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**AUSTRIAN AND NEW CLASSICAL  
BUSINESS CYCLE THEORIES**

**Rudy van Zijp**



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To my parents

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## PREFACE

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which are contained  
in the report as follows:

1. Austria

2. ...

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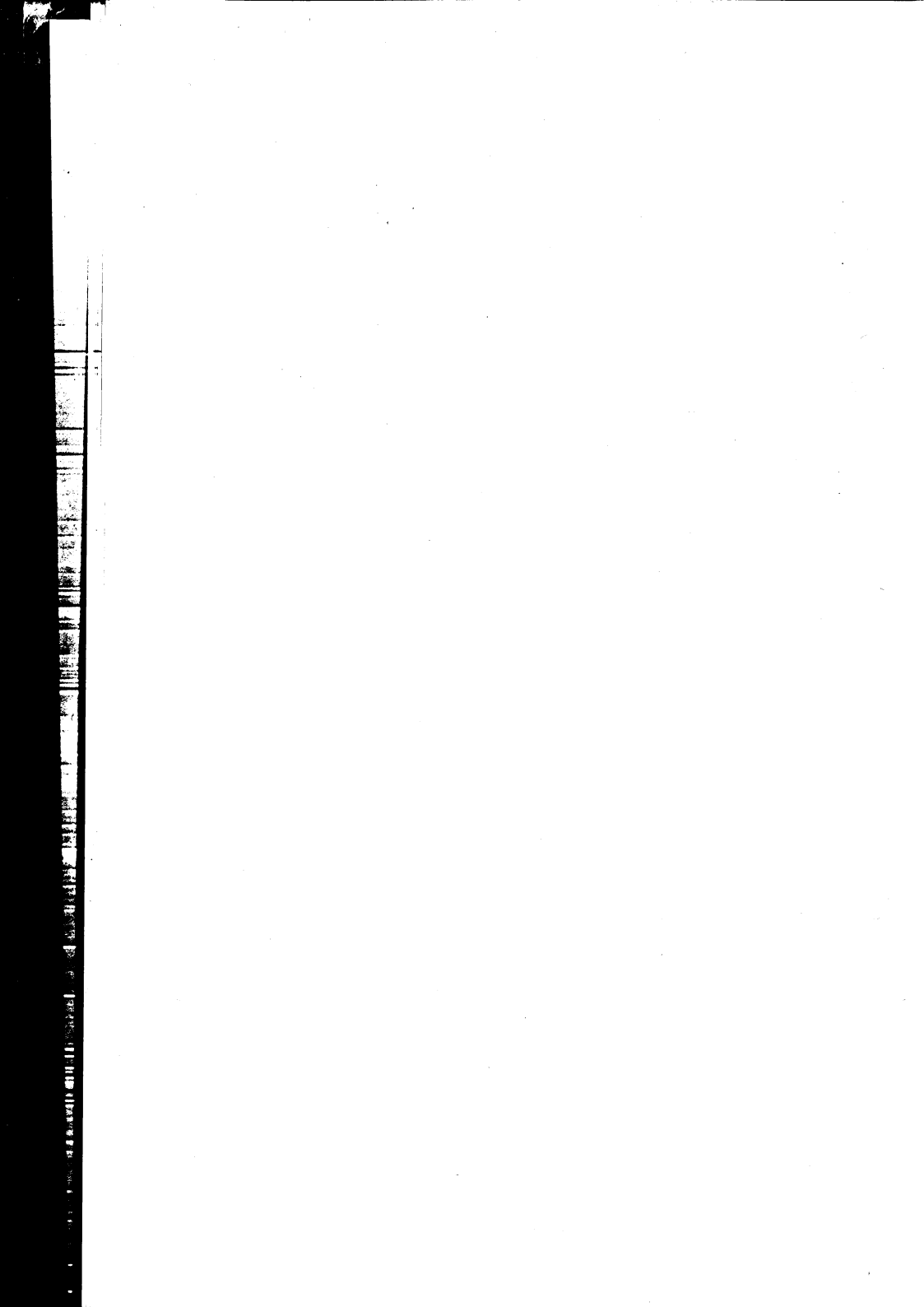
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# 1. INTRODUCTION

Sisyphus, the founder and first king of Corinth, had twice tricked the god Death, once by binding him and once by persuading him to let him return to earth. As a result, Homer tells us, he was sentenced by the gods. His punishment consisted in pushing a boulder uphill to the top of a mountain. Everytime he was about to succeed, its weight would turn the rock back, returning it to the plain, so that he had to start all over again. The tragedy of this myth is that its hero is aware of the absurdity and inevitability of his task. Nevertheless, as Camus (1975, p. 143) pointed out, Sisyphus may be a happy man, because on his way downhill he realizes that his torment results from his own desire, or choice, to live.

