original equilibrium position.

When the banks stop the credit expansion, the structure of production which has developed during the inflationary upswing, turns out as unduly elongated and unsustainable, due to a disproportionality between fixed and circulating capital (Ricardo), respectively capital and consumption goods. The credit boom is thus followed by capital destruction and unemployment. This holds in particular for the specific resources employed in the unfinished prolonged production processes, but even unspecific resources might not be integrated in the remaining profitable and shorter processes without frictions.

For Hayek the Ricardo effect⁶⁶ is the mechanism that inverts the acceleration principle of derived demand, that emphasizes an increase of consumption as a stimulus and amplifier to

⁶⁶ For a critical discussion of Hayek’s use of the Ricardo effect (Kaldor: concertina effect) and the distinction between a *Ricardo value effect* and the *Ricardo machinery effect* see Hagemann and Trautwein (1998).

investment, into a '*deceleration principle*'.⁶⁷ Rising demand for consumption goods would increase their prices and reduce real wages which would make a shortening of production processes (the equivalent of a lower capital-labour ratio in the Austrian model) more profitable, and finally restore the production structure of a neutral money economy.

Capital accumulation running ahead of savings, however, is clearly not a Ricardian theme.

Nor are the causes and effects of technical progress a Hayekian theme in his Austrian business cycle theory.

VIII. Concluding remarks

It is well known that Lucas in his Nobel lecture criticized Hayek and Keynes for "their futility of attempting to talk through hard dynamics without any of the equipment of modern mathematical economics" (Lucas 1996: 669), as well as Hayek's transformation from problems of monetary, business cycle and capital theory to problems of knowledge and information, the constitution of liberty, etc.

When looking back at his Austrian theory of the business cycle, which Hayek never renounced, two major impressions come up. He didn't suffer "from the attractive Anglo-Saxon kind of unnecessary originality", an attack Myrdal (1939, p. 8) particularly directed against Hayek's rival Keynes. Quite the contrary, more than most other great economists Hayek was a scrupulous historian of economic thought, acknowledging the contributions of earlier authors who had influenced his economic ideas, whether Wicksell, Mises, Böhm-Bawerk, Cantillon, Ricardo, Thornton, Mill, or...

On the other hand, it cannot be overlooked that his theory contains both an analytical and a political message. Hayek's pessimism regarding economic policy was implicit in his positive analysis. This led him sometimes astray, most famously when he stated that "a relative increase of the demand for consumers' goods could only make matters worse" (Hayek [1931] 1935, p.97), during the Great Depression with an enormous underutilization of resources.

⁶⁷ See chapter I of *Profits, Interest and Investment* (Hayek 1939).

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