Although Homer does not elaborate on Sisyphus's mental processes, it appears that the former king could not exert any influence on the specific nature of his eternal task. Fortunately, historians of science (think that they) differ from Sisyphus, in the sense that they may choose their rock and the way in which they push it uphill. This chapter elucidates these choices made for the present study. In the first section the choice of the boulder is explained, and in the second the way in which it will be pushed up. Section 1.3 gives the plan of the book.

## 1.1. THE AIM OF THE STUDY

In the last two decades economics has experienced a remarkable shift in focus. Keynesian macroeconomics, at least in its Hicksian IS/LM-version, has been the ruling orthodoxy since World War II. Although it was occasionally and sometimes fiercely challenged by monetarists, it retained its dominant position until the 1970s. In that decade, however, monetarist criticism received support from two other research traditions, the Austrian School and New Classical Economics. These traditions stressed the allocative efficiency of markets. Their focus on business cycle theory led to a revival of interest in this type of theory.

The emphasis of both research traditions on the efficiency of markets has led to the idea that both share common roots. After all, both criticize Keynesianism, stress the communicative role of prices, point to the crucial role of expectations, and claim that business cycles are real phenomena, caused by monetary disturbances. This 'common-roots idea'

was enhanced by Lucas's (1977, p. 216) claim that New Classical Economics (NCE) builds on Hayek's work of the 1920s and 1930s. Several authors subscribed to this view. For instance, Kantor (1979) argued that the New Classical Rational Expectations Hypothesis (REH) is not foreign to Austrian economics. Colander and Guthrie (1980) claimed that this hypothesis made New Classics bed-fellows of the Austrians. Laidler (1982) even proposes to relabel the New Classics into Neo-Austrians. And Scheide (1986) observed that in the post-war period the term 'equilibrium' has changed, and that the New Classical concept of 'rational-expectations equilibrium' is a more explicate and narrowed-down version of Hayek's notion of 'disequilibrium'.

Butos (1986) criticized the 'common-roots claim', on the grounds that it completely neglected Hayek's work on other issues than business cycle theory. He concluded that the claim was correct though misleading. Other analyses of the differences between Austrians and New Classics soon followed. Most informative in this regard are Kim (1988), Hoover (1988), Garrison (1989), and Klausinger (1989a) and (1991). These contributions provide excellent overviews on Austrian and New Classical economics. Unfortunately, they consider both traditions in their fully-fledged forms. This neglect of their respective historical developments means that they cannot fully appreciate the problems which Austrians and New Classics faced, and can only analyze the theoretical aims of some 'representative' Austrian or New Classical theorist. The present study aims to provide such histories, in order to increase our understanding of the problem situations with which the theorists in both research traditions were confronted. The aim of the present study, i.e. the Sisyphus boulder, is thus to understand the respective Austrian and New Classical research traditions by analyzing the way in which they emerged and developed, in order to better define the differences and similarities. The analysis will be restricted to the respective explanations of business cycles, although developments in other fields are discussed as well if deemed relevant.

## 1.2. THE METHOD OF THE STUDY

Following Popper (1972, p. 164), a theory is a tentative solution to some problem. Understanding the theory means that it is known (1) what problem it was intended to solve, and (2) how satisfactory it is as a solution to that problem. The present study attempts to answer these

question by using Popper's version of the method of *Verstehen* (understanding), the so-called *method of rational reconstruction*. This method aims to reconstruct the theorist's *problem situation*, which consists of the *theoretical aims* and the *situational constraints*. According to Wong (1978, p. 11), the former "... generate the main question(s) to which the new theory is directed", and the latter form the constraints or limitations on the answers to these questions. The problem of the theorist is thus to devise a theory which satisfies the theoretical aims as well as the situational constraints. 'Understanding' a theory means to conjecture this problem situation, and to explain why the solution was considered satisfactory, or otherwise significant, to the theorist. As Popper (1972, p. 189) pointed out, the historian of science thus faces the task of reconstructing the problem situation as perceived by the agent, in such a way that the latter's actions can be regarded as being adequate to the situation. This conjectured situation must be logically sufficient to have brought about the theorist's solution (i.e. the theory). Since the theorist then acted according to the logic of the situation as he perceived it, the method of rational reconstruction is also called the method of *situational logic*.

The method of rational reconstruction does not imply that each and every theory provides a satisfactory solution to the theoretical aims for which it is designed. Instead, the theorist need not have perceived his problem situation correctly. As Popper (1972, p. 179) stated, the historian of science must therefore "... distinguish between the [problem] situation as the agent saw it, and the situation as it was (both, of course, conjectured)." The differences between the perceived and reconstructed situations may explain why a theory fails to solve the problem for which it was intended. The differences may result from (1) the theorist's misperceptions of his problem situation (particularly his situational constraints), and/or (2) the historian's misinterpretations and 'misreconstructions'. However, since the historian will consider his interpretation of the theorist's problem situation the best conjectures available, the latter possibility can be ruled out. This means that any difference between the theorist's and the reconstructed problem situation is explained as the result of the former's misperceptions. These misperceptions are most likely to concern the situational constraints, and not the theoretical aims. Wong (1978, p. 12) classified these constraints as follows:

- (1) an appraisal of the theories relevant to the pursuit of the theoretical aims;
- (2) the general theory or theoretical framework of which the theory under



- study is an integral part;
- (3) the epistemological theory of the theorist;
  - (4) the methodological theory of the theorist; and
  - (5) the metaphysical 'doctrines' of the theorist.

The present study will be mainly concerned with the first, second, and fourth classes. The epistemological theories and metaphysical doctrines, however, fall outside the realm of the present study.<sup>1</sup> Furthermore, following Wong (1978, p. 19), problems intrinsic in logics and mathematics are neglected as well, even though these disciplines form part of the theorist's problem situation.

To what kind of history does the method of rational reconstruction lead? In Popper's (1972, p. 164) view, theorists start with a problem (*P*) which they try to solve by conjecturing some theory or tentative solution (*TT*). The solution is subsequently scrutinized in order to eliminate any errors. This phase of error-elimination (*EE*) leads to a new problem (*P'*), for which another theory is conjectured, and so on. The process of scientific research can thus be formulated as follows:

$$P \rightarrow TT \rightarrow EE \rightarrow P' \rightarrow TT \rightarrow \dots$$

This representation of the process of scientific research, and the underlying method of rational reconstruction thus leads to an interpretation of the history of scientific thought as a sequence of problem situations. Or, in Popper's (1972, p. 177) words, "... the history of science should be treated *not* as a history of theories, but as a history of problem situations and their modifications ... through the intervention of attempts to solve the problems." As a corollary, the resulting history stresses the relationships between problem situations *through time*.

Popper (1963, p. 215) argued that 'science' needs to grow. In his

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<sup>1</sup> This is not to say that they do not play an important role in the development of both research traditions. The point merely is that their inclusion would overstretch the domain of this analysis. Furthermore, the metaphysical doctrines are also excluded because they cannot be unambiguously specified. Even if it would be possible to fully explicate one's ideological and ontological views (which it presumably is not), economists do not give such an explication, so that the historian of thought must derive them from their methodological practice. Since there does not exist a one-to-one correspondence between metaphysics and methodology, the former cannot be derived unambiguously from the latter. For instance, van Zijp (1991a, pp. 17 - 18) shows that 'methodological individualism' may be based on either 'ontological individualism' or 'ontological collectivism'. These doctrines are incompatible, in the sense that the latter holds that in reality collective (social) entities exist, whereas the former denies this existence. Ontological collectivism can nevertheless lead to methodological individualism on the grounds that the existence of collective entities is discernible only through the actions of individuals. This suggests that conjectures about the underlying metaphysical doctrines cannot be based on methodological practice alone.

view, "... continued growth is essential to the rational and empirical character of scientific knowledge; that if science ceases to grow it must lose that character." Obviously, the method of rational reconstruction should then allow for an appraisal whether scientific knowledge has 'progressed'. Popper (1963, p. 219) suggested that the notion of *verisimilitude* ('truthlikeness', 'nearness to truth') can be used as a criterion of progress. He defined this notion in terms of the (empirical) content of a theory, which consists of the class of non-tautological statements logically entailed by that theory (1972, p. 48). Since the growth of scientific knowledge presupposes an increase in the empirical content of theories, Popper (1972, p. 53) advised theorists to strive after 'deep' theories, which have greater content, larger classes of allowed statements, and hence are more easily falsified.<sup>2</sup> The method of rational reconstruction is to be used to appraise such progress. It should be noted, however, that the present study merely aims to understand the Austrian and New Classical research traditions, and hence does *not* constitute an attempt to appraise their progressiveness. This may lead to the criticism that it uses a method for a different purpose than for which it was originally intended. This criticism may be answered by pointing out that Austrians do not subscribe to the prescription that economics should try to provide ever 'deeper' theories. Instead, as will be shown in Chapters 4 and 11, they hold that social phenomena cannot be explained in full because of the subjectivity and dispersion of knowledge. As a result, they argue that the explanatory precision of social theories is rather limited. The alleged complexity of social phenomena thus hampers the 'deepening' of these theories, so that Popperian progress cannot be attained in the social sciences. The Austrian research tradition thus does not strive after such progressiveness. This does not mean, of course, that its progressiveness cannot be appraised, but it should be recognized that such an appraisal disregards the reasons which Austrians give for refusing to 'deepen' their theories. Since these reasons form an important part of the Austrian tradition, their elimination distorts our understanding of Austrian economics. Therefore, the present study does *not* attempt to appraise the respective research traditions. Instead, it uses the method of rational reconstruction as a method of understanding only. It yields reconstructions of both Austrian and New Classical business cycle theories, which are compared as regards their methodological features.

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<sup>2</sup> This has led followers of Lakatos to engage in a quest for novel facts.

Some final remarks are now in order. Firstly, the present study concentrates on the internal history of economics as a science, so that considerations from outside economics are mostly disregarded. This reflects the belief that scientific developments have an internal dynamic (which, again, need not constitute 'progress'). Secondly, the analysis of Austrian economics takes a rather unusual route, in the sense that it is mainly concerned with the Austrian business cycle theory, to the neglect of the socialist-calculation debate as held in the 1920s and 1930s. However, this debate enters in a disguised form when attention is paid to the Austrian view of the role of competition as a process. It will be argued that this view has some implications for understanding Austrian business cycle theory. Finally, there is a considerable difference in opinion between Austrians and New Classicals as regards the appropriate language which economics should use. New Classicals opine that mathematics is the appropriate language whereas Austrians are highly sceptical about mathematical formalization because they consider it to enlarge the danger of the mechanistic interpretation of social relationships. A comparison of these research traditions presupposes, though, that a common language exists. This means that either the Austrian theories should be translated in mathematical terms, or New Classical views should be expressed in verbal form. The present study follows the latter strategy, because the former could only be pursued by eliminating one of the central tenets of Austrian thought, namely its subjectivism and its emphasis on fundamental (Knightean) uncertainty and the complexity of economic relationships. At the same time it should be noted that in many cases mathematical, econometric or statistical terminology can be used as a short-hand for verbal descriptions. In the case of the NCE such short-hand will be used to describe the most important test procedures, and to explain Sargent's (1976b) 'observational equivalence'.

### 1.3. THE STRUCTURE OF THE STUDY

The study is organized as follows. Part I consists of five chapters, which describe the development of Austrian business cycle theory. Chapter 2 gives a short pre-history of this theory, and contains the Böhm-Bawerkian framework of the structure of production and the Wicksellian distinction between the natural and the market rate of interest. Chapter 3 discusses Mises's contribution to Austrian methodology and economics. It concen-

trates on his monetary theory and his explanation of the business cycle. Chapters 2 and 3 depict the Austrian situational constraints of the types 1 and 2 above, as faced by Hayek. Chapter 4 treats the latter's transformation of the Misesian general-equilibrium construct, which led to the incorporation of knowledge and time. In this manner the relevant equilibrium construct became an intertemporal general equilibrium. By distinguishing between individual and general equilibrium Hayek could address the so-called 'coordination problem', which forms the central problem of what will be called the Hayek Programme, as outlined at the end of Chapter 4. This outline also entails Hayek's situational constraints of type 4, his methodological constraints. Chapter 5 describes Austrian economics in the Keynesian era, during which Lachmann's work on the role of expectations constitutes its main development. This work is interpreted as an attempt to elaborate on Hayek's views. Chapter 6 contains the revival of Austrian economics, which took place in the 1970s and 1980s. This revival started with Hicks's re-opening of the debate on the Ricardo effect. Its main focus, however, was Kirzner's analysis of the role of entrepreneurship. The discussion shows that one of Hayek's methodological constraints changed over time.

Part II consists of the description of the developments in the New Classical research tradition. Chapter 7 gives some of its pre-history, in particular concentrating on the Friedman-Phelps explanation of the Phillips curve. Analogous to Chapters 2 and 3 of the Austrians, it discusses the New Classical situational constraints of type 1 and 2. Chapter 8 describes the rise of New Classical Economics (NCE), particularly its central propositions and modelling strategies. Furthermore, it identifies some defensive strategies, which New Classics use to immunize their economic model from empirical disconfirmation and refutation. Chapter 9 is concerned with an apparent anomaly of New Classical models, namely the problem how to generate persisting cyclical movements of the economic system as a result of random shocks in a general-equilibrium framework. This problem of persistence was solved by adopting the Slutsky-Frisch hypothesis. Furthermore, it includes a reconstruction of Lucas's problem situation in the shape of the 'Lucas Programme'. Chapter 10 discusses the problem shift which the NCE experienced in the mid-1970s. It increasingly became concerned with the theory of economic policy, and more in particular, with the 'neutrality proposition'. This proposition holds that anticipated monetary policy does not have real effects. The debate on this proposition contained a debate on the optimal form of monetary

policy, the so-called 'rules-versus-discretion' debate. Two approaches which tried to settle the debate on empirical grounds are distinguished. These approaches led to opposite results, one favouring the joint NR/RE hypothesis and the other discrediting it. The latter generated a problem switch from monetary to real business cycle theory, which is also discussed in Chapter 10, albeit briefly.

The descriptions of the respective developments in Austrian and New Classical business cycle theory allow for a comparison between them. This comparison is the subject of Chapter 11. It will explain the differences between the two traditions in terms of the different problems which they try to solve. The NCE is shown to abstract from those features which Austrians regard crucial. This comparison thus makes some caveats to Lucas's claim that the NCE builds on Hayek's work. Finally, Chapter 12 contains a summary, some conclusions, and an epilogue.

**PART I. AUSTRIAN BUSINESS CYCLE THEORY**



## 2. EARLY VERTICAL MALADJUSTMENT THEORY

### 2.1. INTRODUCTION

Austrian business cycle theory evolved from nineteenth- and early twentieth-century business cycle theories. Its most important predecessors were the theories of Michail Tugan-Baranowsky, Arthur Spiethoff and Gustav Cassel, which stressed the importance of the rate of interest in the individuals' savings and investment decisions, as does the Austrian theory. The latter thereby adopts Menger's and Böhm-Bawerk's views on capital as a set of heterogeneous physical goods. These goods can be classified in so-called stages of production. In fact, the theories referred to above can be characterized by the term *vertical maladjustment* theories (Haberler (1937, p. 30)), because they stress that the business cycle is characterized by maladjustments between the stages of production. Obviously, the idea of maladjustments presupposes some notion of adjustment. Such a situation of perfect adjustment can be viewed as an equilibrium situation. When referring to an equilibrium position, we must make clear how such a position is defined. In doing so we base our analysis on Wicksell's distinction between the natural and the money (or market) rate of interest.

This chapter aims at providing a short overview of the 'pre-Austrian' business cycle theories. It is organized as follows. Firstly, some pre-Austrian 'vertical adjustment' business cycle theories are discussed, namely those of Tugan-Baranowski, Spiethoff, and Cassel respectively. Section 2.5 will provide a brief introduction into Austrian capital theory. This introduction will be confined to the Mengerian structure of production. Finally, Wicksell's distinction between the natural and the market rate of interest is addressed.

### 2.2. TUGAN-BARANOWSKI

One of the earliest 'vertical-maladjustment business cycle' theorists was Michail Tugan-Baranowski, a Russian economist who lived during the turn of the century. Tugan-Baranowski did not resort to any exogenous



influences, like Jevons or Moore.<sup>1</sup> Instead, he referred to investment and savings behaviour. He argued that there are two types of capital, free (loanable) capital and fixed capital (e.g., machinery). These types fluctuate differently over time. Free capital, which may be interpreted as savings, is accumulated continuously, so that its accumulation not only takes place during booms but also during depressions. This latter result is brought about by Tugan-Baranowski's assumption that in the latter periods real incomes of 'the salaried and creditor classes' will increase for quite some time. Hence the amount of free capital grows during all phases of the cycle. By contrast, fixed capital ('machinery') will only be increased during the boom. The transformation of free capital into fixed capital therefore takes place by 'spurts'. When it is not yet transformed, it forms latent purchasing power. As soon as some use for these accumulated funds is found (e.g., a new market is opened up), the latent purchasing power becomes effective.<sup>2</sup> Demand for capital goods is then increased, prices of these goods rise, and after some time output of the capital goods industries will begin to rise. When the new equipment is finished and all free capital is transformed into fixed capital, the capital goods industries are confronted with a fall in demand, leading (among other things) to a decrease in the quantity of raw materials demanded by these industries. It then turns out that they have been overexpanded as compared to the consumer goods industries. That is, vertical disproportionalities emerge. The capital goods industries are then confronted with excess productive capacity. Tugan-Baranowski argued that entrepreneurs will nevertheless produce at full capacity, because inactive capital 'cannot pay interest'. Entrepreneurs in the capital goods industries will therefore produce at more or less full capacity, meanwhile gradually reducing excess capacity. General overproduction follows, leading to falling prices of machinery. This deflationary process will continue as long as overproduction occurs. It will only come to a halt when entrepreneurs have eliminated their

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<sup>1</sup> Jevons's business cycle theory considered the effect of sunspot on harvest cycles, which in turn were supposed to cause industrial fluctuations. Moore explained these fluctuations by raincycles, which in turn were seen to depend on the movements of the planet Venus. For an overview of both cycle theories, see Morgan (1990, pp. 18 - 39).

<sup>2</sup> Tugan-Baranowski used the effect of steam in a steam engine as a metaphor of the effects here described. When the pressure of the steam (accumulated free capital) reaches a certain force, the piston (industry) is forced into motion (is forced to invest in fixed capital) and is pushed to the end of the cylinder (is bound to expand productive capacity as far as possible). The steam (free capital) escapes, and the piston (industry) returns to its former position.

excess capacity. However, during the depression fixed capital is transformed into free capital because, as was already stated, people continue to save, that is, to accumulate free capital. As soon as the latent purchasing power is invested, a new boom starts.

### 2.3. SPIETHOFF

Arthur Spiethoff was strongly influenced by Tugan-Baranowski. His analysis also allows for general overproduction. However, he did not adopt Tugan-Baranowski's explanation of the cyclical pattern in terms of investment and savings behaviour. In the 1903 edition of the *Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft* (p. 696) he wondered what the *volume* of savings had to do with the *cyclical* accumulation of capital. That is, why are huge masses of free capital first piled up without being invested? Tugan-Baranowski's analysis could not provide answers for these questions. Spiethoff therefore turned to a different explanation of cyclical fluctuations, and identified two causes. Firstly, the boom is brought about by innovations, or the discovery of overseas markets, either of which could raise profitability in some particular sector, thus starting the upswing. However, this cause explains by no means the *recurrence* of industrial fluctuations. This led Spiethoff to resort to a second explanation, which explains the crisis in terms of limited opportunities for investment. During the boom, output of consumer goods will lag behind investment, so the prices of these goods stay high, keeping profits high. At some point in time, though, the newly produced investment goods will be installed and will be starting to produce consumer goods. Production of these goods will rise, thereby lowering their price. This affects profits in the consumer goods industries. Investment opportunities now become limited. Entrepreneurs in these industries will then curtail their investments, and the crisis spreads to the producer goods industries. It turns out that the wrong goods have been produced. Too much of investment goods have been produced and the resulting excess capacity must be eliminated. This process of elimination takes place during the depression. Pessimism and reluctance to invest arise, hampering the recovery, although the severity of these phenomena will depend on the abruptness with which the boom ended. During the depression monetary funds are accumulated again, since the savings behaviour as presupposed by Spiethoff is similar to that in Tugan-Baranowski's theory. Eventually the revival will emerge through

an increased profitability of hitherto unprofitable investment projects, caused by a lowering of the cost of capital construction (due to the reduction in wages, the fall in the price of raw materials, the reduction of interest charges, the adoption of improved methods of production, etc.; cf. Haberler (1937, pp. 80 - 81)). Entrepreneurs will undertake these new investments, thereby drawing on the monetary funds, which people have accumulated during the depression phase. The cycle then repeats itself.

#### 2.4. CASSEL

Cassel (1918 (1923)) built on Spiethoff's over-investment theory. He argued that at the beginning of the boom profits will be high relative to wages. Banks will then be inclined to lend at too low a market rate of interest, because there is a large supply of loanable funds. High profits and low market rates of interest will stimulate investment. Free (monetary) capital is transformed into fixed (real) capital. As the boom proceeds, more production is devoted to capital formation. However, the propensity to save does not rise, so that eventually and inevitably a shortage of free capital arises, raising market interest rates. Additionally, labour becomes more scarce, which pushes up the wage rate. Both effects will lower the demand for investment goods. In the subsequent depression these effects are reversed, which means that eventually investment in fixed capital will become profitable again.

According to Backhouse (1987, p. 184), Cassel identified several lags which prevented the economy from being in equilibrium continuously. Particularly, these lags concerned "... the response of investment to changes in interest rates; the reaction of interest rates to changes in investment; and the time taken between the start of an investment project and its completion." As in Spiethoff's theory, fluctuations in the production of capital goods spread over the economy, causing other industries to experience such fluctuations as well. Where Cassel differed from Spiethoff was in seeing a greater role for monetary factors. Spiethoff had argued that the shortage of capital at the crisis was a shortage of real capital goods. Cassel attributed the crisis to a shortage of *monetary* savings, thus linking the concepts of capital and money. It is in this regard that his theory is similar to the Austrian malinvestment theory. Ludwig von Mises placed even more emphasis on the role of monetary factors. He linked his monetary theory, including its nonneutrality of money, with Menger's

structure of production and Wicksell's analysis of interest rates.<sup>3</sup> Before addressing Mises's theory, we must first discuss these latter two elements.

## 2.5. THE STRUCTURE OF PRODUCTION<sup>4</sup>

The early business cycle theories under consideration distinguished between 'free' ('loanable') and 'fixed' capital, or between 'monetary' and 'real' capital. This latter type of capital consists of heterogeneous, physical investment goods. Menger (1871 (1968), pp. 8 - 10) tried to bring some sort of order into this heterogeneous set by classifying the goods according to the functions they perform in the process of production, using their remoteness from consumption as a criterion. In Menger's terminology, consumer goods are 'goods of the first order'. Capital goods which are used in the production of these first-order goods are called second-order goods; capital goods which produce second-order goods are called third-order goods, and so forth. It is then possible to distinguish stages of production which can be categorized in a manner similar to that of capital goods, and which use capital goods of the same order. Taken together, these stages form a vertical *structure of production*, or *capital structure*, which can be seen as the reflection of all past investment decisions.

Böhm-Bawerk (1889 (1921)) reformulated Menger's capital theory by adopting three concepts, namely the *absolute* and *average period of production* and the *average waiting time*.<sup>5</sup> The *absolute period of production* (*Produktionsperiode*) is defined as the time interval elapsing between the first application of primary factors and the emergence of the final (con-

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<sup>3</sup> Lachmann (1943) even called the Austrian business cycle theory the 'Austro-Wicksellian theory'.

<sup>4</sup> The purpose of this section is *not* to give a complete account of controversies in Austrian capital theory. It is merely intended to give the reader an idea of the heterogeneous and subjectivistic nature of the Austrian notion of 'capital'. For a more detailed analysis of Austrian capital theory, see e.g. Garrison (1981) and (1985), Endres (1987), and Zuidema (1989).

<sup>5</sup> It should be noted that Böhm-Bawerk (1889 (1921), pp. 39 - 43) distinguished between three types of capital: (1) the subsistence-fund ('Subsistenzfonds'), which contains all goods in the economy under consideration (except its landownership); (2) social capital ('Produktivkapital' or better 'Sozialkapital'), which consists of all goods which are used for production purposes; and (3) private capital ('Privatkapital' or 'Erwerbkapital'), which renders its owners some rent. In our analysis, the differences and similarities in these notions will be disregarded.

sumer) product (p. 117). This concept is important insofar as it enables the determination of the *average period of production* (*durchschnittliche Produktionsperiode*). The latter is defined as the time which *on average* elapses between the first application of primary factors and the final emergence of consumer goods. This average period equals the absolute period only if the inputs uniformly ('gleichmäßig') enter the production process. That is, the absolute and the average period of production are identical only if all periods of production are identical. Böhm-Bawerk's third concept is the *average waiting time* (*durchschnittliche Wartezeit*). It expresses the average time that elapses between the moment at which a specific factor input is applied in production, and the moment at which the output becomes available for consumption.<sup>6</sup> The average waiting time is half the average period of production.<sup>7</sup> Böhm-Bawerk argued that both average periods could be used as a measure for the 'degree of capitalism', that is, for the 'roundaboutness' of production. By contrast, Menger did not consider Böhm-Bawerk's introduction of these concepts an improvement.<sup>8</sup> In the Mengerian-subjectivist view, the structure of production should reflect the use which is made of the heterogeneous capital goods. By contrast, the concepts 'average period of production' and 'average waiting time' are intended to give a one-dimensional measure for this structure. Their use implies that such a measure is at all possible. In turn, this means that the heterogeneous capital goods can be aggregated into an unambiguous, homogeneous concept 'capital'.<sup>9</sup> According to Streissler and Weber (1974, p. 231), Menger (1888) forestalled Böhm-Bawerk's publication by emphasizing the heterogeneity of capital goods. Böhm-Bawerk's student Mises and Wieser's pupil Hayek shared his criticisms, and

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<sup>6</sup> Blaug (1962 (1990), p. 508) formulated Böhm-Bawerk's (1889 (1921), p. 118) discussion of the concept of 'average period of production' in mathematical form as  $\Theta = (K/I)$ , where  $K$  stands for the amount of real capital,  $I$  for the rate of investment, and  $\Theta$  for the average period of production.

<sup>7</sup> This can be made clear as follows. Suppose that factor inputs uniformly enter the production process, and that the absolute (and hence the average) period of production takes one year which is divided into weeks. The (absolute) waiting time of the first input employed is 52, that of the second 51, that of the third 50 weeks, and so on. The waiting time of the last input is only 1 week. This means that the average waiting time of the production process is 26 weeks, that is, half the average period of production.

<sup>8</sup> According to Schumpeter (1954 (1986), p. 847n8), Menger called Böhm-Bawerk's capital theory 'one of the greatest errors ever committed'. Presumably, this harsh rejection to a large extent reflects Menger's disappointment with his student's theory.

<sup>9</sup> Cf. also Hayek (1941, pp. 5 - 6).

returned to his more subjectivistic view on capital.<sup>10</sup>

If the structure of production is in equilibrium, then it corresponds to the decisions made by the economic agents as regards consumption and saving. That is, the individuals' decisions as regards time-preferences are expressed in the rate of interest, which governs the profitability of investment projects. In this sense, the rate of interest brings about intertemporal coordination. However, such intertemporal coordination does not always need to take place. We shall return to this issue later. For now it suffices to hint at a difference between pre-Austrian and Austrian vertical maladjustment theories. In general, vertical maladjustment theories claim that the phenomena constituting the business cycle are caused by a lack of intertemporal coordination. There is then a lack in correspondence between the structure of production (investment) and the decisions made by the economic agents as regards consumption and saving. The pre-Austrian theories did not distinguish between different stages of production. This means that in their view either the economic agents save too little, or they save too much. Business cycles are thus caused by either overinvestment or underconsumption. By contrast, Menger's less aggregated structure of production also allowed for investments in 'wrong' (*ex-post* non-optimal) directions. Such *malinvestments* constitute vertical maladjustments in the structure of production because they imply that the industries or stages of production are disproportionately related to each other in vertical order.<sup>11</sup>

The capital goods used in a particular stage are assumed to be highly (though not completely) specific. Capital goods can only be transferred from one production process to another with great difficulty. The same applies to the transfer of these goods from one stage of production

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<sup>10</sup> According to Faber (1986b) and Zuidema (1989), there are two groups of (German) economists which may also be labelled 'Austrian'. The first group includes economists such as Von Weizsäcker and Orosel. They reformulated the 'period of production' to summarize the structure of production. In this sense they build on the work of Böhm-Bawerk. The second group includes the followers of Stackelberg and Bernholz, who concentrate on the relationship between the length of the period of production ('roundaboutness') and the time structure of different technologies. The present analysis concentrates on the subjectivistic (Austro-American) followers of both Mises and Hayek. Both groups mentioned above are not discussed, because their relation to Menger and Böhm-Bawerk appears too indirect to be meaningful. For an analysis of their respective viewpoints, see Faber (1986b) and Pellengahr (1986).

<sup>11</sup> By contrast, horizontal maladjustment theories claim that the cycle arises because of horizontal disproportionalities, that is, disproportions between stages of production of the same 'rank' (as measured from consumption).

to another. Once capital goods have been produced, bought and installed the investment is often irreversible. This irreversibility has as a consequence that during a business cycle the adjustment of the capital structure to its equilibrium position is hampered. It is one of the factors which make the business cycle a phenomenon with undesired consequences.

Two important criticisms may be advanced against the structure of production. The first criticism concerns what may be called the *problem of classification*. It holds that it is not possible to determine unambiguously the order of a particular good if it is used for different purposes. This may be clarified by an example. Consider a particular car which is simultaneously used as a producer good (e.g. to deliver consumer goods) and as a consumer good. The question then arises whether the goods which are used in the production of the car are goods of the second or the third order. The second criticism raises a more severe problem and may be considered a generalisation of the problem of classification. The *problem of circularity* holds that the concept of stages of production is meaningless because production takes place in a circular manner.<sup>12</sup> That is, it claims that there is no unambiguous 'verticality' which characterizes production in advanced industrial economic systems.<sup>13</sup> Skousen (1990, p. 155) acknowledged that in such systems it is difficult to classify all goods unambiguously, but he maintained that this does not mean that the concept of structure of production becomes meaningless. After all, many capital goods are highly specific, which means that they cannot be transferred from one project to another without incurring costs. Furthermore, the use of the concept makes clear that the heterogeneous capital goods are mutually dependent, that is, that there are chains of production which can be lengthened or shortened. The 'price' which is presumed to determine the lengths of the structure of production is the Wicksellian 'natural rate of interest'.

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<sup>12</sup> Economists who rejected the verticality of the structure of production on this ground are Marshall, Knight, Stigler, Sraffa, and Shackle. For a more detailed analysis of the problem, see Skousen (1990, pp. 151 - 57).

<sup>13</sup> As Shackle (1981, p. 239) observed, "[p]roduction in an advanced industrial society needs for its description a Leontief table of input coefficients, where, in principle ... every operation or every industry or sector is deemed actually or potentially to contribute means of some kind to every other, both directly and indirectly. Such sectors as transportation, the telephone system and the electric power industry plainly have a hand to some degree in everything that is done by anybody anywhere."

## 2.6. WICKSELL

Knut Wicksell (1898) distinguished between two different notions of interest rates, namely the natural and the market (or money) rate of interest.<sup>14</sup> He defined the former as the rate which would arise if real capital goods would be exchanged directly, without the use of money. This rate can be seen as the long-run equilibrium rate of interest, which is determined by the agents' valuation of present to future goods, that is, by their time-preferences.<sup>15</sup> It expresses the rate at which individuals are prepared to exchange present-period consumption for consumption in future periods. This means that it brings about equilibrium between the supply of savings and the demand for investment funds. In such an equilibrium the natural rate will (roughly) equal the expected yield on newly created capital. Apart from the natural rate there also exists a rate of interest which is determined on the loan market. This 'market' (or money) rate of interest is the rate at which the supply of loanable funds equals the demand for loans. It is the price to be paid for loans.

The natural rate of interest reflects individuals' time-preferences, so we may expect that this rate governs the individuals' decisions concerning present and future consumption, and therefore their actions on the loan market. In general equilibrium the natural rate of interest must designate the real rate at a level at which the supply of savings and the demand for investment funds are equilibrated, and the money rate at a level at which the general price level remains constant. This will only be the case in a stationary economy.<sup>16</sup> Wicksell thus adopted a stationary

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<sup>14</sup> As Haberler (1937, p. 36, note 1) observed, "[t]he concept of a 'natural rate' (and even the term) can be found in earlier English economic writings." For instance, see Adam Smith (1776, I.vii, p. 65) and Henry Thornton (1802, pp. 253 - 55). Wicksell's student Carl Uhr (1960, p. 200) opined that Wicksell was not directly exposed to Thornton's ideas, and that instead the influence was merely indirect, through Ricardo.

<sup>15</sup> Wicksell (1898, p. 93, italics in original) stated that "[j]ene Rate des Darlehenszinsens, bei welcher dieser sich gegenüber den Güterpreisen durchaus neutral verhält und sie weder zu erhöhen noch zu erniedrigen die Tendenz hat, kann nun keine andere sein als eben diejenige, welche durch Angebot und Nachfrage festgestellt werden würde, falls man sich überhaupt keiner Geldtransaktionen bediente, sondern die Realkapitalien in natura dargeliehen würden - oder was etwa auf dasselbe hinauskommt, als der jeweilige Stand des natürlichen Kapitalzinsens."

<sup>16</sup> Cf. Garrison (1981, p. 62). According to Hayek (1933a (1975), p. 115n), David Davidson was the first to draw attention to this fact. Cf. also Uhr (1960, p. 279ff.) and Leijonhufvud (1968, p. 222).